PDM Selection GUIDE

From needs to selection; a business solution

Guide for the selection of Product Data Management Systems

Maarten Cornelissen
Arjan de Kok
Dick Mandemaker

Delft University Press
NGI CAD/CAM & Computer Graphics

WJC 195
PDM SELECTION GUIDE

FROM NEEDS TO SELECTION; A BUSINESS SOLUTION

GUIDE FOR THE SELECTION OF PRODUCT DATA MANAGEMENT SYSTEMS
PDM Selection Guide

From needs to selection; a business solution

Guide for the selection of Product Data Management systems

Maarten Cornelissen
Arjan de Kok
Dick Mandemaker

Delft University Press

NGI, Dutch Computer Society
Section CAD/CAM & Computer Graphics
Acknowledgement

This book is the result of the effort of the PDM workgroup of the CAD/CAM & Computer Graphics section of the Dutch Computer Society. It has been a follow-up investigation on an earlier study, performed by another PDM workgroup. In this earlier workgroup the PDM selection method has been developed and presented in 1993, among other things in the form of a publication in Dutch. This publication contained a description of 25 PDM systems. The success of this publication was such, that it was decided to do a follow-up.

This time 28 PDM systems have been investigated and a new version of the selection method has been developed. Also a Business Process Management assessment model (BPM model) has been developed and included in this publication.

Most of the work has been performed at the TNO CAD Centre. Especially Bart Behage and Ben Brouwer have put a lot of effort in the PDM system investigation. Arjan de Kok is the main author of this book, and with Bart Behage he also developed the computer program enclosed.

M.I.S. Organisatie-ingenieurs (business engineers) has been a faithful sponsor of the investigation again. They not only made it possible that Ben Brouwer, as a student from the Hogeschool Informatica at the Hague, could do his work at the TNO CAD Centre, but they also contributed to this book; Dick Mandemaker is the prime author of chapter 2, with useful comments of Rob de Graaf (TU Eindhoven).

The authors appreciate the contributions to this publication of all other members of the NGI workgroup.

Also we would like to thank the American consultancy firm CIMdata, Inc. for their comments and their agreement with the title of this publication. We position this publication as an added value to the CIMdata PDM Buyer’s Guide.

We hope that this publication will aid in the use and understanding of integrated Product Data Management in the daily practice.

May 1995,
Maarten Cornelissen, chairman CAD/CAM section.
# Table of contents

Acknowledgement ........................................................................... v

1 Introduction ................................................................................. 1-1

2 The Business Control Challenge ................................................. 2-1/2-10
   2.1 The business process management challenge ...................... 2-1
   2.2 Assessing organisational readiness and effectiveness ........... 2-3
   2.3 Business Process Management assessment model ................. 2-4
   2.4 Priority assessment based on Industry Issues ....................... 2-7
   2.5 Enterprise Business Process Management Maturity Level .......... 2-8
   2.6 Concluding remarks .......................................................... 2-9

3 Product Data Management .......................................................... 3-1/3-12
   3.1 Definition & positioning ...................................................... 3-1
   3.2 Principle of PDM system ..................................................... 3-1
   3.3 PDM function list .............................................................. 3-3
   3.4 PDM function description ................................................... 3-4

4 The PDM selection process ......................................................... 4-1/4-7
   4.1 The Selection method ......................................................... 4-1
   4.2 PDM Business Questionnaire ............................................. 4-4
   4.3 PDM System Questionnaire ................................................ 4-7

5 PDM systems ................................................................................. 5-1/5-14
   5.1 Overview PDM systems & suppliers ................................... 5-1
   5.2 Evaluation market review .................................................. 5-4

6 Conclusions & recommendations ............................................... 6-1

Appendices ....................................................................................... A-1/G-3

Appendix A Abbreviations ............................................................. A-1/A-2
Appendix B Literature ................................................................... B-1/B-2
Appendix C PDM Business Questionnaire .................................... C-1/C-19
Appendix D PDM System Questionnaire ...................................... D-1/D-38
Appendix E Description PDM systems ......................................... E-1/E-62
Appendix F PDM function support ................................................ F-1/F-29
Appendix G PDM Selection tool ................................................... G-1/G-3

Table of contents
List of figures and tables

Figure 2.1 From Vision to Business Process Management ........................................ 2-1
Figure 2.2 PDM basic architecture and information types ....................................... 2-3
Figure 2.3 CE implementation strategy ................................................................. 2-4
Figure 2.4 Strategic business objectives and enterprise drivers .............................. 2-6
Figure 2.5 The 12 Business Focal Areas (BFA's) .................................................. 2-6
Figure 2.6 Effectivity of Business Focal Areas ..................................................... 2-7
Figure 2.7 Readiness / Effectivity Assessment ...................................................... 2-7
Figure 2.8 Priority assessment for PDM ................................................................. 2-8
Figure 2.9 Maturity Levels ...................................................................................... 2-9
Figure 3.1 Concept of PDM system ......................................................................... 3-1
Figure 3.2 Principle of PDM system ......................................................................... 3-2
Table 3.3 Overlap PDM and CAD .......................................................................... 3-9
Table 3.4 Overlap PDM and MRP .......................................................................... 3-10
Figure 4.1 Principle of selection model .................................................................... 4-1
Figure 4.2 From business criteria to selection ......................................................... 4-1
Figure 4.3 Selection model (2) ............................................................................... 4-2
Figure 4.4 Detailed schema of selection model ....................................................... 4-3
Figure 5.1 No. of PDM systems in price ranges ..................................................... 5-4
Table 5.2 PDM-CAD integration ........................................................................... 5-9
Table 5.3 PDM-MRP integration ........................................................................... 5-10
1 Introduction

An organisation will not stay in business for long if it does not have the capability to add value to its customers. This value-adding capability is continuously under pressure by the surrounding dynamic market. To cope with this ever present pressure two countermeasures are possible; innovation and internal cost reduction.

This requires a creative approach; doing things in another way and doing other things. Both directed internal and external. To do so, more and better information is required. This results in an increasing dependence on the capability of acquiring and manipulating information. The future company is based on knowledge and needs to use this knowledge to control organisation and business processes.

The ability to monitor and control business processes appears to be a critical success factor for successful business operation. All techniques which can assist are more than welcome. Especially the correct use of new techniques can give that competitive edge which is necessary to make business operation successful. Product Data Management (PDM) is such an enabling technology.

But how to apply PDM and how to find the right supporting software? A workgroup of the Dutch Computer Society has developed a method for the selection of a PDM system. A Business Process Management assessment and maturity model (BPM model) has been defined that supports the investigation of a specific business situation. Based on the resultant need for PDM support a short-list can be generated of those systems which fit best to the given situation.

PDM systems of different background and functionality have been investigated. Some of the software is directed specifically to an engineering environment. However, most systems can be applied in non-engineering environments, like for example in an office or banking environment.

The selection method is rather intensive as far as the calculation aspects are concerned. Therefore, a computer program has been developed to support the use of the method. This program is available on a diskette which is included in this book.

Furthermore this book contains a description of the place of the selection method in a business improvement trajectory, an extensive description of the method itself and an elaborate presentation of the PDM systems which have been examined.

The book has been written for:

- those who are entrusted, from their function, with the responsibility of product data or information management within a company. The book is meant as a guide for system selection;
- those who want to acquire a practical insight into the 'ins' and 'outs' of Product Data Management and related software.

PDM, and the supporting selection method, can provide a very useful contribution to those companies which realize that PDM contributes to an improvement of their market position and competitive strength.
The Business Control Challenge

This chapter identifies as the major challenge for companies, the improvement of business control. An important technology to enable this is Product Data Management (PDM). But the first thing to do is assessment of a company's readiness to implement PDM. The steps to follow are outlined, and each step is described in more detail. But it still is intended as an overview, not the methodology as such.

2.1 The business process management challenge

Many companies today are improving the way they are doing business and are rethinking, redesigning and reorganising themselves. Important business issues to competitive advantage are product quality, client satisfaction, cost, partnerships and lead-time or time-to-market.

Integrated Product Development (IPD) is a concept or strategic vision which incorporates effective (product) data management, smooth communication within a company and with its partners and suppliers, multidisciplinary product teams and a flatter, process oriented, organisational structure. Concurrent Engineering (CE) is a systematic approach to IPD that emphasizes responsiveness to client expectations and embodies team values of cooperation, trust and sharing in such manner that decision making proceeds with large intervals of parallel working by all lifecycle disciplines involved [CERC93]. The key business challenge is to deploy the strategic vision into a set of coherent plans and actions to meet customer needs. A company has to develop the vision, plan the strategy in detail, and use the enterprise’s control systems to implement the strategy, thus enabling an effective design, build, use and demolition of the product.

Several major issues are there to address:

Isolated business control systems based solely on people and paper are no longer adequate.

Formerly, the link between strategy and implementation, the business control layer, relied on paper procedures and people to gather information to control and monitor progress of the strategy deployment. What information is fed back to top management through this control hierarchy depends on the way things are perceived through the veil of company and departmental cultures. The rising complexity of both the products and the organisational structure (multi-offices, multi-disciplines) causes this way of control to be no longer adequate.
The quality of enterprise communication determines speed of business response.

Company culture determines the way things get done by telling the individual, by means of rituals, symbols, myths and stories, what is acceptable and what is important. A well-managed company culture can build a virtuous circle of ever improving performance. Alternatively, a negative culture leads to a vicious circle of behaviour and mis-communications slowing down responsiveness and resulting in the eventual demise of the business. Many strategic and business improvement initiatives are concerned with ensuring that quality behaviour prevails.

Enterprise-wide improvements require an integrated team approach.

To effect enterprise-wide improvements to the business control layer, a concerted team effort is needed to change both culture and processes. This may involve:

- Organisational and cultural changes for both managers and their teams.
- People acquiring new skills and new approaches to business and working relationships.
- Business process reengineering or renewal.
- Information systems & technology deployment to support new strategies and approaches.

All of these factors (and others, e.g. the 7-S model of McKinsey) significantly affect the ways an enterprise can gain competitive advantage: by developing new products rapidly, expanding into new markets, pursuing quality improvement, working in partnerships or reducing cost. Timely strategy deployment depends on enterprise teams responding on demand and in concert.

It has become evident that rapid strategic response capability is determined by the flexibility of systems used to manage and deliver information to the enterprise’s decision makers, particularly to those working in the business control layer. With flat management structures that means nearly everybody. Much management time and effort is focused on improving effectivity and efficiency by reengineering the key processes in the business control layer, in order to provide enterprise-wide information management systems.

Effective business control requirements

To ensure success of reengineered business processes, effective use must be made of information technology to automate and integrate those processes concerned with control and monitoring the enterprise’s activities. The advantage of computer systems is they can ensure consistent data quality and, by making data easily accessible, speed up the organisation’s reaction and response times. This leads to a reduction in the cost of doing business, because slack and waste are removed.

The key requirements for effective business control are:

- Consistent enterprise-wide process management.
- Accessable, reliable technical information about products.
- A responsive communication system to support individual team members.

Consistent process management is required for effective enterprise teamwork.

Process management must be coherent across the enterprise and consistent with professional standards within each discipline. Each process step needs to be designed in order to contribute in a customer oriented process chain. Any automated system must control and monitor each process step ensuring that information is available to start the next steps as soon as possible. At the same time it should be flexible, allowing for individual creativity and continuous process refinement.

Reliable technical information about products for tuning and scheduling.

Technical or product data is the back bone for all communication throughout the product life cycle. Tuning and scheduling of activities is dependent on the quality and availability of technical data. Confidence about the quality of product technical data improves professional relationships and reduces the need to check information before use.
A responsive communication system to support the individual team members.

According to where team members work in the product life cycle, their technical information needs and the emphasis on timing issues vary. The control characteristics of the design phase are dominated by the need for technical information management and data status and change management issues. In the manufacturing or construction phase the quality of technical data is assumed, therefore there is more focus on scheduling and timing issues. In the operate and service phase things are about evenly balanced as there is equal concern for the timing and technical information needed to operate or maintain the product or installation efficiently and safely. Business control systems design and emphasis will, of course, vary by industry, company, product type and product complexity and its market.

From an organisational point of view the first thing to do is to concentrate the Business Control function logically at one place. Of course, in reality this function will be distributed over more persons, places and even departments. Next, to execute control in a proper way the "ins" and "outs" must be known, and the way of how input is transformed to output. Thus the organisation must know what they are doing, why they are doing it, and how they do it. Product and process definitions must be clearly defined. Furthermore, it must be known how a certain process is controlled, i.e. the rules, settings, constraints, etcetera. Often these rules are based on experience and statistics. Therefore it is important that history of process execution is kept. Adding it all up, business control can only be executed in a proper way by controlling data flows to and from functions or processes. Figure 2.2 depicts the basic architecture of an automated system to support business control.

![Business Control Diagram](image)

Figure 2.2 PDM basic architecture and information types.

We call this kind of systems Product Data Management systems or PDM systems for short. In this publication when an automated system is indicated it will always be a PDM system.

2.2 Assessing organisational readiness and effectivity

The barriers to effective business control are cultural, organisational, and technological in nature. A successful implementation of better control requires that these barriers are identified up-front. The successful adoption of new control, workmethods and tools, with approaches like Concurrent Engineering (CE), require a phased transformation that inculcates the fundamental principles and practices of CE as well as an enduring commitment to improving all aspects of the organisation and its processes. Once a supportive culture and politics for CE are in place, improvements may be sought from technologies that enhance the capabilities of product developers to work cooperatively and to achieve the early resolution of life-cycle issues.
Assessing an organisation's readiness and maturity (the term effectivity is used here in an attempt to measure goal and current execution of business functions) to adopt CE is one of the key preliminary steps in CE implementation. Product and product development process characterisation, by process analysis, coupled with readiness and effectivity assessments provide a quantitative basis for recommending CE implementation strategies. Therefore, an accepted CE assessment procedure would help organisations in adopting CE practices and the supporting collaborative technologies, of which Product Data Management or PDM plays a very important role.

Several organisational CE transformation strategies have been developed. The strategy adopted by CERC comprises four stages: awareness, readiness, deployment and improvement, see figure 2.3.

![Figure 2.3 CE implementation strategy (CERC)](image)

The CERC approach is based on a maturity classification scheme for organisations that was presented by the CALS/CE Task Group's report [CALS91]. The classification is similar to the one presented by the Mentor Graphics Corporation [CART91]. The attributes of CE are classified into four major categories: organisation, requirements, communication and development methodology. The methodology of the CALS/CE Task Group is complex and does not clearly distinguish between organisational and technical factors. Additionally, the method seems to be based mostly on knowledge of the electronics industry. The model by Mentor Graphics helps determine, via a questionnaire, a company's current product development environment in relation to the four categories of CE.

Another assessment approach is the multi-aspect (spider-web) of the Stuurgroep Nederlandse Kwaliteit [HARD93], or the model of the International TechneGroup Incorporated (ITI). The ITI model uses two variables: process definition (Y-axis) and process implementation (X-axis), the product of both is a measure for effectivity.

### 2.3 Business Process Management assessment model

The Business Process Management assessment model (BPM model) for diagnosis of business functions has been developed in the NGI workgroup. The workgroup has based it on the CE strategy of CERC [CERC93], combining this with the effectivity measurement model and social-technical approach of Delhoofen [DELH93], and the 2-axis measurement method of ITI. This BPM model focuses on the application of PDM in the product development process, because PDM is seen as an important (even the most) enabling technology. The BPM model is not focussed on a specific product or any class of products, e.g. mechanical, electro technical or petrochemical and process.
The objectives of the BPM model

The BPM model is intended to assess both Readiness and Effectivity of Enterprises in order to improve business process control and product data management, which are both main aspects of Concurrent Engineering (CE). The model should give a clear understanding of the current state of product development in an organisation - the culture, management practices, product structure, processes, information flows and technological infrastructure. Also, a set of business issues have been defined in order to assess the priorities of improvements.

More over it should be possible to establish the required PDM functions in order to evaluate the PDM systems available on the market, in a similar manner to the currently developed PDM Business Questionnaire (see chapter 4.2).

The current state of the BPM model is not such that it can be applied without support from the developers. The model is still being worked on. It gives a good overview of assessment, maturity and effectivity, and as such adds value. Reactions and contributions to the BPM model are welcome.

The BPM model has been developed, based on the premises that the effectivity of a design or development process is maximal if a social-technical approach is taken, aimed at both process focus and creativeness focus. The vision is that the mentioned processes is only effective when all available creativity is mobilised to achieve maximum results. Lean development means working in empowered teams. Concurrent or simultaneous engineering not only means combining planning schedules, but most of all working together. The motto is "create alternatives, but strive for consensus".

To establish the strategic business requirements for PDM, a business priority assessment matrix has been composed as well. In this matrix the business priorities are derived from the strategic business issues. The company will look at the internal organisational and external environmental factors that influence its competitive position. Based on a selected number of industry issues the company will indicate how they experience these issues as their own business issues. This will result in an overview of weaknesses and strengths of the organisation as well as a number of problems occurring in the current management and engineering processes. Looking at the external environment a number of threats and opportunities can be identified, caused by the external market. Porter has identified five market forces in this area: competition, customers, suppliers, new entrants and substitutes.

This is shown in figure 2.4 on the next page. The strategic business priorities initiate change and drive solutions in order to reach the improved situation. The need for change usually leads to a need for organisational change and a need for new information technology to support the improved business processes. PDM technology acts as an enabling technology for business process improvements.

The BPM model addresses four aspects, both to assess the current situation in an organisation (readiness and effectivity) and the required situation (priorities in business issues):

A. **Product**: both product structure itself (e.g. modularity) and product data are viewed;

B. **Business process**: the model addresses all business processes that are directly involved in the product creation process, therefore financial and human resource management are excluded;

C. **Organisation**: the focus is on project teams, but the existing organisation is included;

D. **Information**: regarding information product data itself is explicitly distinguished from the data used for coordination and control; focus here is on the latter.
Within an enterprise three levels of decision taking are defined: strategic, tactical and operational. The BPM model addresses each level for all 4 aspects A through D.

The combination of the 3 levels of decision taking with the 4 aspects lead to 12 so-called Business Focal Areas (BFA's, see figure 2.5). The strategic BFA's are more oriented towards the results or deliverables that the company sells to its customers. The tactical BFA's are more structure oriented - of course because structure follows strategy! - and define how things should be done in order to be most effective. The operational BFA's describe the day to day actual working practices.

For each BFA a set of key criteria, maturity stage definitions and issues to be addressed have been identified. This has been translated in 5 questions on the Definition of the BFA and 5 questions on the actual Execution of the BFA (similar to the Delhoofen model). The questions are partly based on the questions in both the Delhoofen and CERC models, but are modified to fit better in the BPM model. Furthermore new questions have been added. For each BFA in total 10 questions or elements draw up a grid similar to the one used by Delhoofen (see figure 2.6). The calculated average gives the BFA effectivity number.
When all the 12 BFA's are scored like this, a 'spider web' can be made (similar to the CERC assessment model) see figure 2.7. This web indicates the effectivity of the enterprise for all BFA's. This in turn determines the readiness for CE in general and PDM in specific. An overall readiness level can be calculated based on the 12 BFA effectivity numbers (the dotted circle in figure 2.7).

2.4 Priority assessment based on Industry Issues

In order to perform an analysis of the business first an industry segmentation is defined. For each of these industry segments a number of strategic industry issues can be identified. When a company intends to define its priorities, they will start to formulate these industry issues. By giving a weight factor to the industry issues the company identifies its own specific business issues. The priority assessment matrix (see figure 2.8) will generate the BFA priorities. In return these will result in criteria for the eventual business solutions.
The industry segmentation has resulted in the following breakdown:

- Consumer products i.e. a telephone
- Industrial products i.e. a car
- Industrial projects i.e. a boat
- Infrastructural projects i.e. a bridge

For the different industry segments industry issues can be identified, for example:

<table>
<thead>
<tr>
<th>Consumer products</th>
<th>Industrial products</th>
<th>Industrial projects</th>
<th>Infrastructural projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce time to market</td>
<td>Reduce cost</td>
<td>Reduce proposal leadtime</td>
<td>Meet Quality</td>
</tr>
<tr>
<td>Continuous reduce cost</td>
<td>Reduce lead-time</td>
<td>Reduce project cost</td>
<td>Reduce Cost</td>
</tr>
<tr>
<td>Continuous improve quality</td>
<td>Improve quality</td>
<td>Realise set of functional standards</td>
<td>Manage and Reduce Lead time</td>
</tr>
</tbody>
</table>

In general the reduction of time to market (or lead-time) and cost, higher quality and partnerships are identified as major industry issues.

The business issues should be tangible; measurable in quantity, occurrence or frequency and importance of the business issue. An example of a business issue could be: what is the current number of products per year and what is the price, cost and profit per product (turnover), and how do these numbers relate to the future prospectives? How important is this issue rated?

Based on general industry issues, a set of business issues is determined. Especially the priority of business issues is calculated, see figure 2.8. The main categories of business issues are: Competitiveness, Partnership, Quality, Cost and Lead Time. Within each of these categories more issues can be pre-defined. The total of the priorities of all detailed issues will then result in the weight factor for the more high level issue. Whether this is needed, e.g. for a specific industry or even each company needs further investigation.

In a similar way the priority rating, based on these business items can be displayed as the goal in the Readiness/Assessment web (see figure 2.7). It will then be clear which BFA’s need improvement.

![Figure 2.8 Priority assessment for PDM](image)
2.5 Enterprise Business Process Management Maturity Level

The current overall readiness level can also be compared to the 5 maturity levels that have been defined as a maturity model for CE (like the Nolan maturity model for IT).

These 5 maturity levels are, see also figure 2.9:
- Chaotic: effectiveness up to 20%;
- Repeatable: effectiveness of 20 to 40%;
- Defined (ISO 9000 is indicative): effectiveness of 40 to 60%;
- Measured: effectiveness of 60 to 80% and higher.
- Optimised: effectiveness of 80% and higher.

These levels apply to all BFA’s, no difference has been made between them. The CERC model does have different maturity levels: 5 stages in the process area and 2 stages in the technology area. For the BPM model only one set of stages is adequate.

![Figure 2.9 Maturity Levels](image)

It can be questioned whether or not an overall maturity is really sensible: a specific company will and needs to be on a different level of effectiveness for each aspect. Thus an overall maturity number can be used as some kind of selling item.

2.6 Concluding remarks

In order to use the BPM model within an organisation the following 5 steps have to be taken:

I. Assessment of priority in business issues and also of the goal for the 12 business focal areas. This step is called Awareness.

II. Assessment of readiness and effectiveness of enterprise.

III. Determination of maturity level of enterprise. See figure 2.7: Maturity levels.

IV. Link to PDM Business Questionnaire. At this moment the PDM Business Questionnaire is a separate list. A new working group will attempt to incorporate most of the questions in this business questionnaire in the BFA questions. Probably questions on infrastructure will remain as a separate questionnaire. This step is called Deployment.

V. The final step, within an iteration, is the Improvement, where the actual implementation of reengineered processes, organisational structures and PDM functionality will take place.
The development of the Business Process Management (BPM) assessment and effectivity model is a tedious but challenging task. What has been presented in this chapter are the concepts and first implementations of the BPM model. Work done by CERC, Delhoofen and others is incorporated in the BPM model. Certainly more research is needed on the priority assessment (based on business issues) and the BFA questionnaire (incorporation of the PDM Business Questionnaire). Possibly some evaluation in specific companies will be completed by the end of the year.
3 Product Data Management

3.1 Definition & positioning

Product Data Management, or PDM, has become a widely used term. With all respect to the different variations on this term, in this publication Product Data Management is used in the broad sense of the word. This means that related technologies and disciplines such as Engineering Data Management (EDM), Product Information Management (PIM), Technical Document Management (TDM), Document of Drawing Management Systems (DMS) and Workflow Management will have overlap with PDM or include aspects of Product Data Management.

Product Data Management (PDM) is the management of all product data from conception through design, engineering, manufacturing, use and maintenance to disposal.

'A PDM system is used within an enterprise to: organise, access, and control data related to its products, and manage the life cycle of those products. A single PDM system may work with CAD, CAM, CAE, other software applications, and with traditional non-computer systems that generate or use product data (such as paper documents). It also may use a mix of computers, workstations, and associated hardware. This mix of applications and hardware is referred to as a heterogeneous environment. PDM systems provide access and security controls, maintain relationships among product data items, rules that describe data flows and processes, and notification and messaging facilities. PDM systems are used by managers, administrators and end-users.' [MILL93]

3.2 Principle of PDM system

Data concerning products, processes, projects etc. are critical elements of daily company management. These data will be retrieved, used and changed by often many users. Furthermore, these data have several states and versions and access is limited to authorised users. Central data management is one of the mayor starting-points of a PDM system. Figure (3.1) schematically shows the concept of a PDM system.

![Figure 3.1 Concept of PDM system](image-url)
A PDM system manages the central data storage or data vault. The data vault will contain all (physical) product data. The PDM system will ensure that users can not directly access the data under its control, but can only do this by use of the offered PDM functions. Therefore the PDM system will have to maintain record of which users have access to which versions of which data as well as the format in which the data have to be presented and which changes the user is allowed to perform.

To guarantee this, information has to be maintained on the data related to products, processes and projects. These data are also referred to as meta-data (data on data). By way of central data management the possibility arises to support process management and change management.

A PDM system is roughly positioned between the user applications and the stored (meta)data (see figure 3.1). The PDM system will therefore have to provide data(base) management functions as well as user functions. A PDM system can be imbedded in an application (for example a CAD/CAM/CAE system). The user of the application can not directly see the PDM system, the application takes care of the data transport to and from the PDM system.

A PDM system can also function independently. This will more and more become a reality; a situation where data are managed independently from the application and where the user determines which application has to be used (launched), on the basis of the desired presentation form or change requirements (viewing or editing). There can be multiple users who, through multiple applications or directly, work simultaneously with the PDM system and exchange data.

The user will in both cases retain the right to keep private files that are not part of the central vault that is managed by the PDM system. In some cases this is done to allow local work until a certain conceptual status of the data is reached. In most cases the creation of private files is discouraged. Only by the use of PDM functions a consistent, complete and correct management of product- and process data can be guaranteed.

The process of retrieving and editing data is managed by the PDM system. Figure (3.2) schematically shows the principle of a PDM system.

![Figure 3.2 Principle of PDM system](image-url)
Figure 3.2 gives an example of a user who changes certain data. The user addresses the system by way of the user interface, and searches for certain data. His request for data will initiate a retrieve process in the system that will query and extract the requested data from the vault, and present the data in the user interface in a text screen or by means of a viewing application in a graphical screen. When the user wishes to change the data, his change request initiates a change process that will check-out the required data from the vault. The user is now provided with the ability to change the data in an editing application. For all other users the data now have a 'read-only' status. When the changes have been made, the user will release the data back to the system for (re)check-in to the vault. This release from the user's point of view should not be confused with the release of e.g. a final design in a workflow process. The new version of the data will now be available for all operations to all authorized users.

3.3 PDM function list

This paragraph contains an overview of PDM functions and PDM facilities. The PDM functions and facilities have been used to structure the PDM Business and System Questionnaires. The numbers refer to the chapters and paragraphs in the questionnaires. The chapters refer to main PDM functions or facilities, the paragraphs refer to sub-functions or facilities.

The main part of a PDM system is formed by a number of 'core' PDM functions. PDM functions can be described as the enabling functions to enable product data management in a consistent way.

The following PDM functions have been defined:

2 Structure Management
   2.1 Classification
   2.2 Document structure
   2.3 Product structure management
   2.4 Configuration management

3 Retrieval Management
   3.1 Searching
   3.2 Viewing

4 Release Management
   4.1 Authorization
   4.2 Sign-off
   4.3 Status control

5 Change Management
   5.1 Change process
   5.2 Mark-up & Redlining
   5.3 Version control
   5.4 History management

6 Workflow Management
   6.1 Document routing
   6.2 Process modelling
   6.3 Process management
   6.4 Planning
   6.5 Communication
The supporting POM facilities support the end user in working with the PDM functions in a logical way. The supporting POM facilities also include the data and database technology needed to perform the PDM functions.

The following supporting POM facilities have been defined:

1 General
   1.1 Product information
   1.2 Modularity
   1.3 Software typology
   1.4 Vendor information
   1.5 Contact person information
   1.6 Developer information
   1.7 Commercial information
   1.8 Pricing
   1.9 Support

7 Data Exchange
   7.1 Data transportation
   7.2 Data translation

8 Systems Integration
   8.1 Applications
   8.2 CAD/CAM/CAE systems
   8.3 Title block integration
   8.4 MRP/PPS

9 User-interface
   9.1 Operational features
   9.2 Presentational features
   9.3 Help

10 Customising
   10.1 Customisation
   10.2 Tailoring
   10.3 Reports

11 System architecture
   11.1 Platforms
   11.2 Operating Systems
   11.3 Networks
   11.4 Databases
   11.5 Distributed databases
   11.6 Datadictionary
   11.7 Backup & Restore

3.4 PDM function description

In the PDM System Questionnaire the PDM function list has been translated into relevant questions. In the following paragraph a number of PDM (sub-)functions will be further explained as well as the fields of investigation in the market review. The code/numbers of the PDM (sub-)functions are shown between brackets (1.1). Paragraph 5.2 contains the evaluation of the market review. Paragraph 5.2 is structured in the same way as this paragraph.
General Information (1)

Product & vendor information (1.1)

The general section is meant to summarize data about the product e.g. product name, version, contact persons (1.5), names of developer (1.6) and distributor (1.4). It is important to have a clear view of the type of organisation that develops or distributes the PDM system. The relationship between the distributor or developer of the PDM solutions and the company that uses the PDM solutions is often long term. The company should make sure that there is a certain 'fit' between the parties involved. A short introduction to the developer and distributor strategies and background is contained in appendix E.

Modularity (1.2)

In this section the modularity of the system is investigated; the base modules that are essential for operation and optional or extra modules with extra functions or facilities e.g. integration modules. Appendix E contains an overview of the available base and optional modules.

Software typology (1.3)

Some systems have been especially designed to serve certain disciplines or industry branches.

Pricing (1.8) and support (1.9)

The price of a PDM system can be based on concurrent users, registered users or users by node. The pricing information in this publication is always indicative. This means e.g. that no discounts have been included. The pricing indications are included in appendix E. Product support for the PDM system is measured by the availability of manuals, helpdesk support, bulletin boards or (in-house) training facilities.

Structure Management (2)

Classification (2.1)

Classification can be made through group-related documents, parts or data with the same features. Part classification is also referred to as Group Technology.

Document structure (2.2)

Document structure management means managing the complex interrelationships of documents and data. A group of documents is referred to as a folder or envelope. There are different types of document associations: flat, single-level hierarchically or multi-level hierarchically graphical relations presentation.

Product structure management (2.3)

The Bill of Materials or BOM describes the complete product structure with relationships such as options, versions, and effectivities. It is important that different users can have different structure views. A design engineer is interested in functional viewing while a manufacturer needs to view the structure to see assembly information and relationships. Different types of Bills of Materials have been defined: single- or multi-level (indented), summarized or where-used parts list with alternate and optional parts.
Configuration management (2.4)

Through configuration management complex product structures can be managed including version and options used in the past. Also standard generic associations can be managed.

Retrieval Management (3)

Searching (3.1)

For searching and finding documents search criteria have to be specified. These may include boolean, ranges and wild cards, which can be used to create a database query without having to learn database commands or search mechanisms such as SQL. The system should be able to name and save commonly used queries so the user can re-query the system without having to re-enter the set of criteria. If the user has found the correct document, he may want to view the image of the file.

Viewing (3.2)

The view function makes it possible to create (capture by scanning or transfer from a CAD or drawing program), maintain and to browse through images. If the user wants to view a detail of an image he can blow-up a part of the image. Most systems provide viewing by integrating a third party image application for the viewing of files, which can be in all kinds of formats (e.g. raster, vector, text). Usually, it is possible to annotate images or to make mark-up’s on a drawing (mark-up & redlining). Since annotation is mostly held in separate files, design integrity is maintained and overall control of the master design remains with the originator.

Release Management (4)

Authorization (4.1)

Important documents or data can be safely (electronically) locked by passwords or other authorization tools. Only authorized personnel or a small group of people (user group) has the authority to change, copy or delete certain data. Different authorization levels have been defined: user (group), project, data type, document, attribute and application.

Sign-off (4.2)

Change requests can be initiated by more than one person, but permitting the change to be implemented can only be done by a restricted group of authorized personnel. This electronic approval is called sign-off. There are different levels of approval: project, stage (sub-project), group of documents, or one document.

Status control (4.3)

Status control provides a way to describe a condition of a document. What is currently happening to the document? (e.g. in the electronic vault, checked-out, etc.). Options are a free definition of status names and automatic change of the status when the defined status-change conditions are met.
Change Management (5)

Change process (5.1)

In this section the possibilities to define the change process are investigated including the responsibilities of persons in the change process.

Engineering Change Order (5.2)

Engineering Change Request (ECR’s) and Engineering Change Orders (ECO’s) are essential management forms in the change process. What will happen to the original document during a change process: total outcheck locking, or document locking (no modifying only viewing), incheck locking or no locking.

Mark-up & Redlining (5.3)

Change annotation can be redlined or marked in different colours and/or in different layers. The document, part or data, complete with mark-up is then mailed to personnel authorized to actually change the document. Mark-up and redlining software may be third party software without needing a CAD system.

Version control (5.4)

A PDM system should provide the means to structure the change process. After every change a new version number is given to the document, part or BOM and the old version is managed by the system or discarded.

History management (5.5)

All changes are recorded in the change history of the PDM system. Some of the history items are: document name, date and time, event (e.g. change, status or version) and person. Also the possibility to make a history overview is investigated.

Workflow Management (6)

Document routing (6.1)

The system should have sufficient routing capabilities such as sending of (groups of) documents along a pre-defined route. Proper notification should be brought to the attention of sender and receiver. There are different possibilities to send a document: one user, user-group, using a routing list or automatic distribution. Also different types of routing lists are possible: parallel, serial. Routing schemas may graphically be shown or in text format.

Process modelling (6.2)

In this section the ability to create Work Breakdown Structures (WBS) is investigated. A WBS can help an organisation to split the work process into pieces/tasks. WBS function optimally if they can be related to the product structures, planning schedules and resources. This way the WBS is an integral part of workflow management.
**Process management (6.3)**

In which way will the system deal with project overview (routing status), deadlines milestone management, etc.

**Planning (6.4)**

A planning schedule is a list of activities which can have dependencies amongst them (e.g. activity A can not start before activity B has finished) and can be related to documents. When planning schedules for example are related to WBS's and the system is programmed with 'what to do and when to do it' then the system can manage all processes. If deadlines are not met, the employees in question should be notified. Also, if the WBS's are connected to product structures and the required resources for those products (product parts), then the system can notify people when resources are running low.

**Communication (6.5)**

For sending messages PDM systems have to offer Electronic Mail facilities or support interfaces to EDI systems. Some systems allow one to send a message automatically in response to an event. Mailing facilities can be the key to successful communication if the system runs on a Local Area Network, for example multiple buildings. Mailings to individuals or user groups should be standard functions. Mailing facilities may be integrated with other change- and workflow management functionalities.

**Data Exchange (7)**

**Data transportation (7.1)**

The user should be isolated from network and operating system commands to copy or move files. Data transport can also be done automatically if required. Can the system manage a distribution list (list of document sent to other organisations) and is an import/export function of data and meta-data included.

**Data translation (7.2)**

Usually standard file transfer protocols are available to translate files between two applications. Data translation functions are often incorporated via customisation. PDM systems automatically apply the translators when necessary, and maintain a list of applicable translators.

**Integration (8)**

**Applications (8.1)**

A PDM system is often a framework for other applications to be built upon. To edit a drawing or picture one could select the drawing by activating the drawing icon or filename. The PDM system selects the right application and launches it. When saving the document again in the application, the PDM system will again take over and save or restore the file in the data vault, with perhaps a new status, version or date. In section 8.1 integrations are investigated with Wordperfect, Word, Lotus, Quattro, Excel, etc. Is the application fully integrated, encapsulated, or is there only registration. Another field of investigation is the integration with other PDM systems.

Section 8.2 (CAD/CAM/CAE integration) and 8.4 (MRP/PPS integration) will be discussed in more detail as these sections are a major focus area for many companies.
CAD/CAM/CAE systems (8.2)

The integration between PDM and CAD systems at first sight seems to be a field of little concern. Most PDM systems are distributed by CAD vendors, and have often started as file management system for the CAD system. In practice however one should be cautious to be too optimistic. The PDM system may manage the CAD files in the vault in a proper way, but integration on lower levels is not always provided to full depth.

There is a clear area of overlap between PDM and CAD systems, as shown in the below table (3.3) from the Workshop PDM-CAD integration [MACK94]:

<table>
<thead>
<tr>
<th>Support / management of:</th>
<th>PDM</th>
<th>CAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part / Product information</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Drawing titleblock information</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Part attributes</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Product structure / Configuration</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Classification</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Process / Workflow</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Vault / Data</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Viewing / Mark-up &amp; Redlining</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Program</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 3.3. Overlap PDM and CAD

Roughly three levels of integration can be distinguished:

- **Encapsulation**
  The most simple form of product invocation, with the ability to find files. Depending on the quality of the encapsulation also metadata can be managed, or the CAD system may automatically be launched.

- **Interface**
  This level transfer of information between the PDM and CAD system. In most cases one of the systems will control and manage the data.

- **Integration**
  At this level a tight integration between the PDM and CAD system is established. This integration is often completely transparent for the end user.

The questions that will need to be answered by the company concerning PDM and CAD integration include:

- What does and controls the PDM and CAD system?
- Which data should in which format be passed between the two?
- Where will (the original) data be stored?

In the market review the PDM systems are investigated on standard joinings or interfaces realised with CAD/CAM/CAE systems. A number of CAD/CAM systems has been investigated, including AutoCAD, Catia, Euclid, I-DEAS, I/EMS, ME10/30, PRO/Engineer, and Unigraphics, and CAE systems including Abaqus, Ansys, Cosmos, Diana, Marc, Mechanica, and Nastra.
Title block integration (8.3)

The direction can be one direction (drawing to database or database to drawing) or bi-directional (always vice versa). In chapter 5 the results of the review of CAD, title block and viewing integrations are shown in a table (5.2).

MRP/PPS (8.4)

Integration of PDM systems with MRP and PPS systems is an important issue for many companies. The benefits of a good PDM and MRP system integration are substantial. The ability to have a single source of product structure data for all systems in an enterprise is a definite advantage. This is particularly true if the product line is complex, or if special structuring programs, such as configurators, are being used. Storage requirements can be reduced by a considerable margin, and ambiguity eliminated [IPDM95].

There is a growing overlap between PDM and MRP systems. This is also shown in the below table (3.4) from the Workshop PDM-MRP integration [MILL94,2]:

<table>
<thead>
<tr>
<th>Support / management of:</th>
<th>PDM</th>
<th>MRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part / Product information</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Product structure / Configuration</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Classification</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Process / Workflow / Change management</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Vault management (parts &amp; documents)</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Viewing / Redline &amp; mark-up</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Product planning &amp; routing</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Product costing</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

Table 3.4 Overlap PDM and MRP

The questions that will need to be answered by the company concerning PDM and MRP/PPS integration include:
- When and where (in which system) will a new part be created / initiated?
- Where and when will a part number generated?
- Should the part number be equal to the drawing number?
- How are changes processed?

In general one could conclude the following with regard to PDM and MRP integration:
- New items will in most cases be created in the CAD system by creating a new object, or choosing an item from the library. As the PDM system manages the CAD environment, new product (structure) data will be available first in the PDM system. Also in case of revisions the PDM/CAD environment will initiate changes to the product (structure) data.
- Though data exchange in two directions is possible it is preferable that all information is created in the PDM/CAD environment and then be taken to the MRP environment.
- Engineering changes (ECO's and ECR's) are handled far better in PDM systems than in most MRP systems, which gives the PDM system the lead in overall control of the BOM and its Parts [IPDM95].
In the market review integrations have been investigated with a number of MRP/PPS systems including e.g. SAP/R3 and Triton. The review has been performed in two directions; the MRP vendor has been asked about his interfaces with PDM systems, and the PDM vendor has been asked about his integrations with MRP systems. In chapter 5 the results are presented in a table (5.3).

**User-interface (9)**

**Operational features (9.1)**

The operational features are the way in which the user-groups of a system communicate with the PDM system and how they receive the information needed from the system (e.g. different presentation languages). Users can use a range of means for communication with the system, such as keyboards, mouses, touch screens, etc. The system gives the user its information by displaying it on screen (e.g. close- or fixed list boxes).

**Presentational features (9.2)**

The best way of interfacing with the users is realised when each user or user-group has his own, preferably self-defined, user-interface. Each screen of the system should be customiseable and preferably have a graphical user interface (GUI). The user-interface is particularly important because this will, for a large part, determine the success of a software system in an organisation.

**Help (9.3)**

The help functionality may be context sensitive and on-line.

**Customising (10)**

**Customisation (10.1)**

Customising is the way in which a system can be fit with all the necessary functions. System integrators can often customise the system so that it will suit the company’s needs. Customising is adding new functionalities that are not standard but can still be made relatively easy. Different customisation applications: GUI-screen, menu and query builder. Mostly C or C++ is the application programming language (APL).

**Tailoring (10.2)**

Tailoring is based on the use of standard customisations. The system has a range of functions and the user just omits the functions that he does not need. This way one’s own working environment can be simplified. With a good user-dependable interface, a user will only have the functions available that he needs. The ability to use standard pre-modelled processes and menus is investigated.

**Reports (10.3)**

It is very important that a system has a good facility for reporting. The system has to produce reports that can be customized and adjusted to the standards and/or wishes of the user.
System Architecture (11)

Platforms (11.1)
In this section the hardware requirements are investigated required to run the PDM system, as well as the need for internal and external memory. Also the use of servers and clients, or the stand-alone (PC) capabilities is investigated.

Operating Systems (11.2)
In this section the availability of a number of operating systems is investigated on which the PDM system may run as well as the capabilities for the support of server, client and stand-alone operating systems (e.g. Unix, Windows and DOS).

Networks (11.3)
In this section the availability of a number of networks / protocols is investigated on which the PDM system may run.

Databases (11.4)
In this section the availability of a number of databases is investigated on which the PDM system may run. Also the interfacing capabilities to other databases is investigated.

Distributed databases (11.5)
In this section the capability of the PDM system is investigated to operate on a real sharing or distributed database.

Datadictionary (11.6)
In this section a number of questions are raised on the flexibility and management of the data dictionary.

Backup & Restore (11.7)
In this section the data security items are investigated.
4 The PDM selection process

4.1 The selection method

The selection process of PDM systems depends strongly on the specific business situation. Each company may have a different view on how the PDM system should fit in the organisation and how broad it should be implemented. Because the needs and demands for PDM solutions may differ for each company a selection method has been developed to support the selection process within a specific company. The aim is to provide a business independent selection method with criteria that can be specified per company. The selection method is based on two questionnaires; the PDM Business Questionnaire for the business requirements, and the PDM System Questionnaire, that has been used to perform the market review. Both questionnaires are structured in the same way in compliance with the PDM functions and facilities as shown in chapter 3. Because the questionnaires are structured in the same way, they allow comparisons and matches to be made. By the matching of the two questionnaires company specific PDM selections can be performed. This is shown schematically in the figure below (4.1).

![Figure 4.1 Principle of selection model](image)

The selection method offers a practical methodology which is able to supply, within a restricted time, selection criteria for product data management for a particular situation of a particular company.

![Figure 4.2 From business criteria to selection](image)
By combining the two questionnaires, i.e. adding the specific business related score to the individual PDM system scores, one gets a result per PDM function or facility. Using these scores, the best overall PDM systems can be determined by adding the scores on each PDM function to one total score. Those PDM systems which have the highest overall score match the given requirements, demands or problems best. This is schematically shown in figure 4.3.

The requirements in the PDM Business Questionnaire are split in two sections: functional requirements and limiting conditions. In the functional requirements section the importance of PDM functions and sub-functions is investigated. In the section on the limiting conditions e.g. the maximum price for the total system has to be filled in. Also the importance of interfaces between the PDM system and a number of other applications can be filled in. Paragraph 4.2 and appendix C describe the PDM Business Questionnaire in detail.

The selection method is able to generate a 'shortlist' of the most applicable resources for the desired situation (see figure 4.4). This particular shortlist is based on the specific need for PDM functions. With due regard to the price per seat and the cost of the entire system, a 'knock-out' list can be generated.

Finally, by comparing the importance and match of system integrations and support of hard- and software platforms and database integration a 'strike-out' list can be generated.
The below figure (4.4) contains a more detailed schema of the selection model:

From the above it may be clear that the selection method is rather intensive as far as the calculation of results is concerned. Therefore, a computer program has been developed to support the use of this methodology. This program is available on the diskette included with this book. An explanation on the use of the software is in appendix G.
4.2 PDM Business Questionnaire

By means of the PDM Business Questionnaire the need for existing and available PDM functions and technology is investigated within a company. As already mentioned the PDM Business Questionnaire is structured in the same way as the PDM System Questionnaire. The structuring of PDM functions and facilities in the PDM Business Questionnaire has been defined in chapter 3.

The PDM Business Questionnaire is composed out of two sections. The first section is the section for the functional requirements. In this section the need for a number of 'core' PDM functions is investigated. The second section is the section with the limiting conditions. One restriction that can be filled in is the cost of the total system for a certain number of users. Other limiting conditions may be the operating environment or the interfaces to other systems. In this part more than one item (interface, etc) can be marked, including the importance of this interface. The limiting conditions sections contains 26 questions in total. The complete PDM Business Questionnaire is in appendix C.

The PDM selection method is supported by the PDM Selection tool that also contains the forms to fill in for the PDM Business Questionnaire. The PDM Selection tool can hold the data of maximally 6 completed PDM Business Questionnaires. At least one questionnaire should be filled in in order to perform a proper selection. It is advised to have the PDM Business questionnaire filled in by persons in different business functions (e.g. engineering, production, marketing). With regard to future expansion of the PDM system the scope should be as broad as possible.

Functional requirements

In the section on the functional requirements in total 30 questions are asked about PDM functions. Every time the questionnaire asks to rate the importance of PDM (sub)function. This rating can be filled in by ticking the applicable box and can vary between none, low, average, high or very high. An explanation to the relevant answer is included. See the below example.

5.2 What is the need for mark-up & redlining ?

- none: We do not need mark-up & redlining. It is not necessary to make remarks, notes, sketches on the documents you see with this system. We do this on the paper/hard copy.
- low: We sometimes need some mark-up functionality e.g. the possibility to make remarks in a memo for each document.
- average: We need mark-up & redlining. We need to be able to mark-up on the screen, in this way we do not need to print a document first. The remarks we make should all be archived in the document history.
- high: Mark-up & redlining is important for our leadtimes. Besides text mark-up we also need the graphical red-lining functionality with the possibility to use different colours etc.
- very high: Mark-up & redlining is essential to speed-up our processes. We need full support; remarks of different persons should be maintained in separate layers and should be viewed independently and simultaneously. Also voice and video notes are needed.

The grading will be used in the PDM Selection tool to calculate the relative grading of all functional requirements in a table or matrix. The total need for PDM requirements is always set to 100%. Also a number of graphs (circle and bar charts) showing the relative importance of the PDM functions will be generated by the PDM Selection tool. The relative need of a PDM function is matched with the support of this function by all PDM systems. See for the PDM function support rates of PDM systems also appendix F.
The below example shows that a relative different need and a different functional support by two POM systems (A and B) will result in different result scores.

<table>
<thead>
<tr>
<th>PDM function</th>
<th>Business relative requirement/need</th>
<th>Functional support PDM system A</th>
<th>Functional support PDM system B</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>2.0 %</td>
<td>90 %</td>
<td>30 %</td>
</tr>
<tr>
<td>3.2</td>
<td>4.0 %</td>
<td>40 %</td>
<td>80 %</td>
</tr>
</tbody>
</table>

Result scores:
POM system A: $0.02 \times 0.9 + 0.04 \times 0.4 = 0.018 + 0.016 = 0.032$
POM system B: $0.02 \times 0.3 + 0.04 \times 0.8 = 0.006 + 0.032 = 0.038$

Though system A scores much better than system B on function 3.1, the need for this function is not so high. There is more need for function 3.2, that is better supported by system B. The result is that the total score of system A (3.2 %) is lower than the total score of system B (3.8 %).

The grand total of all comparisons for all (sub)functions results in an overview for all POM systems of the offered functional support. The best systems of this overview are contained in the shortlist selection of POM systems; this list shows the top 10 in ranked order of POM systems that best meet the business specific functional requirements.

Limiting conditions

Not only functional requirements will however influence the buy or not-buy decision of a PDM system. A number of important aspects also influencing the choice for a certain PDM system are:

- Cost of the total or the eventual PDM system.
  PDM software is not cheap. In the situation where an enterprise wide use of the PDM system is envisaged the cost will often be more than 1 million Dutch guilders.
  The PDM Selection tool contains a number of price indications as also shown in appendix E. One should always bear in mind that discounts may be substantial when buying a system. It is therefore advised to also try out a broader scope of cost constraints.

- Legacy systems.
  In most cases the company will already have a number of information systems e.g. CAD/CAM/CAE systems and MRP/PPS systems, that are not to be replaced. This means that the capabilities of interfacing between the PDM system and these systems are essential in the evaluation of these PDM systems.
  In the PDM System Questionnaire a number of questions has been raised for the existing and standard available interfaces. In a number of cases the developer was able to build the required interface in a short space of time. The maximum allowed for this was 2 days of programming.

- Operating environment and software already in place.
  It is often company policy to use a certain hard- and software platform for the information technology to operate on. This policy is not likely to change in the case of the selection of a PDM system. In some cases another server than in use is allowable, but mostly the operating environment is essential. In the PDM market often a broad scope of hard- and software environments are being supported, not in the least because PDM systems claim to be systems for a heterogeneous environment.
The PDM selection method supports the selection of PDM systems on the above items. This can be done by filling in the section for the limiting conditions. On the basis of this a knock-out list and a strike-out list can be generated. The knock-out list is a shortlist of best suitable PDM systems with the restriction of the cost of the total system. The strike-out list represents the top 10 PDM systems in ranked order that best fit the environmental requirements such as interfaces, hardware platform, operating system and database support.

Other aspects that may influence the choice of a PDM system may include:

- **Developers strategy for PDM.**
  Is PDM 'core' business for the developer? How independent is the developer; is the developer a CAD/CAM/CAE supplier, system house, or hardware supplier? Appendix E gives some of the background information on the developers of the reviewed systems.

- **Current achievements.**
  It is useful to evaluate the current use and spread of the PDM system, and the satisfaction of current users. This can be done by visiting reference sites, and by speaking to other users (PDM platforms and user groups).

- **Product strategy.**
  The development strategy for the future product development. Appendix E contains some information on this item for most of the reviewed systems.

- **Company fit.**
  The match between the distributor (developer) and the own organisation is of great importance; in the future a lot will depend on this relation. Therefore the company fit is or should be an important issue in the choice of a certain system.

- **Organisational aspects.**
  Which departments will work with the system? How is the system perceived by non-engineers? Can the system be implemented step by step, e.g. starting with the document management module and later adding other modules?
4.3 PDM System Questionnaire

The market review of PDM systems has been performed using the PDM System Questionnaire. The structuring of PDM functions and facilities in the PDM System Questionnaire has been defined in chapter 3. The PDM System Questionnaire is a de-composition of PDM functions to questions. This results in a breakdown to functional tasks.

See the example below;

2.2 Document structure
2.2.7 What kind of relations can be defined between documents?
- no relations
- one document can be related to only one document (flat) [1:1]
- one document can consist of many documents (single-level hierarchically) [1:N]
- one document can consist of many documents and these can also consist of many other documents (multi-level hierarchically) [N:M]

The PDM System Questionnaire contains 220 detailed questions divided in 11 chapters (functions or facilities) and 46 paragraphs (sub-functions or -facilities). The aim of the PDM System Questionnaire is to de-compose PDM functions to a level where a clear 'yes' or 'no' answer is possible or a tick of the applicable box. In this way a completely independent market review can be performed. Independent of the vendor or distributor, but also independent of the researcher who performs the review. The complete PDM System Questionnaire is in appendix D.

The results, or answers, are so detailed that by a composition of questions within a sub-function or facility a 'score' can be calculated automatically. Are all questions within a sub-function answered with 'yes' (this means that the sub-function is fully supported) then the support percentage will be 100%. The results of these calculations are all in appendix F. The results would be almost useless if they could not be used in the selection process. But because the review results are structured identically to the requirement analysis, matches and comparisons can be performed in the selection model.
The PDM selection process
5 PDM systems

5.1 Overview systems & suppliers

Review restrictions

Between November 1994 and April 1995 the PDM market review has been performed. The review has been performed under certain restrictions. The selection of the products that were evaluated in the market review has been restricted by the following constraints:

- The product must be commercially available in the Netherlands.
- The product must be supported in the Netherlands. This does not mean that the distributor should be resident in the Netherlands, but support should be possible.
- The product should have an installed base.
- The product should give standard support to (a number of) PDM functions. The product may not be a building block toolbox in which PDM functions can be made.
- If the product is mainly based on document management, the product should also be able to support the engineering environment to some extent by CAD files management, CAD viewing and/or workflow management.

A large number of products have been listed and checked against these criteria, including amongst others the products mentioned in the 4th and 5th edition of CIMdata’s PDM Buyer’s Guide [MILL93, MILL94]. Eventually in 28 cases the developers or distributors were willing to contribute to the market review. By the possible lack of information the list of reviewed systems may not be complete.

In a number of cases the developers or distributors of products that were interesting, and available in the Netherlands, for several reasons refrained from contribution.

The next page contains the lists of reviewed and other systems with their developers and distributors for the Netherlands.

Appendix E contains the detailed information on all reviewed PDM systems, including general information on the developer and distributor, address information, system characteristics, system specifications, and price indications. Appendix E contains also the address information of a number of other systems that are interesting in this field.
### Reviewed systems

The following PDM systems have been investigated in the market review. In alphabetical order:

<table>
<thead>
<tr>
<th>No.</th>
<th>PDM system</th>
<th>Developer</th>
<th>Distributor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Autodesk WorkCentre</td>
<td>Autodesk Inc.</td>
<td>Autodesk Benelux B.V.</td>
</tr>
<tr>
<td>2.</td>
<td>AutoEDMS</td>
<td>ACS Telecom</td>
<td>CAD PLUS BV</td>
</tr>
<tr>
<td>3.</td>
<td>AutoManager Organizer</td>
<td>Cyco Software</td>
<td>Cyco Automatisering</td>
</tr>
<tr>
<td>4.</td>
<td>AutoManager WorkFlow</td>
<td>Cyco Software</td>
<td>Cyco Automatisering</td>
</tr>
<tr>
<td>5.</td>
<td>BravoFrame</td>
<td>Hossoft GmbH</td>
<td>Landré &amp; Glinderman N.V.</td>
</tr>
<tr>
<td>6.</td>
<td>CADIM/EDB</td>
<td>Eigner + Partner GmbH</td>
<td>PDM Solutions BV</td>
</tr>
<tr>
<td>7.</td>
<td>D-Engine</td>
<td>Done Centre B.V.</td>
<td>Done Centre B.V.</td>
</tr>
<tr>
<td>8.</td>
<td>Document Manager</td>
<td>Cimage Corporation</td>
<td>Delaware Computing B.V.</td>
</tr>
<tr>
<td>9.</td>
<td>Documentum</td>
<td>Documentum Inc.</td>
<td>Source Information Technology</td>
</tr>
<tr>
<td>10.</td>
<td>DocuFlex</td>
<td>Xerox Engineering systems</td>
<td>Xerox Engineering systems</td>
</tr>
<tr>
<td>11.</td>
<td>EDM</td>
<td>Computervision Corporation</td>
<td>Tree C. Technology B.V.</td>
</tr>
<tr>
<td>12.</td>
<td>EuroEMS</td>
<td>2 EPS B.V.</td>
<td>2 EPS B.V.</td>
</tr>
<tr>
<td>13.</td>
<td>Formtek</td>
<td>FORMTEK, Inc.</td>
<td>FORMTEK Europe n.v.</td>
</tr>
<tr>
<td>14.</td>
<td>FYI</td>
<td>IdentiTech, Inc.</td>
<td>Logisterion B.V.</td>
</tr>
<tr>
<td>15.</td>
<td>HP PE/WorkManager</td>
<td>Hewlett-Packard Company</td>
<td>Beographics bv</td>
</tr>
<tr>
<td>16.</td>
<td>Information Manager</td>
<td>EDS Unigraphics Division</td>
<td>EDS Nederland BV</td>
</tr>
<tr>
<td>17.</td>
<td>I/PDM</td>
<td>Intergraph Corporation</td>
<td>Intergraph Benelux B.V.</td>
</tr>
<tr>
<td>18.</td>
<td>Keyfile</td>
<td>Keyfile Corporation</td>
<td>Borsus Systema B.V.</td>
</tr>
<tr>
<td>19.</td>
<td>LT Manager</td>
<td>EDM Consultants</td>
<td>CAD PLUS BV</td>
</tr>
<tr>
<td>20.</td>
<td>Manta</td>
<td>B.A. Intelligence Networks Ltd.</td>
<td>Logos, Greenock B.V.</td>
</tr>
<tr>
<td>21.</td>
<td>Metaphase PDM</td>
<td>Metaphase Technology, Inc</td>
<td>Control Data BV, SDRC NI.</td>
</tr>
<tr>
<td>22.</td>
<td>NOW24</td>
<td>D[M]S</td>
<td>Twinsoft</td>
</tr>
<tr>
<td>23.</td>
<td>Pafec Access</td>
<td>Pafec Ltd.</td>
<td>Betographics bv</td>
</tr>
<tr>
<td>24.</td>
<td>ProductManager</td>
<td>IBM Corporation</td>
<td>IBM Industrial Systems Centre</td>
</tr>
<tr>
<td>25.</td>
<td>R/Solution</td>
<td>Raveca B.V.</td>
<td>Raveca B.V.</td>
</tr>
<tr>
<td>26.</td>
<td>Sherpa/PIMS</td>
<td>Sherpa Corporation</td>
<td>Sherpa Corporation</td>
</tr>
<tr>
<td>27.</td>
<td>SoftSolution</td>
<td>SoftSolutions Technology Corp.</td>
<td>Cyco Automatisering</td>
</tr>
<tr>
<td>28.</td>
<td>Trimeco</td>
<td>Trimeco enterprise Ltd.</td>
<td>Octagon Computing Services B.V.</td>
</tr>
</tbody>
</table>

More detailed information on these PDM systems is contained in appendix E including:

- General information on PDM system, developer and supplier
- Address information of developer and supplier
- System specifications;
  - Version and release date
  - Supported platforms
  - Use of internal and external memory
  - Supported operating systems
  - Support of database engines
  - Network systems support
  - CAD/CAM/CAE interfaces
  - MRP/PPS interfaces
  - Base modules
  - Extra modules
- Price indication

For a complete description of the PDM system see CIMdata’s PDM Buyers Guide [MILL94].
Other systems

The following PDM systems have not been investigated in the market review. They may however be interesting in this field as most of these products are available in the Netherlands or other European countries. In alphabetical order:

<table>
<thead>
<tr>
<th>No.</th>
<th>PDM system</th>
<th>Developer</th>
<th>Distributor</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>AutoORG CAD</td>
<td>CAD &amp; LAN Computersyteme</td>
<td>CAD &amp; LAN Computersyteme</td>
</tr>
<tr>
<td>30</td>
<td>Centra 2000</td>
<td>Auto-Trol Technology</td>
<td>Auto-Trol Technology</td>
</tr>
<tr>
<td>31</td>
<td>CIM Database</td>
<td>CONTACT Software GmbH</td>
<td>CONTACT Software GmbH</td>
</tr>
<tr>
<td>32</td>
<td>CIM Series/400</td>
<td>IBM Deutschland GmbH</td>
<td>IBM Industrial Systems Centre</td>
</tr>
<tr>
<td>33</td>
<td>CMStat</td>
<td>CMStat Corporation</td>
<td>CMStat Corporation</td>
</tr>
<tr>
<td>34</td>
<td>EDB-CAD</td>
<td>TIB-Jena GmbH</td>
<td>TIB-Jena GmbH</td>
</tr>
<tr>
<td>35</td>
<td>Engineering: Express</td>
<td>EXP Group Inc.</td>
<td>EXP Group Inc.</td>
</tr>
<tr>
<td>36</td>
<td>Express</td>
<td>IRI Software</td>
<td>IRI software B.V.</td>
</tr>
<tr>
<td>37</td>
<td>Linkage</td>
<td>CIMLINC Inc.</td>
<td>CIMLINK Ltd.</td>
</tr>
<tr>
<td>38</td>
<td>Mezzanine/CURO</td>
<td>Frame Technology Corporation</td>
<td>Curo Technology Europe B.V.</td>
</tr>
<tr>
<td>39</td>
<td>NovaManage</td>
<td>NovaSoft Systems, Inc.</td>
<td>Source Information Technology</td>
</tr>
<tr>
<td>40</td>
<td>Open Data Manager</td>
<td>Digital Equipment Corporation</td>
<td>Digital Equipment B.V.</td>
</tr>
<tr>
<td>41</td>
<td>Open ODMS</td>
<td>Odesta Systems Corporation</td>
<td>Odesta Systems Corporation</td>
</tr>
<tr>
<td>42</td>
<td>PreView</td>
<td>Rosetta Technologies, Inc.</td>
<td>Source Information Technology</td>
</tr>
<tr>
<td>43</td>
<td>Priamos</td>
<td>IRI Software</td>
<td>IRI software B.V.</td>
</tr>
<tr>
<td>44</td>
<td>Productivity Edge</td>
<td>PRC</td>
<td>PRC</td>
</tr>
<tr>
<td>45</td>
<td>Pro*file</td>
<td>PROCAD GmbH &amp; Co. KG</td>
<td>PROCAD GmbH &amp; Co. KG</td>
</tr>
<tr>
<td>46</td>
<td>Pro PDM</td>
<td>Parametric Technology Corp.</td>
<td>Parametric Technology Nederland</td>
</tr>
<tr>
<td>47</td>
<td>TDMS</td>
<td>Access Corporation</td>
<td>Access Corporation</td>
</tr>
<tr>
<td>48</td>
<td>Win / Pro Cube</td>
<td>WIN Technology International</td>
<td>WIN Technology International</td>
</tr>
</tbody>
</table>

Appendix E contains the address information of the developer and distributor of these PDM systems.
5.2 Evaluation of market review

The following paragraph contains the evaluation of the market review of PDM systems. The evaluation is structured by the PDM functions and facilities as mentioned in chapter 3.

General information (1)

Pricing (1.8)

The price of products is probably the aspect with largest differentiation in the PDM market. A number of levels can be identified here (in Dfl. = Dutch guilders):

- **< Dfl. 2000,- per user**
  - In this range most PC based systems can be found, sometimes not for the first licence but with the extra users the price is lower and discounts may climb up to 50% of the list price.

- **< Dfl. 5000,- per user**
  - This is the lower range of mostly workstation based systems. The first licence includes the data vault, and is therefore often a factor 10 more expensive than the extra users. Discounts need to be negotiated with the vendor.

- **> Dfl. 5000,- per user**
  - This is the higher range of enterprise systems. The systems may be workstation or mini/mainframe based. The base package often exists of the (expensive) central data vault and a number of (concurrent) users. Discount will however rise by the number of seats (users), and can often be negotiated.

In the figure below (5.1) the relative spread in these price ranges is shown on the basis of the price indications for the first and extra user of the full licence.

Figure 5.1 No. of PDM systems in price ranges
**Structure Management (2)**

**Classification (2.1)**

Extensive classification (group technology) is supported poorly in most systems. Some systems have support of structured libraries such as DIN 4000. It is however a major field of growing interest for future developments, in many cases driven by the importance of interfacing with MRP systems that have excellent classification support. A simple form of classification by means of attributes is supported broadly by most systems.

**Document structure (2.2)**

The structuring of documents is in many cases arranged by attributes. Document relations 1:n are well supported, n:m relations less well. Extensive support in compound documents is found in only a minority of systems. The PDM system developers sometimes face major difficulties in understanding the principles of complex document management in a company, which goes on the other hand also for the document management developers with regard to product structure management.

**Product structure management (2.3)**

The development in the area of product structure management has been, and still is, enormous. The high end group of 'real' PDM systems have extensive functionality and are moving strongly towards configuration management and a better user-interface feasibility. The middle group tends to copy product structure management technology into their systems with differing success. The better examples often also achieve a good interface to MRP product structure managers. The remaining group of document management systems have none or very limited support of product structures. They often tend to the attitude that most companies do not really need product structure management.

**Configuration management (2.4)**

A minority of mature and well established PDM systems is currently growing towards extensive support of configuration management. A number of modules will emerge in this field. A larger group of systems is currently looking at the concepts of configuration management. A new area in which some support is beginning to emerge is Software Configuration Management (SCM). Support of this area includes the management of the software development process and the integration with the CASE tools that are being used.

**Retrieval Management (3)**

**Searching (3.1)**

Searching is very well supported in almost all products. The number of extensive search facilities, such as saved queries, adding constraints and fuzzy search, is less supported in a few products.

**Viewing (3.2)**

Viewing capabilities has probably been the fastest growing functional area in the past years. The majority of products are currently supported by viewers, often standard third party products, sometimes own developments. Viewing may have a big difference in performance. Fast walk-through browsers with a viewing box are mostly limited to PC based products. MS-Windows offers new capabilities here in the field of viewing a large scope of file formats.
Recent announcements made in the MS-Windows environment (Wang) will probably result in viewing being a common (free of charge) facility. In section 8.2 the table on integrations with CAD systems also contains an overview of CAD viewing capabilities offered by the reviewed PDM systems.

**Release Management (4)**

**Authorization (4.1)**

All products have some support of authorization (protections). The differences are however enormous. PC based products are more difficult to protect than UNIX based products. More than half of the products offer sufficient authorization possibilities as a standard functionality.

**Sign-off (4.2)**

The (electronic) sign-off is supported in most products, mostly by an attribute. Automatic triggering and control of events is supported less. Support of this area also depends on the support of workflow capabilities.

**Status control (4.3)**

Status control is well supported in almost all products. Not always the status will change automatically by the use of triggers. Support is here also dependent on the workflow capabilities.

**Change Management (5)**

**Change process (5.1)**

The file locking is well supported. Many products use check-in / check-out procedures to control the integrity of the database. Support of Engineering Change Orders (ECO's) and Engineering Change Requests (ECR's) is reasonable; about 2/3 of all systems support an ECO and/or ECR.

**Mark-up & Redlining (5.2)**

Mark-up & redlining is often implemented by means of an external third party module. The PC based engineering data management systems often have good redlining facilities. Redlining is support by 3/4 of all investigated systems.

**Version control (5.3)**

Version control is supported well in all products. Automatic version numbering is not always present.

**History management (5.4)**

The storage of 'old' files is often managed by the back-up facilities of the database-engine (e.g. tape storage). The meta-data of old files can be held in the PDM system, if that is required. The history of actions performed in handling the data are often kept in a log (file). Also notes may be attached to certain events. The number of old versions that need to be held in the PDM system is mostly user-definable. History data are useful in case of re-use of certain products. The history log data are not often used in practice.
Workflow Management (6)

Document routing (6.1)

A majority of the systems has a good support of document routing, including sending folders with documents, etc. Extensive support of document routing with parallel routing and re-directioning of documents is not always present. The office administration packages perform well in this field.

Process modeling (6.2)

A detailed Work Breakdown Structure (WBS) is not often supported. Sometimes a third party application can be used. Often the developers bring forward that process control functions do not belong to the core PDM functionality.

Process management (6.3)

Process management is better supported than process modeling because of the possibilities to make status reports. A better support for the use of triggers such as events and deadlines is growing.

Planning (6.4)

As in 6.2. Also with regard to planning, many PDM vendors do not rate the planning function as core PDM functionality. Sometimes a link to a planning software product is available. General support is poor, and planning is not a growing area at this moment. As the reduction of lead-time and time-to-market is one of the major PDM objectives and benefits, this approach is surprising. Better interfaces and good integrations with planning systems should therefore be a focus area for future development, perhaps even forced by PDM user groups.

Communication (6.5)

In general communication and communication protocols are well supported. Most PDM systems support some E-mail facility that is often imbedded in the system.

Data Exchange (7)

Data transportation (7.1)

Import and export of data and data distribution is well supported. Almost all systems support good data transportation or can create support on short term by customising.

Data translation (7.2)

Most of the data translation to other formats is done by the (CAD) applications themselves. Mostly the PDM itself will not translate and distribute different file formats to different users. Sometimes HPGL is supported also to view documents. Besides other neutral formats such as DXF and IGES, ISO/STEP support is growing in some sectors (Automotive, Defense). Several developers have a strategic statement on the support of ISO/STEP standards.
Systems Integration (8)

Applications (8.1)

Interfaces with text editing applications such as WordPerfect and MS-Word are in most cases available as well as interfaces to spreadsheets such as Lotus, Quattro and Excel. When interfacing is possible, this is mostly restricted to registration and encapsulation.

In almost 50% of the cases an interface to another PDM system should be possible. Only two are however mentioned (Metaphase/DMCS, Product manager/Sherpa). Interfaces are realised through API’s by or dB-integrations.

As in paragraph 3.4 the sections 8.2 (CAD/CAM/CAE integration) and 8.4 (MRP/PPS integration) will be presented in more detail as these sections are a major focus area for many companies.
The table below (5.2) shows the overview of integrations with CAD systems by PDM systems. The table includes the results of section 3.2 (viewing). The CAD interfaces can be distinguished into three types:

- **V** = Viewing capabilities of CAD format file.
- **I** = Integration with CAD system (of data, meta data).
- **T** = Title block integration.
- **A** = All above integrations

<table>
<thead>
<tr>
<th>PDM-CAD integration</th>
<th>AutoCAD</th>
<th>Bravo</th>
<th>Cadam</th>
<th>Cadence</th>
<th>Cadkeys</th>
<th>Cadra</th>
<th>Catia</th>
<th>Dogs</th>
<th>Euclid</th>
<th>Generic Cadd</th>
<th>I-Deas</th>
<th>I/EMS</th>
<th>MB10/Me30</th>
<th>Modusa</th>
<th>Mentor Graphics</th>
<th>MicroCADAM</th>
<th>Microstation</th>
<th>PC-Draft</th>
<th>Pro/Engineer</th>
<th>Unigraphics</th>
</tr>
</thead>
<tbody>
<tr>
<td>View</td>
<td>V</td>
<td>V</td>
<td>IT</td>
<td>IT</td>
<td>IT</td>
<td>IT</td>
<td>IT</td>
<td>IT</td>
<td>IT</td>
<td>V</td>
<td>A</td>
<td>IT</td>
<td>V</td>
<td>IT</td>
<td>IT</td>
<td>IT</td>
<td>IT</td>
<td>A</td>
<td>V</td>
<td>IT</td>
</tr>
<tr>
<td>Data</td>
<td>V</td>
<td>V</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>VI</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>IT</td>
<td>I</td>
<td>I</td>
<td>V</td>
<td>A</td>
<td>A</td>
<td>V</td>
</tr>
<tr>
<td>Metadata</td>
<td>A</td>
<td>IT</td>
<td>IT</td>
<td>IT</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
<td>V</td>
</tr>
</tbody>
</table>

Table 5.2 PDM-CAD integration

In the above table it appears that AutoCAD is the most integrated with, followed by MicroStation. Most PDM systems support more than one CAD system; CADIM/EDB, FormTEK, and Sherpa support 9 or more CAD interfaces, and are therefore very 'open' PDM systems. CAD support by Metaphase is a growing area due to the relatively new release of the product. Already having a certain CAD system in the organisation does not very much restrict the choice of PDM system. The quality and depth of the required PDM-CAD integration will however need to be defined and investigated by the company.

**Title block integration (8.3)**

Title block integration is often a special integration function allowing meta-data from the PDM system to be integrated in the drawing title block. In this way consistency can be guaranteed. The above table also shows the results of the review for this functionality.
MRP/PPS (8.4)

As mentioned in paragraph 3.4, the integration between PDM and MRP is an area of growing interest, but also growing overlap. PDM software developers are also aware of the need of integrations with MRP/PPS systems. The table below therefore only shows a time-restricted state-of-the-art overview, as new developments can be expected in the near future. The results of two market reviews on PDM-MRP interfaces are shown in the below table (5.3): The interface between a PDM and a MRP/PPS system as filled in by the developers of PDM systems in this PDM market review, marked with an 'I'; and the link or integration as filled in by the MRP developers in the market review by Logiplan and Berenschot [LOGI94], marked with an 'L'.

<table>
<thead>
<tr>
<th>PDM-MRP integration</th>
<th>Avalon</th>
<th>Bedrijfsbeheer</th>
<th>Bpies</th>
<th>CIIIM</th>
<th>Control: Manufactur.</th>
<th>E-Pas</th>
<th>Include</th>
<th>MAC-PAC open</th>
<th>Mapica</th>
<th>MARCAM</th>
<th>MPR/Pro</th>
<th>Oracle manufacturing</th>
<th>Paradigm EPMS</th>
<th>Piuss-O</th>
<th>Prodin P2</th>
<th>Propac-X</th>
<th>PSystem</th>
<th>RPS</th>
<th>SAP R/3</th>
<th>Strategie</th>
<th>Triton</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Table 5.3 PDM-MRP integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table shows that SAP and Triton are the most interfaced MRP systems. The table also shows that the area of integration with MRP/PPS systems still has a lot of growing potential. From the table CADIM/EDB and Metaphase appear to be the PDM systems with most MRP/PPS interfaces. Interesting is also that PC based PDM systems perform relatively well in interfacing with MRP/PPS systems.

User-interface (9)

Operational features (9.1)

The past time has shown a tremendous growth in presentational features of the user interface. The menus look mostly very good and comprehensible. If not, it can be a knock-out criterium for the company. The support of different languages, even simultaneously per user, is well.
Presentational features (9.2)

In the GUI systems Windows or the Windows look is most successful and used. OSF/Motif is still available, but been taken over by Windows type interfaces. Windows NT is not yet often seen. A number of PDM developers (e.g. Eigner + Partner, Methaphase, Sherpa, ...) have decided to no longer develop the GUI but use standard object oriented products like Open Data Interface and Galaxy. These products provide GUI for Windows and OSF/Motif support.

The features in this area will probably remain an area of growth. New features like pick, klick, push, drop and drag will help the end user to even easier perform his functions with the system.

Help (9.3)

In general the Help function is well supported with context sensitive help. In practice a help function is however not often used.

Customising (10)

Customisation (10.1)

Most systems are becoming more open to customisation and less pre-defined. New coming systems in the market do not have a lot of standard examples but try to gain their market share by easy and quick customisation.

One of the points that was often brought forward by vendors with regard to the standard available features was how many time (days) are at maximum allowed for customisation of a feature. The rule was set that if a feature could be fully customised within 2 days this would in a number of cases be allowed as standard option of the PDM software.

Tailoring (10.2)

When more standard functionality has been prepared, the PDM system does not need extensive customisation. The parts one needs or does not need in the system can be 'tailored' to use. In this way a fit-for-use PDM system can be composed on very short term. In relation to customising, tailoring carries less risks in implementation, because no complete new functionalities need to be built but standard options can be chosen. It is clear that the elder systems in the market offer most tailoring capabilities.

Reports (10.3)

The creation of a number of standard reports is reasonably well supported. Special reports can often be created by application programming interface (API) customisation, or by means of the report builder.
System architecture (11)

Platforms (11.1)

In general platforms are well supported, also due to the fact that PDM systems are systems for a heterogeneous environment. The listing below gives an overview of the percentage of PDM systems that support a specific platform as server, in relation to the total number of investigated PDM systems:

SUN 60 %
HP 57 %
DEC station 54 %
Pentium 46 %
486 43 %
386 39 %
DEC Alpha 29 %
Silicon 30 %

SUN, HP and Digital are the most supported platforms. The 286 computer has clearly been abandoned (2 %). The Pentium appears to have a growing market share.

Another aspect is the use of internal and external memory. PDM systems tend to claim a growing space in this area. The following list gives the relative percentages of PDM systems that require at least the shown internal memory:

< 2 MB 11 %
≤ < 4 MB 19 %
≤ < 16 MB 31 %
> 16 MB 39 %

The relative percentages of requirements for of external memory are as follows:

< 40 MB 30 %
≤ < 120 MB 11 %
≤ < 600 MB 33 %
> 600 MB 26 %

The above shows a growing need for large internal and external memory use by PDM systems. Regarding the fact that PDM systems manage many (old) versions of data, huge storage areas are unavoidable.

Operating Systems (11.2)

A broad support also goes for the operating systems. The list of support of operating systems by PDM systems is as follows:

Solaris 61 %
HP-UX 61 %
MS-Windows 39 %
Ultrix 36 %
Windows NT 36 %
VMS 29 %
MS-DOS 21 %

Again Solaris and HP-UX are popular. MS-DOS appears to become more and more an abandoned operating system. MS-Windows is more popular, but Windows NT is a growing area of support.
The answers to the extra question in the review 'can the system operate stand alone on a PC?' are as follows:

- No: 46%
- Yes, under:
  - OS-2: 4%
  - MS-DOS: 25%
  - MS-Windows: 39%
  - Windows NT: 18%

The above overview shows that about 50% of all PDM systems will require a non-PC based server. Clients are often available on PC. The overview also again shows the popularity of MS-Windows, and the growth of Windows NT.

*Networks (11.3)*

The network support is well in the average. The most popular supported networks and protocols are Ethernet, NFS, Novell and TC/PIP.

*Databases (11.4)*

Many PDM systems operate on a preferred database-engine, but in many cases support of more than one database is offered. Looking at the support of database-engines by PDM systems the following list appears:

- Oracle: 64%
- Sybase: 46%
- Ingres: 43%
- Informix: 25%
- dBase IV: 18%
- RDB: 18%
- dBase III: 14%
- DB2: 14%

Oracle was, and remains, the most supported database-engine. What is interesting is that the use of proprietary databases (own database-format and engine) has shrunk in the last years (to 3%).

*Distributed databases (11.5)*

The concepts and approaches for distributed databases differ per developer. In most cases the data files themselves are stored on a unique place, and are only distributed on special request by making a copy. The meta-data are mostly available on all sites, and are constantly/frequently updated.

Sometimes the PDM system itself controls all data and meta-data. In the other cases the database engine controls all distribution of data. This costs less control by the PDM system but the risks of failures by the database going down are bigger. When the PDM system controls all data it is in most cases easier to use different (types of) databases in different sites.

An important issue, that should not be overseen, is how many processes need to be constantly open in the database to perform the data distribution. This will influence the number of concurrent users needed for the database licence, and may therefore have large cost implications.
Datadictionary (11.6)

The complexity of the data dictionary depends on the capabilities of the database engine. Most PC based systems have a 3rd generation hierarchical database. Workstation based systems almost all use a relational DBMS. Matrix (not in review) is the first PDM system to offer functionality based on a real OODBMS.

Backup & Restore (11.7)

The back-up and restore function, and the tracking of history data, is mostly performed by the database itself. The database systems are not always self-repairing after crashes, sometimes this function is automatically performed by the internal database manager.
The POM market has rapidly evolved in the past three or four years, and is currently becoming a major component in the information technology market. CIMdata's investigation of the POM market shows a growth of 36% in 1994. Only in the Netherlands a variety of over 50 products is offered in the market.

POM technology has a growing acceptance in the industry. POM technology is appreciated by the companies using POM. A recent review, also by CIMdata, of companies who implemented POM, showed that 98% of the companies would immediately implement POM again.

The need for POM solutions often begins at the level of a need for document management solutions. Dependent on the company strategy and demands, the second most important aspect may be workflow management or product structure management. If there is to be expected a basic need for only document management solutions in the coming several years, it should be considered and is possible to start with only the document management module of a PDM system. The products in the market are rapidly adapting to this philosophy. The products are becoming more modular with functional building blocks.

Developers tend to return to the development of 'core POM technology'. They often use and implement facilitating modules from third party developers. The viewing, mark-up and redlining modules were the most common areas in this field in the past, but now also the use of a third party graphical user interface (GUI) is growing. Many leading POM products already have a third party GUI. Also database interfaces are becoming more general, making the support of a broad scope of database engines possible. Finally, a very interesting development is that even functional PDM modules are being used from third parties. In one case a document management system uses the product structure module of another PDM system. In another case a vendor uses a complete third party POM system as an 'engine' for its own data management products.

The commercial strategy for selling and use of value added resellers (VAR) is not always clear to the potential PDM buyer. Who develops and sells which products may differ from country to country. In one case a PDM developer who did not sell its own PDM product, did resell another third party PDM product.

Integration areas are growing rapidly. CAD/CAM/CAE support is extending, but the main target area for development will be the interface to MRP/PPS systems. Though some good initiatives are on the way, the coming one or two years this will need to be a major area of development and improvement forced by the market's need for solutions.

A new area that begins to develop is the support of Software Configuration Management (SCM). In this area configuration support of software development programs and interfaces with development tools can be expected in the near future.
## Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>APL</td>
<td>Application Programming Language</td>
</tr>
<tr>
<td>API</td>
<td>Application Programming Interface</td>
</tr>
<tr>
<td>BFA</td>
<td>Business Focal Area</td>
</tr>
<tr>
<td>BLOB</td>
<td>Binary Large Object</td>
</tr>
<tr>
<td>BOM</td>
<td>Bill of Material</td>
</tr>
<tr>
<td>BPM</td>
<td>Business Process Management</td>
</tr>
<tr>
<td>CAD</td>
<td>Computer Aided Design/Computer Aided Drafting</td>
</tr>
<tr>
<td>CAE</td>
<td>Computer Aided Engineering</td>
</tr>
<tr>
<td>CAM</td>
<td>Computer Aided Manufacturing</td>
</tr>
<tr>
<td>CE</td>
<td>Concurrent Engineering</td>
</tr>
<tr>
<td>DBMS</td>
<td>Database Management System</td>
</tr>
<tr>
<td>DIN</td>
<td>Deutsche Industrie Norm</td>
</tr>
<tr>
<td>Dfl</td>
<td>Dutch Guilders</td>
</tr>
<tr>
<td>ECO</td>
<td>Engineering Change Order</td>
</tr>
<tr>
<td>ECR</td>
<td>Engineering Change Request</td>
</tr>
<tr>
<td>EDM</td>
<td>Engineering Data Management</td>
</tr>
<tr>
<td>IPD</td>
<td>Integrated Product Development</td>
</tr>
<tr>
<td>ISO</td>
<td>International Standardization Organisation</td>
</tr>
<tr>
<td>GUI</td>
<td>Graphical User Interface</td>
</tr>
<tr>
<td>MPS</td>
<td>Master Produktion Schedule</td>
</tr>
<tr>
<td>MRP-I</td>
<td>Material Requirements Planning</td>
</tr>
<tr>
<td>MRP-II</td>
<td>Manufacturing Resources Planning</td>
</tr>
<tr>
<td>OODBMS</td>
<td>Object-oriented Database Management System</td>
</tr>
<tr>
<td>PDM</td>
<td>Product Data Management</td>
</tr>
<tr>
<td>PPS</td>
<td>Production Planning System</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>QFD</td>
<td>Quality Function Deployment</td>
</tr>
<tr>
<td>RDBMS</td>
<td>Relational Database Management System</td>
</tr>
<tr>
<td>SCM</td>
<td>Software Configuration Management</td>
</tr>
<tr>
<td>WBS</td>
<td>Work Breakdown Structure</td>
</tr>
<tr>
<td>WFM</td>
<td>Workflow Management</td>
</tr>
</tbody>
</table>
Appendix B  Literature


Appendix C  PDM Business Questionnaire

Introduction

This appendix contains the PDM Business Questionnaire for the selection of PDM (Product Data Management) systems. By means of this questionnaire a company can define its company specific requirements for product data management solutions. The PDM Business Questionnaire is part of the selection method for PDM systems. In this method the company specific requirements are compared with the market support of these requirements. This will result in a short list of software products which best support the specific demand. It is also possible to add limiting conditions such as the maximum cost of the total system or the hard- and software environment.

The questionnaire is composed of two sections. The first section is the section for the functional requirements. In this section the need for a number of 'core' PDM functions is investigated in 30 questions. The questionnaire asks to rate the importance of PDM functions by none, low, average, high or very high by ticking the applicable box. An explanation to the relevant answer is included. The second section is the section on the limiting conditions for the supporting PDM facilities. Limiting conditions that can be filled in include the cost of the total PDM system for a certain number of users, the operating environment and interfaces to CAD/CAM/CAE and other systems. In this section more than one item (interface, etc) can be marked, including the importance of this interface. The limiting conditions section contains 26 questions.

The PDM selection method is supported by the PDM Selection tool that also contains the forms for the PDM Business Questionnaire. The PDM Selection tool can contain the data of maximum 6 completed questionnaires. At least one questionnaire should be completed in order to perform a proper selection. The result of the filled in questionnaires is two matrices showing the totals of the section for functional requirements and limiting conditions. Also a number of graphs (circle and bar charts) showing the importance or relative importance of the PDM functions will automatically be generated by the PDM Selection tool. When at least one questionnaire is filled in, three types of selections can be calculated:

- The short list selection of PDM systems on the basis of functional requirements; this list shows the top 10 in ranked order of PDM systems that best meet the business specific functional requirements.
- The knock-out list. This is a short list of best suitable PDM systems with the restriction of the cost of the total system.
- The strike-out list. This list represents the top 10 PDM systems, in ranked order, which best meet the environmental requirements such as interfaces, hardware platform, operating system and database support.

This PDM Business Questionnaire has been filled in by:

Name __________________________________________

Function __________________________________________

Department __________________________________________

Company __________________________________________

Date __________________________________________

Signature __________________________________________
## Contents of PDM Business Questionnaire

### Functional requirements

<table>
<thead>
<tr>
<th></th>
<th>General Information</th>
<th></th>
<th>Structure management</th>
<th></th>
<th>Retrieval management</th>
<th></th>
<th>Release management</th>
<th></th>
<th>Change management</th>
<th></th>
<th>Workflow management</th>
<th></th>
<th>Data exchange</th>
<th></th>
<th>User Interface</th>
<th></th>
<th>Customising</th>
<th></th>
<th>System architecture</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Limiting conditions

<table>
<thead>
<tr>
<th></th>
<th>General Information</th>
<th></th>
<th>System Integration</th>
<th></th>
<th>Applications</th>
<th></th>
<th>CAD/CAM/CAE systems</th>
<th></th>
<th>Title block integration</th>
<th></th>
<th>MRP/PPS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>Pricing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.1</td>
<td>Applications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.2</td>
<td>CAD/CAM/CAE systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.3</td>
<td>Title block integration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.4</td>
<td>MRP/PPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>System architecture</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.1</td>
<td>Platforms</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.2</td>
<td>Operating Systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.3</td>
<td>Networks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.4</td>
<td>Databases</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Appendix C-2
Functional requirements

1. General Information

1.1 What is the need for support?
- none: We do not need support; We plan to use an off-the-shelf product and implement it ourselves; we do not need manuals or documentation.
- low: We do not need much support; we plan on implementing the system ourselves, but do need manuals and system documentation.
- average: We will implement the system ourselves, but we want a system training, full documentation and help-desk available.
- high: We expect the distributor to implement the system in our organisation, do in-house training and on site support.
- very high: We expect the distributor to implement the system in our organisation, and do the complete project implementation resourcing including in-house training and on site support.

2. Structure management

2.1 What is the need for classification?
- none: We do not have a classification system for our documents and see no need to install this or improve our current classification capabilities.
- low: We sometimes use classification for certain documents, but we have not had many problems with classification, archiving and retrieving documents yet.
- average: We regularly run into problems with documents because of poor classification and we intend to improve our means of classifying by adding certain attributes to documents.
- high: Classification of documents is lacking and often a problem. We want to significantly improve our means of classification by attributes and group technology.
- very high: Classification is an important issue in our organisation. It has become a point of major concern. We want to implement a complete classification system, including several levels of group technology.

2.2 What is the need for document structure?
- none: We do not have any need for structuring documents or improving our current way of structuring our documents.
- low: We could sometimes use some structured information concerning our documents, but this has no priority.
- average: We recognize the need for structuring our documents and managing metadata, grouping of documents and relations between documents.
- high: The structuring of documents is often a problem in the organisation. Time is wasted because documents are not properly structured. We plan to improve functionality in the near future.
- very high: The structuring of our documents is very important because of complex relations between documents [N:M]. It is of vital importance that we get a firm grip on document structuring.
2.3 What is the need for product structure management?

- **none**: We have no need at all for product structures. Product structures are completely irrelevant for our organisation.
- **low**: We do have some parts that could be captured in some sort of product structure but we can very well do without it.
- **average**: We could use product structures. In the past the problem of product structuring grew bigger. We want to increase our abilities to structure products.
- **high**: We need product structures for the management of our processes. Without a good structure (development) projects would be inefficient and costly. We need a good support of product structuring capabilities.
- **very high**: Product structuring is one of the backbones of our development organisation. We need a thorough product structure management system to deal with our multi-level product structures with multiple views.

2.4 What is the need for configuration management?

- **none**: We do not use or need to fall back on different configurations of products, therefore this feature has no use for us.
- **low**: We do have a couple of configurations which a system could handle.
- **average**: We have different configurations of products and configuration management would be very useful. We want some basic functionality.
- **high**: Configurations is an important issue in our company. We work with all sorts of product configurations and high functionality is a must.
- **very high**: We have many complex products configurations and without a good configuration management support system our organisation would run into major problems.

3 Retrieval management

3.1 What is the need for searching?

- **none**: Currently we have no problems in searching for data and documents, there is no need to improve our means of searching for information. Our department and/or personal archives are fine.
- **low**: Sometimes it happens that we are not able to find information, but this is not of critical importance to projects and not time-consuming.
- **average**: On a regular basis we are not able to search for the right information, we plan to improve this in the future. We want to be able to search in the meta-data of a document.
- **high**: It often happens that we cannot retrieve information. This takes a lot of time and is one of the reasons for future improvement. We want to be able to have pre-defined searches and different search methods.
- **very high**: Searching for information is a major problem in our organisation. We must improve the time and cost spent on this item. We need full searching capabilities for all meta-data elements, full text search etc.
3.2 What is the need for viewing?

- **none** Viewing is not necessary. We have not encountered any problems in this field and do not want to complicate matters by adding this feature. We just want to be able to start the application when the document is found.

- **low** This is not a key function for us. It may be handy for one or two employees but is not necessary. A simple AutoCAD or text viewer would be convenient.

- **average** Almost everyone in our company needs viewing to speed up the work process, but it is not a vital need. We want support of different file format viewing capabilities.

- **high** This is definitely an important feature that saves a lot of time. Company processes would be delayed significantly without it. Views, blow-ups and details of files should be viewed by multiple users.

- **very high** A work area without some viewer capabilities is almost a necessity. Viewing is a key function for our company. We need support of graphical browsers through multiple files and full viewing capabilities.

4 Release management

4.1 What is the need for authorisation?

- **none** No, we do not want any authorisation. The procedures around authorisation are already defined in the practices and procedures manual, and working properly.

- **low** We only need basic access authorisation. This is managed by the access to the system through a login-screen. Only the basic authorisation definitions are needed.

- **average** We sometimes have problems with un-authorised actions in our projects. We would like to be able to define basic authorisation levels for at least each document class.

- **high** We often have problems in the field of authorisation. We need good system supported authorisation rules for creating, deleting, and copying files, as well as the possibility to define different user group levels.

- **very high** Without a strict authorisation, the integrity of our organisation and projects would be severely damaged. We need full capabilities of protection on all data levels, multiple user groups and individual authorisation.

4.2 What is the need for sign-off?

- **none** We do not need automatic sign-off support. Sign-off is done by hand and this is working fine.

- **low** Electronic sign-off might save us time and would improve the traceability in our projects.

- **average** We do not use electronic sign-off right now, but we would like to have this ability. We would need sign-off authorisation at one or two levels in our projects.

- **high** We need to have electronic sign-off in place on short notice. We need to be able to control different release levels in our projects that are variable and depending on document classes and status.

- **very high** The current sign-off procedure is a point of major concern and mistakes. We need authorisation in our sign-off procedures for our projects, folders, documents, versions etc.
4.3 What is the need for status control?

- **none**
  - No status control is needed. The current way of tracking a document status is fine.

- **low**
  - It would be convenient if a certain number of status levels could be used and maintained (at least 1 level)

- **average**
  - We need a basic status control in our organisation. Statuses should be definable, based on document class and organisation structure and maintained automatically.

- **high**
  - Bad status control often leads to failures and cost consequences. The status should be definable and change automatically when a certain condition is met.

- **very high**
  - The management of the current status is vital. Through triggers or other mechanisms the status should automatically be initiated or managed. Also the distribution status should always be clear.

5 Change management

5.1 What is the need for a change process?

- **none**
  - We do not have an official change process and do not need or want to create change requests and orders to define an approval cycle. Changes are traced and effected by hand which gives no problems.

- **low**
  - We sometime have problems with the routing of changes in our projects. We need some change registration functionality to improve the traceability.

- **average**
  - We would like to have a change mechanism. It should be able to create a change request (ECR, Engineering Change Request) or change order (ECO, Engineering Change Orders), so that the documents or parts to be changed are directly related and identified, in order to prevent other persons to change, or sometimes even view them.

- **high**
  - We need change process support. Above the aforementioned we need to be able to define a change process (approval cycle) in the system. This makes it possible to ‘automate’ the change procedure. Tracking of progress should be possible as well as parallel approvals by different persons.

- **very high**
  - Without a thorough change process our organisation would be at a loss. Full support is needed; it should be possible to define standard approval cycles, company as well as project standards, using the effective authorisations.

5.2 What is the need for mark-up & redlining?

- **none**
  - We do not need mark-up & redlining. It is not necessary to make remarks, notes or sketches on the documents. We do this on the paper/hard copy.

- **low**
  - We sometimes need some mark-up functionality e.g. the possibility to make remarks in a memo for each document.

- **average**
  - We need mark-up & redlining. We need to be able to mark-up on the screen, so that we do not need to print a document first. The remarks will be archived in the document history.

- **high**
  - Mark-up & redlining is important for our leadtimes. Besides text mark-up we also need the graphical red-lining functionality with the possibility to use different colours etc.

- **very high**
  - Mark-up & redlining is essential to speed-up our processes. We need full support; remarks of different persons should be maintained in separate layers and should be viewed independently and simultaneously. Also voice and video notes are needed.
5.3 What is the need for version control?
- **none**: We do not need version control. The different document versions need not to be managed at all.
- **low**: We need some basic version management. It must be able to retrieve a certain version in the system, or create a new version of the same document.
- **average**: We need version control. The system must ensure that the user will always work with the latest and correct version.
- **high**: Version control is important in our company. Document versions must be maintained and numbered by the system automatically, based on our document classes. If there is a revision of a document that belongs to a group, the group also needs to get a revision.
- **very high**: Version control is essential. In addition to the above we need version control of your products, and BOM's related to our documents.

5.4 What is the need for history management?
- **none**: We have no need for computerised history management. History of documents, data, changes or other events is not needed.
- **low**: We need some basic history management, but only of certain documents, because change management is done by hand.
- **average**: We need a history management functionality. We need to have the history of changes and other events, as well as the support of change management by the system.
- **high**: History management is important. In addition to the above we want to be able to make a version history overview of a document, in order to report.
- **very high**: A proper history management is essential. We must also be able to define which items must be archived, because we do not need everything to be historically documented.

6 Workflow management

6.1 What is the need for document routing?
- **none**: We do not need to (automatically) route documents in our organisation. The current way of distributing paper documents is sufficient.
- **low**: We could use some basic routing of documents, i.e. sending a document by mail to another network user.
- **average**: Document routing is needed as a normal facility in our organisation. We need basic support of mailing messages with documents and notification.
- **high**: Document routing is an important means of communication in our organisation. We need to be able to send documents or folders of documents to one or more readers at the same time, with all notifications to the receiver and sender.
- **very high**: Document routing is an essential functionality for improving our lead-times. In addition to the above we need automatic routing on the basis of status and triggers, designation of tasks and responsibilities, tracking and redirecting of documents and all sorts of information merges.
6.2 What is the need for process modelling?

- **None**
  - There is no need for process modelling.

- **Low**
  - We should be able to use a basic pre-defined Work Breakdown Structure (WBS) in the system.

- **Average**
  - We should be able to define our own WBS with our own tasks.

- **High**
  - In addition to specific WBS modelling we need support of time scheduling and a monitoring functionality.

- **Very high**
  - We need full support of process modelling functionality. In addition to this we also need to be able to connect the WBS with the Product structure.

6.3 What is the need for process management?

- **None**
  - We do not need any management of our processes.

- **Low**
  - In some cases we need to be able to report on routing status of documents.

- **Average**
  - We need a basic support of process management. We need the ability to define and report on routing status of documents and documents.

- **High**
  - Process management is very important. In addition to the above we need automatic notification on events and scheduling of certain activities in time.

- **Very high**
  - We need full functionality for process management, tracking of deadlines etc.

6.4 What is the need for planning?

- **None**
  - We do not need any planning facilities. Our current way of planning activities is sufficient.

- **Low**
  - We might need some basic planning support i.e. deadlines for finishing documents.

- **Average**
  - We need planning capabilities but we want them by interfacing with our current project planning system.

- **High**
  - Planning is an important function. We want to be able to define activities in the PDM system, and relate these activities to documents. We also want to define priorities and dependencies between activities.

- **Very high**
  - We need full planning capabilities; automatic rescheduling and repositioning of activities and support of all planning data and facilities.

6.5 What is the need for communication?

- **None**
  - We do not need any communication support; our current mailing and messaging system has all the required support.

- **Low**
  - We might need some support of E-mail functionality, in order to send a document to another internal user.

- **Average**
  - We need to have automatic communication and messaging and need E-mail support by the system.

- **High**
  - Communication facilities are very important; we need support of E-mail and active notification by the PDM system of actions to take.

- **Very high**
  - We need full communication support. In addition to the above we need to be able to address geographically spread users. And have notification of sent and received messages.
7 Data exchange

7.1 What is the need for data transportation?
- none Our current way of sending documents and data does not need improvement.
- low We could use some support in sending documents and other data to another user or system in the future.
- average We need to be able to direct a certain file to a certain user by means of the PDM system. We need to be able to create a distribution list and manage all our data distribution.
- high There is a lot of data transportation in our organisation. The PDM system automatically needs to move data including meta data to the next user in the process on the basis of event or time constraints.
- very high In addition to the above we need database in- and export functionality and distribution over geographically spread locations, with local filenames.

7.2 What is the need for data translation?
- none We do not need the PDM system to translate data. Our applications have translators that suit our need.
- low We sometimes would like to be able to translate data and meta data to a standard format.
- average We need to have the ability in the PDM system to translate data and meta data to a standard format.
- high Data translation is important. In addition to the above the PDM system has to automatically translate and move data from one CAD system to another, so as the user always has the right information in the right format.
- very high Data translation is essential. In addition to the above we need file compression facilities and Optical Character Recognition (OCR) functionality, and automatic conversion of data, times and units to different types of systems.

8 System Integration

For the system integration conditions see the section on limiting conditions

9 User Interface

9.1 What is the need for operational features?
- none There is no specific demand for special operational features such as action logging and application launching for the PDM system.
- low In the near future we want to be able to launch CAD- and other applications from the PDM system.
- average We need to be able to launch CAD- and other applications from the PDM system. We also need logging of user activities in the system.
- high In addition to the above we need to have support of multiple languages, input consistency and mouse support.
- very high We need full support of operational user interface features including query logging, system confirms on actions, and different languages at the same time.
9.2 What is the need for presentational features?

- **none** We are not really interested in the way in which the system will interface with the user on his terminal.
- **low** We would like some basic support of windows, or window-type of user interface.
- **average** We need to have support of a windows-based graphical user interface on as well the server as the client.
- **high** We need a broad support of the GUI in MS-Windows, Windows NT and/or OSF/Motif.
- **very high** The presentational features of the system are very important. In addition to the above we also need to able to define a user-specific interface (unique for each user) and icons.

9.3 What is the need for help?

- **none** In practice we never use the help function, so we do not have any special requirements.
- **low** In rare case we might need a help function.
- **average** A help function must be available in the system.
- **high** We need a full explanatory help-function for all commands, menus and screens.
- **very high** In addition to the above the help-function also needs to be context sensitive.

10 Customising

10.1 What is the need for customisation?

- **none** We plan to use the standard off-the-shelf product without any customisation.
- **low** We will probably need to make some basic adaptations to the menus and naming conventions.
- **average** We need to be able to customise the user screens, colours, naming conventions and language support.
- **high** Customising is an important aspect for the implementation of the PDM system in our organisation. In addition to the above we need to be able to create our own reports and queries, and the contents or menus and lists. A package of customisations made by other users is welcome.
- **very high** We need full support of customising capabilities. In addition to the above we need to be able to make a user-specific customisation. Also dependencies between choices already made and creation of new product groups and other relational aspects need to be definable.

10.2 What is the need for tailoring?

- **none** We do not need to tailor the system to our organisation. We will accept the system in the way the software developer has designed it.
- **low** We would like to have some standard options to tailor the system to our needs.
- **average** We need to have standard options for menus, so we do not need to build our own customisation, but can choose from the standard options.
- **high** We expect the system to be broad and well suitable for many types of organisations. We need to have a number of optional standard pre-defined workflow processes and menus.
- **very high** In addition to the above we also need standard ISO and DIN libraries.
10.3 What is the need for reports?

- **none** We do not need report facilities from the system.
- **low** We sometimes need to make a list of managed files and versions.
- **average** The standard reports the system can generate will in most cases fit our need.
- **high** In addition to the above we need the ability to create user defined reports.
- **very high** We need to have full and flexible report functionality.

11 System architecture

11.5 What is the need for distributed databases?

- **none** We do not need support of distributed databases.
- **low** We might need a distributed database concept in the future.
- **average** We need basic support of the concept of a distributed database.
- **high** We need support of distributed databases on geographically spread locations. And management of all data (vaults) and meta data.
- **very high** In addition to the above we need the system to be always 100% operational, also when new storage areas are being defined.

11.6 What is the need for data dictionary support?

- **none** We do not really care how the PDM system internally manages the data.
- **low** We might sometimes need to make queries on the data dictionary (without using the PDM system).
- **average** We must be able to create queries on the data dictionary for the direct retrieval of information through a supported standard query language (SQL).
- **high** We need to be able to define attributes, attribute types and tables in the data dictionary and form our own data concept in the PDM system.
- **very high** The way in which the data dictionary can be approached and defined should be open and accessible.

11.7 What is the need for backup & restore?

- **none** We do not need any special back-up facilities from the PDM system.
- **low** It might be handy to have some way of automatic vault back-up in the future.
- **average** We need to be sure that no information is lost on our projects. The PDM system should provide standard back-up facilities that can manually be initiated for the back-up of vault and meta data.
- **high** The security of our project information is a vital part of the organisation. We need tracking of files on external media (tape/storage) and ability to easy and fast restore data.
- **very high** Data security is essential. In addition to the above the system needs to automatically back-up or restore data on triggers such as deadlines. Also the system must be able to detect defaults and inconsistencies, and automatically repair these in the database.
Limiting conditions

1. General Information

1.2 Pricing

1.2.1 How many users will the system eventually have?
This number needs to be filled in once or divided if filled in in more than one PDM Business questionnaire.
No. of users total system: ________

1.2.2 What is the maximum cost (for only the PDM software) of the total system?
This price needs to be filled in once or divided if filled in in more than one PDM Business questionnaire (Dutch guilders).
Cost total system: Dfl. ________

8 System Integration

8.1 Applications

8.1.1 What is the importance of the PDM system being able to interface with applications (text, spreadsheets, and other PDM systems)
- none We do not the PDM system to have any interfaces to applications.
- low We might need some interfacing to applications in the future.
- average We need basic registration of application files.
- high The PDM system must be able to interface to applications (encapsulation).
- very high The PDM system must be fully integrated with the applications.

8.1.2 With which of these text editing applications are joinings or interfaces required?
- Wordperfect
- MS-Word

8.1.3 With which of these spreadsheet applications are joinings or interfaces available as a standard?
- Lotus 1-2-3
- Quattro
- Excel

8.1.4 With which of these PDM systems should the PDM system be connectable?
- CADIM/EDB
- DMCS
- EDM
- Sherpa
8.2 CAD/CAM/CAE systems

8.2.1 What is the importance of the PDM system being able to interface with CAD/CAM/CAE systems?
- none The PDM system does not need to have any interface with CAD/CAM/CAE systems.
- low We might need some interfacing to CAD/CAM/CAE systems in the future.
- average We need basic registration of CAD/CAM/CAE files.
- high The PDM system must be able to interface with CAD/CAM/CAE systems (encapsulation).
- very high The PDM system must be fully integrated with the CAD/CAM/CAE systems.

8.2.2 With which CAD/CAM system(s) is interfacing required?
- Anvil 5000
- AutoCAD
- Bravo
- CADAM (professional)
- CADDS
- CADDY
- CATIA
- DOGS
- Euclid
- Generic Cadd
- I-DEAS
- I/EMS (Intergraph)
- ME10/ME30
- Medusa (Prime)
- Mentor graphics
- MicroCADAM
- MicroStation
- PC-DRAFT
- Personal Designer
- PRO/Engineer
- Unigraphics

8.2.3 With which FFE system is interfacing required?
- Abaqus
- Ansys
- Cosmos
- Diana
- Marc
- Nastran
8.3 Title block integration

8.3.1 What is the importance of title block integration with the CAD/CAM system?
- **none** We do not the PDM system to have any title block integration with our CAD/CAM system.
- **low** We might need some title block integration to our CAD/CAM system in the future.
- **average** We need one-way integration of basic title block information with our CAD/CAM system.
- **high** The PDM system must be able to integrate all title block information with our CAD/CAM system (encapsulation).
- **very high** The PDM system must be fully bi-directional integrated with our CAD/CAM system.

8.3.2 With which CAD/CAM/CAD system(s) is title block integration needed?
- Anvill 5000
- AutoCAD
- Bravo
- CADAM
- CADDs
- CADDY
- CATIA
- DOGS
- Euclid
- Generic Cadd
- I-DEAS
- I/EMS (Intergraph)
- ME10/ME30
- Medusa (Prime)
- Mentor graphics
- MicroCADAM
- MicroStation
- PC-DRAFT
- Personal Designer
- PRO/Engineer
- Unigraphics
8.4 MRP/PPS

8.4.1 What is the importance of integration with MRP/PPS systems?

- **none** The PDM system does not need to have any integration with our MRP/PPS system.
- **low** We might need some integration with our MRP/PPS system in the future.
- **average** We need a basic integration that is able to transport data from the PDM system to our MRP/PPS system (data exchange file).
- **high** The PDM system must have an (one-way) integration with our MRP/PPS system and must automatically update product data from our PDM system to the MRP/PPS system.
- **very high** The PDM system must be fully integrated with our MRP/PPS system and have a bi-directional data link.

8.4.2 With which MRP/PPS systems is/are integrations or joinings required and should be standard and available within the PDM-system?

- Avalon
- Bedrijfsbeheer
- BPICS
- CINCOM
- Control: Manufacturing
- E-Pas
- Include
- MAC-PAC open
- MARCAM
- MFG/Pro
- Oracle Manufacturing
- Puss-O
- Probe
- Prodin P2
- Propac-X
- PSystem
- RPS
- SAP
- Strategy
- Triton

8.4.2 With which Project Management systems is/are integrations or joinings required and should be standard and available within the PDM-system?

- Superproject
- PARISS Enterprise
- Ontarget
- Primavera Project Planner
- Project
- Project Manager Workbench
- MS-project
- CAT
- Artemis
11. System architecture

11.1 Platforms

11.1.1 What is the importance of the support of the required platform?
- none: We do not need the PDM system to run on a specific platform.
- low: It might be convenient if the PDM system would operate on our current platform.
- average: The PDM system should operate on our current platform.
- high: The PDM system should be able to support not only our own platform, but also the platform in other departments.
- very high: The PDM system should have full support of all our platforms in the enterprise (departments and divisions).

On which platform should the PDM system run?

<table>
<thead>
<tr>
<th>Platform</th>
<th>As server</th>
<th>As client</th>
<th>As stand-alone</th>
</tr>
</thead>
<tbody>
<tr>
<td>286</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>386</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>486</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple Macintosh</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple Classic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bull</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control Data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital VAXstation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital DECstation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Alpha AXP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HP-9000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HP/Apollo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBM RS/6000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBM AS/400</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pentium (586)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PowerPC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silicon Graphics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sun SparcStation2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sun ClassicX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X-terminal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11.1.3 On how much internal memory should the PDM system be able to run (minimum)?
- less than 2 MB
- = < 4 MB
- = < 16 MB
- more than 16 MB

11.1.4 How much external memory (disk space) is the PDM system and vault allowed to use?
- Less than 40 MB
- = < 120 MB
- = < 600 MB
- more than 600 MB
11.2 Operating Systems

11.2.1 What is the importance of the support of the required operating system?

- **none**: We do not need the PDM system to run on a specific operating system.
- **low**: It might be convenient if the PDM system would operate on our current operating system.
- **average**: The PDM system should operate on our current operating system.
- **high**: The PDM system should be able to support not only our own operating system, but also the operating system in other departments.
- **very high**: The PDM system should have full support of all required operating systems in the enterprise (departments and divisions).

11.2.2 On which operating systems should the PDM system run?

<table>
<thead>
<tr>
<th>Operating System</th>
<th>As server</th>
<th>As client</th>
<th>As stand-alone</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple-OS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clix</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HP-UX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irix</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS-DOS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS-Windows 3.x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MVS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OSF/1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OS/2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solaris</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNIX ITT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ultrix</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VMS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VSE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Windows NT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Xenix</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11.2.3 Should the PDM system be able to work stand alone on a PC?

- **no**
- **yes, under OS-2**
- **yes, under MS-DOS**
- **yes, under MS-windows**
- **yes, under Windows NT**
11.3 Networks

11.3.1 What is the importance of the support of the required network/protocol?
- none: We do not need the PDM system to run on a specific network/protocol.
- low: It might be convenient if the PDM system would operate on our current network/protocol.
- average: The PDM system should operate on our current network/protocol.
- high: The PDM system should be able to support not only our own network/protocol, but also the network/protocol in other departments.
- very high: The PDM system should have full support of all required network/protocols in the enterprise (departments and divisions).

11.3.2 Which network system or protocol should be supported by the PDM system?
- 3Com
- Banyan VINES
- DECnet
- Ethernet
- HP netwerk
- IBM-PCLAN
- LANtastic
- LANmanager
- NetBIOS
- NFS
- Novell
- PCNFS
- PCSA/Path works
- TCP/IP
- Token ring
- XNS

11.4 Databases

11.4.1 What is the importance of the support of the required database?
- none: We do not need the PDM system to run on a specific database.
- low: It might be convenient if the PDM system would operate on our current database.
- average: The PDM system should operate on our current database.
- high: The PDM system should be able to support not only our own database, but also the database in other departments.
- very high: The PDM system should have full support of all required databases in the enterprise (departments and divisions).
11.4.2 Which database-engine(s) should be supported by the PDM system?
- Adabas
- AllBase (HP)
- DB2
- BasisPlus
- dBase III
- dBase IV
- Btrieve
- Fairpro
- Foxpro
- Gupta SQL server
- IDMS
- Informix
- Ingres
- Netware SQL Server
- Nonstop SQL
- ORACLE
- Paradox
- RAIMA (dBvista)
- RDB
- Sybase
- Unify
- Proprietary
- OODBMS

11.4.2 From which databases should data import be possible?

<table>
<thead>
<tr>
<th>Database</th>
<th>As ASCII</th>
<th>With External modules</th>
<th>With Bridges (interfaces)</th>
<th>As DB-integrator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adabas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AllBase (HP)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DB2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BasisPlus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dBase III</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dBase IV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Btrieve</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faircom C-tree</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foxpro</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gupta SQL server</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDMS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informix</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ingres</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netware SQL Server</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nonstop SQL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ORACLE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paradox</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAIMA (dBvista)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RDB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sybase</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unify</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proprietary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OODBMS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix D  PDM System questionnaire

Introduction

This appendix contains the PDM System questionnaire for evaluation of PDM systems. The questionnaire is intended to give a clear overview of the capabilities of a PDM system.

The PDM System questionnaire is composed out of several sections. At first, a chapter with several general questions about general items such as supplier, developer, vendor, software price and support is included. Secondly, the chapters 2 to 6 cover questions about most of the 'core' functionality of the PDM system, e.g. retrieval, release and change management. Thirdly, the chapters 7 and 8 include aspects of data exchange and integration. Chapters 9 and 10 go into the user-interface and customisation, finally followed by a chapter about the system architecture.

There are different types of questions in the PDM System questionnaire.

- open questions
- yes/no questions
- multiple choice questions

Most questions can (and need to) be answered by yes or no. However, sometimes more than one box can be chosen. In this case every applicable box has to be ticked.

This questionnaire may be filled out for the PDM system in its most complete form. This means including all modules.

This PDM System questionnaire has been filled in by:

Name

Company

Date

Signature

The PDM System questionnaire has been filled in with the following configuration:

Platform

Operating system
## Contents of PDM System questionnaire

1. General Information .......................................................... D-4  
   1.1 Product information ............................................... D-4  
   1.2 Modularity .......................................................... D-4  
   1.3 Software typology .................................................. D-4  
   1.4 Vendor information ................................................. D-4  
   1.5 Contact person information ...................................... D-5  
   1.6 Developer information ............................................. D-5  
   1.7 Commercial information .......................................... D-5  
   1.8 Pricing ............................................................. D-6  
   1.9 Support ............................................................. D-7  

2. Structure Management ..................................................... D-9  
   2.1 Classification ....................................................... D-9  
   2.2 Document structure ................................................ D-9  
   2.3 Product structure management .................................... D-11  
   2.4 Configuration management ......................................... D-12  

3. Retrieval Management .................................................... D-13  
   3.1 Searching ........................................................... D-13  
   3.2 Viewing ............................................................ D-14  

4. Release Management ....................................................... D-16  
   4.1 Authorization ....................................................... D-16  
   4.2 Sign-off ............................................................ D-17  
   4.3 Status control ...................................................... D-17  

5. Change Management ........................................................ D-18  
   5.1 Change process ...................................................... D-18  
   5.2 Mark-up & Redlining ............................................... D-19  
   5.3 Version control ..................................................... D-19  
   5.4 History management ................................................ D-20  

6. Workflow Management ..................................................... D-21  
   6.1 Document routing ................................................... D-21  
   6.2 Process modeling ................................................... D-21  
   6.3 Process management ............................................... D-22  
   6.4 Planning ............................................................ D-22  
   6.5 Communication ...................................................... D-23  

7. Data Exchange ............................................................. D-25  
   7.1 Data transportation ................................................ D-25  
   7.2 Data translation .................................................... D-25  

8. Systems Integration ........................................................ D-27  
   8.1 Applications ........................................................ D-27  
   8.2 CAD/CAM/CAE systems .......................................... D-27  
   8.3 Title block integration ........................................... D-28  
   8.4 MRP/PPS ............................................................. D-29  

9. User-Interface ............................................................. D-30  
   9.1 Operational features .............................................. D-30  
   9.2 Presentational features .......................................... D-31  
   9.3 Help .............................................................. D-31
10. Customising ................................................................. D-32
10.1 Customization .......................................................... D-32
10.2 Tailoring ................................................................. D-33
10.3 Reports ................................................................. D-33

11. System architecture .................................................... D-34
11.1 Platforms ............................................................... D-34
11.2 Operating Systems ................................................... D-35
11.3 Networks ............................................................... D-35
11.4 Databases .............................................................. D-36
11.5 Distributed databases ............................................... D-37
11.6 Datadictionary .......................................................... D-37
11.7 Backup & Restore ..................................................... D-38

PDM System questionnaire

Appendix D-3
1. General Information

1.1 Product information

- **Product name**: 
- **Alias**: 
- **Last version**: 
- **Last version date**: 
- **First release date**: 
- **No. of major upgrades since last version**: 
- **Expected next release date**: 

1.2 Modularity

<table>
<thead>
<tr>
<th>Name</th>
<th>Price[DFL]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td></td>
</tr>
</tbody>
</table>

1.3 Software typology

Positioning of software:
- office environment
- production environment
- engineering environment
- total quality support
- planning environment

1.4 Vendor information

- **Vendor name**: 
- **Address**: 
- **City**: 
- **Country**: 
- **Telephone**: 
- **Fax**: 

Appendix D-4 PDM System Questionnaire
1.5 Contact person information

name

address

city

telephone

fax

1.6 Developer information

name

address

city

country

telephone

fax

Developer typology
- CAD developer
- independent PDM developer
- platform developer
- systems integrator

main business of developer

1.7 Commercial information

<table>
<thead>
<tr>
<th>Location</th>
<th>No. seats</th>
<th>No. systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA / Canada</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belgium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Great Britain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total worldwide

PDM System questionnaire
### 1.8 Pricing

#### 1.8.1 What is the cost of a base licence (modules A/B/C - see 1.2)?

<table>
<thead>
<tr>
<th>Seats</th>
<th>Extra user</th>
<th>10 Seats</th>
<th>Discount %</th>
<th>100 Seats</th>
<th>Discount %</th>
<th>&gt; 100 Seats</th>
<th>Price per seat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Seat (Vault)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Seats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 Seats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 100 Seats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 1.8.2 What is the cost of a full licence (modules A/B/C/D/E/F - see 1.2)?

<table>
<thead>
<tr>
<th>Seats</th>
<th>Extra user</th>
<th>10 Seats</th>
<th>Discount %</th>
<th>100 Seats</th>
<th>Discount %</th>
<th>&gt; 100 Seats</th>
<th>Price per seat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Seat (Vault)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Seats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 Seats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 100 Seats</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 1.8.3 What is the pricing is based on?

- [ ] concurrent users (a certain no. of people simultaneously)
- [ ] registered users (only certain people)
- [ ] users by node (a certain no. of terminals)

#### 1.8.4 Support Price per year (full license)

(with agreement of supporting)

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

#### 1.8.5 Upgrade Price per year (version update)

(without agreement of supporting and full license)

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

#### 1.8.6 Training Price

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

#### 1.8.7 How many people can work with the PDM system at the same time?

- [ ] 1
- [ ] 1 - 10
- [ ] 10 - 100
- [ ] 100 or more

---

Appendix D-6  

PDM System Questionnaire
1.9 Support

1.9.1 Is a helpdesk available?
   - no
   - yes

1.9.2 Is remote support possible?
   - no
   - yes

1.9.3 Does supplier/vendor run a electronic bulletin board?
   - no
   - yes

1.9.4 Which services are available at implementation?
   - delivery
   - installation
   - customization
   - data conversion
   - testing
   - training
   - project control (remote)
   - staffing (close control)

1.9.5 If user training is available: where can the training be given?
   - at the customer site
   - at vendor
   - through self-study

1.9.6 What types of manuals are available?
   - implementation / start-up guide
   - user manual
   - technical system manual
   - reference guide
   - administrator’s guide
   - customization guide

1.9.7 On which media are manuals available?
   - software ("help" command)
   - book or album
   - compact disk, not approachable from PDM
   - compact disk, approachable from PDM

1.9.8 What are the languages in which these manuals/guides are written?
   - Dutch
   - English
   - German
   - French

1.9.9 How many years will old system versions be supported (without maintenance license)?
   - 0
   - 1
   - 2
   - 3 or more
1.9.10 How many business partners (consulting/support) are available in Holland to develop a specific customer solution?

- 0 no. of partners outside Holland
- 1
- 2 - 3
- 4 - 5
- 6 or more

1.9.11 User group in the Netherlands

<table>
<thead>
<tr>
<th>name user group</th>
<th>contact person</th>
<th>address / city</th>
<th>tel./fax.</th>
</tr>
</thead>
</table>

1.9.12 User group in the world

<table>
<thead>
<tr>
<th>name user group</th>
<th>contact person</th>
<th>address / city</th>
<th>tel./fax.</th>
</tr>
</thead>
</table>
2. Structure Management

2.1 Classification

2.1.1 Which kind of classification can be defined?
- None
- Standard classification (one document can belong to one class)
- Flexible classification (one document can belong to many classes)

2.1.2 How many levels (hierarchically) does the classification have?
- 1
- 2 - 3
- 4 - 5
- 6 or more

2.1.3 Is it possible to show the graphical aspects of the classification structure?
- No
- Yes, but only viewing
- Yes, viewing and modifying

2.2 Document structure

2.2.1 Can a document carry meta-information in the form of attributes? If yes how many attributes?
- No
- Yes, 1 - 30
- Yes, 31 - 50
- Yes, 51 or more

2.2.2 Is it possible to define a default attribute value?
- No
- Yes
- Yes, and the default attribute value can depend on another attribute value

2.2.3 Which metadata can be generated automatically if a document is archived?
- Document/file name
- Datatype/class
- Application version
- Creating date
- Creator
- Version/release level
- Status

2.2.4 Can documents be temporarily grouped to one folder (or envelope)?
- No
- Yes

2.2.5 Can a folder carry meta-information in the form of attributes? If yes how many attributes?
- No
- Yes, 1 - 30
- Yes, 31 - 50
- Yes, 51 or more

2.2.6 Can a folder consist of references, so that it is not necessary to merge the ‘physical file’?
- No
- Yes
2.2.7 What kind of relations can be defined between documents?
- no relations
- one document can be related to only one document (flat) [1:1]
- one document can consist of many documents (single-level hierarchically) [1:N]
- one document can consist of many documents and these can also consist of many other documents (multi-level hierarchically) [N:M]

2.2.8 Is it possible to link different kind of documents e.g. an image-based document with a text document?
- no
- yes

2.2.9 In which way can the relations be presented?
- not possible
- textual list
- graphical in textual form
- graphical with type icons
- graphical with thumbnail images

2.2.10 Is it possible to relate a memo(document) to a document (e.g. a drawing)?
- no
- yes, but only one memo
- yes, many memos

2.2.11 Is it possible to relate a memo(document) to a group of documents (so-called: folder or envelope)?
- no
- yes, but only one memo
- yes, many memos

2.2.12 Is it possible to relate a memo(document) to a BOM?
- no
- yes, but only one memo
- yes, many memos

2.2.13 Is it possible to assign information within a relation between two documents?
- no
- yes

2.3 Product structure management

2.3.1 Is it possible to create and to manage a product structure?
- no
- yes, but the product structure must be made in a PDM system
- yes, the product structure can also be converted from the components or parts structure of a CAD system.

2.3.2 Is a BOM managed as a file or a table from a database? (BOM is retrieved from the database)
- file
- table from a database

2.3.3 How many levels can a product structure have?
- 2-3
- 4-5
- 6-7
- 8 or more
2.3.4 How many product structure views are possible, without double storage?
- 1
- 2
- 3 - 4
- 5 or more

2.3.5 Which product structure or Bill Of Materials (BOM) can be generated?
- single-level (Top down)
- multi-level (indented) (Top down)
- summarized BOM (total) (Top down)
- single-level Where Used Parts List (Bottom up)
- indented-level Where Used Parts List (Bottom up)

2.3.6 Which operations are allowed in a BOM?
- to add an article
- to remove an article
- to change the number of articles.

2.3.7 Is it possible to scan a product structure for special requirements, in a way that all product parts are checked for accordance with that requirement?
- no
- yes

2.3.8 Is it possible to define multiple effectivity schemes (E.S.) within a BOM? (E.S. are used to determine which part revision to use when a product is assembled)
- no
- yes
- yes, with e.g. serial number, date and lot

2.3.9 Is it possible to define alternate parts or optional parts within the product structure?
- no, none
- yes, only alternate parts
- yes, only optional parts
- yes, both

2.3.10 Is it possible to indicate parts in a drawing with a positions number (post number) and show this number on the BOM?
- no
- yes, but only in the drawing
- yes, in the drawing and on the BOM

2.3.11 If the Bill Of Materials is displayed on screen, is it possible to directly view a drawing of the selected part of a BOM?
- no
- yes, by clicking on the part number
- yes, a smaller view of the picture is displayed

2.3.12 Is it possible to define generic BOMs?
- no
- yes

2.3.13 Is it possible to have a graphical display (with boxes and lines) of a product structure that shows multiple assembly levels?
- no
- yes
2.4 Configuration management

2.4.1 Does the system provide a way of managing multiple configurations of products?
- no
- yes, 2 - 10 configurations of one product
- yes, 11 or more configurations of one product

2.4.2 Is it possible to alter a few parts in a standard product structure and store this as a new configuration of the standard product structure?
- no
- yes

2.4.3 Is it possible to define BOMs where permitted combinations can be stored, and where restricted combinations are excluded automatically?
- no
- yes

2.4.4 Is it possible to store and retrieve old product configurations?
- no
- yes
3. Retrieval Management

3.1 Searching

3.1.1 If there are many versions of a document, will the system automatically select the last version?
- no
- yes

3.1.2 Is it possible to search for a specific word?
- no
- yes, within an attribute
- yes, within a memo related to a document
- yes, inside the complete document (full text search)

3.1.3 Does the system support 'knock-out list searching' by entering one criterion at a time, decreasing the amount of options in a close-list?
- no
- yes, but only one criterion
- yes, multiple criteria, but former criteria have to be retyped
- yes, multiple criteria, and the new criterion can be added

3.1.4 Which ways are available for selection?
- ranges (>, <)
- logical combinations (and, or)
- fuzzy search
- wildcard

3.1.5 A query selection can relate to:
- all documents not including last query section.
- all documents including last query section.
- only the documents of the last query section.

3.1.6 Is it possible to have a personal query library with quite a few applied queries?
- no
- yes

3.1.7 Which methods are available to combine graphical data (drawings)?
- layer
- object
- block
- symbol
- x-reference

3.1.8 Is it possible to sort the selected document types? (documents, parts, data files)
- no
- yes, it is possible to define the order of the attributes
- yes, it is possible to define decreasing or increasing order of an attribute
- yes, both
3.2 Viewing

3.2.1 Which view applications are available (without running the application)?
- Excel
- Lotus
- MS Word
- own CAD view format (fast raster)
- Quattro
- raster format
- vector format
- Word Perfect

3.2.2 Which CAD-view applications are available? (without running the application)?
- AutoCAD DWG
- AutoCAD DXF
- Bravo
- CADAM
- CADDY
- CADDs
- CATIA
- DOGS
- Euclid
- Generic Cadd
- I-DEAS
- I/EMS (Intergraph)
- ME10/ME30
- Medusa (Prime)
- MicroCADAM
- MicroStation
- PC-DRAF T
- Personal Designer
- PRO/Engineer
- Unigraphics

3.2.3 Which raster and bitmap formats are supported by the system?
- BMP/DIB
- FIF (Fractal)
- GIF
- GKS
- GXT
- GP3
- GP4
- HPGL
- JPEG
- PCX
- PHIGS
- RNL
- TGA (Targa)
- TIFF
- WMF

3.2.4 Does the system support a graphical drawing browser?
- no
- yes
3.2.5 Can the drawing and its information be viewed simultaneously?
- no
- yes

3.2.6 How many images can be viewed simultaneously?
- 1
- 2
- 3 - 4
- 5 or more

3.2.7 Can multiple users view the same document, at the same time?
- no
- yes

3.2.8 Is it possible to make a blow-up of a detail of a document?
- no
- yes
4. Release Management

4.1 Authorization

4.1.1 Is the access of the system protected with a password?
- [ ] no
- [ ] yes
- [ ] yes, and the computer login-password can be combined with the PDM-system password

4.1.2 What kind of authorizations can be made?
- [ ] create folder
- [ ] change folder
- [ ] split folder into subfolder
- [ ] merge (sub)folders
- [ ] add data (memo) to a folder
- [ ] delete folder
- [ ] copy folder
- [ ] create document
- [ ] read (or view) document
- [ ] print document
- [ ] change document
- [ ] add data (memo) to a document
- [ ] delete document
- [ ] copy document
- [ ] create attribute value
- [ ] read attribute value
- [ ] change attribute value
- [ ] delete attribute value
- [ ] copy attribute value
- [ ] create relation
- [ ] add data (memo) to a relation
- [ ] delete relation
- [ ] copy relation
- [ ] create workflow schedule (routing)
- [ ] change workflow schedule
- [ ] delete workflow schedule
- [ ] copy workflow schedule
- [ ] create BOM
- [ ] print BOM
- [ ] change BOM
- [ ] delete BOM
4.1.3 Which authorization levels are possible?
- none
- user
- user-group
- project / department
- class / object
- datatype
- document
- folder
- attribute
- status
- version
- application
- free defining attribute(s) value(s)

4.1.4 How many different user groups are can be defined?
- none
- 1
- 2 - 5
- 5 or more

4.2 Sign-off
4.2.1 Is electronic approval (sign-off) possible?
- no
- yes

4.2.2 At which level can an approval be given?
- project
- stage (sub-project)
- folder (set)
- subfolders (sub-set)
- document

4.2.3 How many different release levels can be defined?
- none
- 1
- 2
- 3 or more

4.3 Status control
4.3.1 How many different document statuses can be defined?
- none
- 1 - 4
- 5 - 9
- 10 or more

4.3.2 Is it possible to define status names?
- no
- yes

4.3.3 Can the status change automatically?
- no
- yes, when the defined conditions are met
- yes, when the document is sent to somebody who is working in other state.
5. Change Management

5.1 Change process

5.1.1 In what way will the user be notified that a change has certain consequences? (change analysis)
- documents / parts that are influenced will be shown
- activities that are influenced will be shown
- statuses that are influenced will be shown
- attribute values that are influenced will be shown

5.1.2 Can Engineering Change Orders (ECO) be generated?
- no
- yes

5.1.3 Can an Engineering Change Request (ECR) be generated?
- no
- yes

5.1.4 Is it possible to define the change process? E.g. who signs off? Who makes Change requests? Who reviews a request? etc...
- no
- yes

5.1.5 Which kind of information will the change process take into account?
- none
- sign-off
- status of the document
- change process date

5.1.6 Can a change process contain a condition that has to be met before the change process is (automatically) initiated?
- no
- yes

5.1.7 Are comments and change information directly linked to the original?
- no
- yes

5.1.8 What will happen to the original document during a change process?
- total outcheck locking, no viewing and modifying
- document locking, no modifying only viewing
- incheck-locking, it is possible to view and modify, but it is not possible to store the document with the same name.
- no locking, only a message that the document is reserved for modification
- no locking and also no message

5.1.9 If a document is part of a group of documents and is retrieved for alteration (change), what happens to the rest of the group?
- total outcheck locking, no viewing and modifying
- document locking, no modifying only viewing
- incheck-locking, it is possible to view and modify, but it is not possible to store the document with the same name.
- no locking, only a message that the document is reserved for modification
- no locking and also no message
5.1.10 Is it possible to define the locking process by a system engineer?

☐ no
☐ yes

5.1.11 If you modify the product configuration will the part of the BOM that has been changed be marked?

☐ no
☐ yes

5.2 Mark-up & Redlining

5.2.1 Is redlining possible without having a CAD system?

☐ no
☐ yes

5.2.2 How many different colours (or layers) are available to the function redlining (without altering the original image)?

☐ redlining not present
☐ 1
☐ 2 - 4
☐ 5 or more

5.2.3 Is it possible to have the 'Engineering Change Request' data and the mark-up information together on one screen.

☑ no
☐ yes

5.2.4 Is it possible to make voice and video annotation?

☐ no
☐ yes, voice annotation is possible
☐ yes, video annotation is possible
☐ yes, both are possible

5.3 Version control

5.3.1 Is it possible to manage different document versions?

☐ no
☐ yes, all old versions are always managed.
☐ yes, but it is possible to define how many old versions for all document types.
☐ yes, but it is possible to define how many old versions for each document type.

5.3.2 Can the system automatically generate version numbers?

☐ no
☐ yes, but it not possible to define the numbering method (1.1 / 1a / I) yourself
☐ yes, it is possible to define the numbering method (1.1 / 1a / I) yourself

5.3.3 Does the PDM system ensure that everyone always works with the latest version?

☐ no
☐ yes

5.3.4 If there is a modification on a BOM, will the BOM get a new version?

☐ no
☐ yes, all old versions are always managed.
☐ yes, but it is possible to define how many old versions are managed.
5.4 History management

5.4.1 Which items can be archived in the change history of documents?
- none
- document name
- memo
- data
- folder name
- time
- event (e.g. change status, version)
- person

5.4.2 Which items can be archived in the change history of folders?
- none
- folder name
- memo
- document names
- data
- time
- event (e.g. change status, version)
- person

5.4.3 Which items can be archived in the history of the workflow routing?
- none
- document name
- folder name
- memo
- data
- time
- event (e.g. change status, version)
- person

5.4.4 Is it possible to define which items must be archived?
- no
- yes

5.4.5 Is it possible to make a version history overview of a document?
- no
- yes
6. Workflow Management

6.1 Document routing

6.1.1 What are the possibilities to send a document?
- no send function
- to one user
- to one system defined user-group (routing list)
- to self defined user-group (ad hoc paths)
- automatic (e.g. if a document has a specific status)

6.1.2 Is it possible to make a routing list?
- no
- yes, but only parallel
- yes, but only serial
- yes, both parallel and serial
- yes, both parallel and serial and graphically

6.1.3 Is it also possible to send a folder (group of documents)?
- no
- yes, but it is not possible to split or to merge folders.
- yes, it is also possible to split or to merge folders.

6.1.4 What are the attentions if somebody has sent (a) document(s)?
- receiver gets attention
- receiver gets a message from who the document(s) is (are).
- sender can see if the receiver has opened the document(s).

6.1.5 Are recipients able to transfer the responsibility of a folder, for which they are the designated recipient, to another user?
- no
- yes

6.1.6 Are recipients permitted to establish an additional review for a folder, conduct the review and subsequently merge the results of this additional review into the original folder?
- no
- yes

6.1.7 If the receiver does not open/read a document can it then be automatically redirected?
- no
- yes

6.1.8 When you send a document, can you give it (or do you have to give it) a priority?
- no
- yes

6.2 Process modeling

6.2.1 Is it possible to create and modify work breakdown structures (WBS)?
- no
- yes, but the order of activities to make the WBS can not be self-defined
- yes, and the order of activities to make the WBS can be self-defined

6.2.2 Is it possible to relate WBS tasks to product structures?
- no
- yes
- yes, the relation can be displayed graphically

PDM System questionnaire
6.2.3 Is it possible to assign time schedules to WBS tasks?
- no
- yes
- yes, and when a deadline is broken the people in question will be notified

6.2.4 Can resources be associated with WBS tasks? Does the system automatically check if enough resources are available for the tasks in the near future?
- no
- yes
- yes, and the employee(s) working on that task will be notified if this is not the case

6.2.5 Is it possible to browse through the WBS?
- no
- yes
- yes, and the WBS is displayed graphically

6.3. Process management

6.3.1 If some actions are required will the system automatically notify?
- no
- yes

6.3.2 What does the system do if deadlines are missed?
- nothing
- re-send a message
- notify user

6.3.3 Is it possible to get an overview of the routing status, e.g. who has already looked at which document?
- no
- yes, overview of all documents belonging to one person
- yes, overview of all documents

6.3.4 Are the significant events of a folder's life cycle traceable?
- no
- yes

6.3.5 Is it possible to direct certain activities to evening processing (batch wise)?
(E.g. All activities that can be done during the night are processed, batch wise, after office hours.)
- no
- yes

6.4 Planning

6.4.1 Can the PDM system maintain a planning schedule?
- no
- yes

6.4.2 Which of the following elements can be implemented in the planning schedule?
- startdates
- enddates / deadlines
- milestone dates
- meeting dates
- Priorities

Appendix D-22

PDM System Questionnaire
6.4.3 Can dependencies between activities be defined and implemented?

- no
- yes

6.4.4 Can activities be related to documents?

- no
- yes, to one document
- yes, to many documents

6.4.5 If an activity is defined, can the PDM system automatically position the activity in the schedule taking into account dates, priorities and dependencies?

- no
- yes, based on dates
- yes, based on priorities
- yes, based on dependencies
- yes, based on dates, priorities and dependencies.

6.4.6 If an activity is changed, will the PDM system automatically reposition the activity and recalculate dates in the planning schedule?

- no
- yes, based on dates
- yes, based on priorities

6.5 Communication

6.5.1 Does the PDM-system offer Electronic Mail facilities?

- no
- yes

6.5.2 To which standards do the Electronic Mail facilities comply?

- none
- CCmail
- MHS
- PROFS
- Proprietary mailsystem
- UNIX-mail (according to X.400)
- VAX-mail

6.5.3 To which electronic-mail system can the proprietary mail system be interfaced?

- none
- CCmail
- MHS
- PROFS
- UNIX-mail (according to X.400)
- VAX-mail

6.5.4 Can the PDM system automatically send a message to somebody in response to an event?

- no
- yes, in response to an event
- yes, in response to an event and as dates approach

6.5.5 Does the system support an interface to Electronic Data Interchange (EDI) systems?

- no
- yes
6.5.6 How are users alerted when they have a new message?
- an audible beep
- a short textual message

6.5.7 Is it possible for the sender to see if the receiver has read his message?
- no
- yes
7. **Data Exchange**

7.1 **Data transportation**

7.1.1 Is it possible to select which documents and/or metadata have to be transported?
- no
- yes

7.1.2 Which data transport functions are available?
- copy or move on user request
- automatically copy or move files in response to an application or event request
- automatically copy or move files in response to a time constraint
- apply default settings for data translations

7.1.3 Can the system make a distribution list? (list of documents sent to other organisations)
- no
- yes
- yes, and the attributes of the distribution list are self-defined.

7.1.4 Can a document, which has to be distributed, carry several codenames? (e.g. internal and external codenames). Depending on where a document is, can it carry a certain codename?
- no
- yes

7.1.5 If documents are imported will the external document name remain standard?
- no
- yes, but optional

7.1.6 Is a document locked for changes when it has been distributed?
- no
- yes
- yes, but you can still view the document and its attributes

7.1.7 Does the system support an import/export function for database files that includes meta-data?
- no
- yes

7.2 **Data translation**

7.2.1 Which data exchange formats are available as a standard to translate files between two applications? (i.e. must be provided by PDM system, not the CAD system)
- DXF
- IGES
- VDA-FS
- STEP
- CGM
- EDIF
- HP-GL
- SET
- SGML
- WMF
7.2.2 How does the translation with standard data exchange formats perform?
- automatically
- user has to choose one of the applicable translators from a list
- user has to use network commands

7.2.3 Can the system give a list of entities that will be accepted and created during the translation?
- no
- yes

7.2.4 Which of the following items can be converted automatically?
- date (e.g. mm/dd/yy or dd-mm-yy)
- time (e.g. uu/mm/ss or uu:mm)
- value (e.g. $ or f)
- length (e.g. inch or cm)

7.2.5 Is it possible to compress files?
- no
- yes, not automatically (optional)
- yes, automatically (optional)
- yes, by use of third party software

7.2.6 Does the system support an Optical Character Recognition (OCR) function?
- no
- yes
8. Systems Integration

8.1 Applications

8.1.1 With which of these text editing applications are joinings or interfaces available as a standard?
- Wordperfect version_
- MS-Word version_
- 

8.1.2 With which of these spreadsheet applications are joinings or interfaces available as a standard?
- Lotus 1-2-3 version_
- Quattro version_
- Excel version_
- 

8.1.3 In which way is integration with applications possible?
- fully integrated (Application can query and update PDM database)
- encapsulated (Application is launched by PDM-system and PDM-system controls documents)
- registration (Documents are automatically registrated by PDM-system)
- 

8.1.4 Is it possible to connect the PDM-system to a different PDM-system?
- no
- yes, PDM system: 

8.2 CAD/CAM/CAE systems

8.2.1 With which of these CAD/CAM systems are standard joinings or interfaces realised and available within the PDM-system?
- AutoCAD
- Bravo
- CADAM
- CADDY
- CATIA
- DOGS
- Euclid
- Generic Cadd
- I-DEAS
- I/EMS (Intergorh)
- ME10/ME30
- Medusa (Prime)
- MicroCADAM
- MicroStation
- PC-DRAFT
- Personal Designer
- PRO/Engineer
- Unigraphics
8.2.2 With which of these Fast Finite Elements (FFE) systems are joinings or interfaces realised as a standard and available within the PDM-system?
- Abaqus
- Ansys
- Cosmos
- Diana
- Marc
- Nastran

8.3 Title block integration

8.3.1 With which of these CAD/CAM systems are title block integrations or joinings realised as a standard and available within the PDM-system?
- AutoCAD
- Bravo
- CADAM
- CADDY
- CATIA
- DOGS
- Euclid
- Generic Cadd
- I-DEAS
- I/EMS (Intergraph)
- ME10/ME30
- Medusa (Prime)
- MicroCADAM
- MicroStation
- PC-DRAFT
- Personal Designer
- PRO/Engineer
- Unigraphics

8.3.2 In which direction is the integration realised?
- not applicable
- one direction PDM → CAD (database -> drawing)
- one direction CAD → PDM (drawing -> database)
- bi-directional (drawing <-> database)
8.4 MRP/PPS (Material Resource Planning / Production Planning System)

8.4.1 With which MRP/PPS systems are integrations or joinings realised as a standard and available within the PDM-system?
- Bedrijfsbeheer
- Control: Manufacturing
- Include
- MAC-PAC open
- MARCAM
- Oracle Manufacturing
- Piuss-O
- Probe
- Prodin P2
- Propac-X
- PSystem
- RPS
- SAP
- Strategy
- Triton

8.4.2 With which Project Management systems are integrations or joinings realised as a standard and available within the PDM-system?
- Superproject
- PARISS Enterprise
- Ontarget
- Primavera Project Planner
- Project
- Project Manager Workbench
9. User-interface

9.1 Operational features

9.1.1 Does the system support multiple languages?
- no
- yes
- yes, and different users can use different languages at the same time.

9.1.2 Which presentation language can be used?
- Dutch
- English
- German
- French
- 

9.1.3 Which input devices are supported?
- keyboard
- mouse
- touch screen
- stylus (pen)
- data tablet
- voice recognition

9.1.4 Is it possible to use short cuts instead of the menu structure?
- no
- yes

9.1.5 Is it possible to launch the PDM-system from a CAD application?
- no
- yes

9.1.6 Is it possible to log events (e.g. use of module, start of application)?
- no, logging is not possible
- yes, logging is possible, but only two modes are available: logging is on or off for all events.
- yes, logging is possible for several separate event.

9.1.7 Is it possible to query the logging?
- no
- yes

9.1.8 When the user has to input a value, does the system show which values are allowed (fixed list box)?
- no
- yes

9.1.9 Does the system confirm actions? (e.g. with deleting of files)
- no
- yes
9.2 Presentational features

9.2.1 Which user-interfaces (windowing systems) are supported?
- 3270 interface
- Command line
- CUA
- DEC/Windows
- General Magic
- MS-Windows (DOS)
- News
- NewWave (HP)
- Openlook (Sun)
- OSF / Motif
- Presentation-Manager
- Sunviews
- Windows NT
- X-windows (UNIX)
- only character based

9.2.2 Does the (client) PC also have a Graphical User Interface (GUI)?
- no
- yes

9.2.3 How many levels does the menu tree have?
- 1
- 2 - 3
- 4 - 5
- 6 or more

9.2.4 Is the user-interface dependent on the authorization of a user or user-group?
- no
- yes

9.2.5 Is it possible to create icons?
- no
- yes, but only the standard icons can be changed
- yes, it is possible to define new icons

9.2.6 An error will be recognizable by:
- only a beep signal
- an error code
- an error message

9.3 Help

9.3.1 Is the help function context sensitive?
- no
- yes

9.3.2 Which type of help functions are available?
- explanation of available commands
- help screens
- on-line manuals
10. Customising

10.1 Customization

10.1.1 Which customization applications are available?
- GUI-Screen Builder
- report generator
- menu builder
- query builder

10.1.2 Which items can be modified by a user?
- language
- menu's
- (error) messages
- attributes

10.1.3 Is it possible to change the screen colours?
- no
- yes, but only the front and the back colour
- yes, everything except the menu rules
- yes, everything including the menu rules

10.1.4 Is it possible to define pulldown-menus or close-lists?
- no
- yes, but all the attribute values of the list have the same colour
- yes, all the attribute values of the list can have other colours

10.1.5 Can the attribute values of a document depend on the choice of another attribute value of that document?
- no
- yes, but only one dependency
- yes, many dependencies

10.1.6 Is it possible to customise the user-interface?
- no, only the standard user-interface is available
- yes, but all users have to use the same user-interface
- yes, per user-group
- yes, per user

10.1.7 Which programming languages can be used to develop applications?
- C++
- C
- Pascal
- Cobol
- Fortran
- Lisp
- ACL
- proprietary macro languages

10.1.8 Is a development environment available (editor, debugger, etc.)?
- no
- yes

10.1.9 Is an additional software package available with applications made by end-users?
- no
- yes
10.2 Tailoring

10.2.1 Can the end-user also tailor the system to set his own preferences (according to business requirements)?
- no
- yes

10.2.2 Is it possible to omit choices from menus?
- no
- yes

10.2.3 Does the system provide a number of standard pre-modelled processes? (workflow)
- no
- no, but they can be modelled by customization
- yes, a 2-stage process is a standard feature
- yes, a 3-stage process is a standard feature
- yes, a 4-stage process is a standard feature
- yes, 5 or more stage processes are standard features

10.2.4 Does the system provide a number of standard pre-modelled menus?
- no
- no, but they can be modelled by customization
- yes, a 1-level menu is a standard feature
- yes, a 2-level menu is a standard feature
- yes, a 3-level menu is a standard feature

10.2.5 Does the system provide standard ISO and DIN libraries?
- no
- yes, just ISO library
- yes, just DIN library
- yes, both libraries

10.2.6 How many predefined views does the system provide?
- none
- 1
- 2-4
- 5-10
- more than 10

10.3 Reports

10.3.1 Does the system provide reporting facilities?
- no
- yes, only standard reports
- yes, standard reports but also user-defined reports.

10.3.2 Can user-defined reports be saved for later use?
- no
- yes

10.3.3 How many reports can be made or are available?
- 1
- 2-4
- 5-7
- 8 or more
11. System architecture

11.1 Platforms

11.1.1 On which platform does the PDM system run?

<table>
<thead>
<tr>
<th>Platform</th>
<th>Server</th>
<th>Client</th>
<th>Stand-alone</th>
</tr>
</thead>
<tbody>
<tr>
<td>286</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>386</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>486</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Apple Macintosh</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Apple Classic</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Bull</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Control Data</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Digital VAXstation</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Digital DECstation</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Digital Alpha AXP</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>HP-9000</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>HP/Apollo</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>IBM RS/6000</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>IBM AS/400</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Pentium</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>PowerPC</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Silicon Graphics</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sun SparcStation2</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sun ClassicX</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>X-terminal</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

11.1.2 Is it possible for the PDM system to be used on different machines simultaneously?

- no
- yes, Client-server
- yes, Multi-server
- yes, ________

11.1.3 How much internal memory does the PDM system need to operate (minimum)?

- less than 2 MB
- = < 4 MB
- = < 16 MB
- more than 16 MB

11.1.4 How much external memory (disk space) does the PDM system and vault need (minimum)?

- Less than 40 MB
- = < 120 MB
- = < 600 MB
- more than 600 MB
11.2 Operating Systems

11.2.1 On which operating systems does the PDM system run?

<table>
<thead>
<tr>
<th>Operating System</th>
<th>Server</th>
<th>Client</th>
<th>Stand-alone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple-OS</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Clix</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>HP-UX</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Irix</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>MS-DOS</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>MS-Windows 3.x</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>MVS</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>OSF/1</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>OS/2</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Solaris</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>System5</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>UNIX ITT</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Ultrix</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>VMS</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>VSE</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Windows NT</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Xenix</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

11.2.2 Can the system work stand alone on a PC?
- ☐ no
- ☐ yes, under OS-2
- ☐ yes, under MS-DOS
- ☐ yes, under MS-windows
- ☐ yes, under Windows NT

11.3 Networks

11.3.1 Which network system or protocol is supported by the PDM system?
- ☐ 3Com
- ☐ Banyan VINES
- ☐ DECnet
- ☐ Ethernet
- ☐ HP network
- ☐ IBM-PCLAN
- ☐ LANtastic
- ☐ LANmanager
- ☐ NetBIOS
- ☐ NFS
- ☐ Novell
- ☐ PCNFS
- ☐ PCSA/Path works
- ☐ TCP/IP
## 11.4 Databases

### 11.4.1 Which database-engines are supported by the system?
- Adabas
- AllBase (HP)
- DB2
- BasisPlus
- dBase III
- dBase IV
- Btrieve
- Foxpro
- IDMS
- Informix
- Ingres
- Netware SQL Server
- ORACLE
- Paradox
- RAIMA (dBvista)
- RDB
- Sybase
- Unify
- Proprietary
- OODBMS

### 11.4.2 From which databases can data be imported?

<table>
<thead>
<tr>
<th>Database</th>
<th>ASCII</th>
<th>Externe modules</th>
<th>Bridges (interfaces)</th>
<th>DB-integrator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adabas</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>AllBase (HP)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>DB2</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>BasisPlus</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>dBase III</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>dBase IV</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Btrieve</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Foxpro</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>IDMS</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Informix</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Ingres</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Netware SQL Server</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>ORACLE</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Paradox</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>RAIMA (dBvista)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>RDB</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Sybase</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Unify</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Proprietary</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>OODBMS</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### 11.4.3 What kind of database-engine can be applied?
- only one database-engine
- many database-engines but for the implementation all databases must be the same.
- many database-engines and for the implementation all databases can be different (intermixed)
11.5 Distributed databases

11.5.1 Is the system capable of supporting any real sharing or distributed database?
- no
- yes, only distributed vaults
- yes, only distributed metadata
- yes, both

11.5.2 Is it possible for the system and the database to be 100% operational, while new storage areas are being defined?
- no
- yes

11.6 Datadictionary

11.6.1 Is it possible for the PDM system to distribute parts of the database over different locations (e.g., buildings)?
- no
- yes

11.6.2 Is it possible using a query language (e.g., SQL), to retrieve information directly from the datadictionary?
- no
- yes

11.6.3 Which query language does the database system offer to retrieve product information directly from the databases without using the PDM-system?
- none
- SQL
- dBase-SQL
- proprietary

11.6.4 What can be defined in the datadictionary?
- databases
- tables
- attributes
- domains
- associations/relations
- authorization
- triggers
- user functions

11.6.5 What sort of fieldtypes can be defined in the datadictionary?
- char
- decimal/Real
- integer
- boolean
- memo
- date
- 

11.6.6 Is it possible that a unique master key is made up of combinations (more than one) of attributes?
- no
- yes
11.6.7 What sort of database is used for the PDM system?
- hierarchical
- network
- relational
- object-oriented

11.7 Backup & Restore

11.7.1 In which way can a backup be made?
- by hand
- automatically

11.7.2 What kind of backup possibilities does the system have?
- none
- database backup
- backup of database parts
- system backup

11.7.3 Which data storage media are possible to use?
- tapestreamer
- rewritable optical disk unit
- DAT-streamer
- large capacity harddisk
- auto-loader
- disk array

11.7.4 What are the possibilities to archive documents?
- automatically if the defined period is crossed.
- automatically if the documents are marked.
- the system registrates the tape number and the backup medium
- none

11.7.5 What are the possibilities to recover from an inconsistency in the database?
- the system manager has to repair the database
- the PDM-system detects that the database is inconsistent and the system manager has to repair it
- the PDM-system detects that the database is inconsistent and repairs it.
Appendix E  Description PDM systems

Index

Reviewed systems

1. Autodesk WorkCentre .......................................................... E-2
2. AutoEDMS ........................................................................ E-4
3. AutoManager Organizer ......................................................... E-6
4. AutoManager WorkFlow ......................................................... E-8
5. BravoFrame ....................................................................... E-10
6. CADIM/EDB .................................................................. E-12
7. D-Engine ........................................................................ E-14
8. Document Manager ............................................................. E-16
9. Documentum ..................................................................... E-18
10. DocuPlex ......................................................................... E-20
11. EDM ................................................................................ E-22
12. EuroEMS .......................................................................... E-24
13. Formtek .......................................................................... E-26
14. FYI .................................................................................. E-28
15. HP PE/WorkManager .......................................................... E-30
16. Information Manager .......................................................... E-32
17. I/PDM ............................................................................. E-34
18. Keyfile ........................................................................... E-36
19. LT Manager ..................................................................... E-38
20. Manma ............................................................................ E-40
21. Metaphase PDM ................................................................ E-42
22. NOW24 ........................................................................... E-44
23. Pafec Access .................................................................... E-46
24. ProductManager ................................................................. E-48
25. R/Solution ....................................................................... E-50
26. Sherpa/PIMS ................................................................... E-52
27. SoftSolution .................................................................... E-54
28. Trimco ............................................................................ E-56

Other systems

29. AutoORG .......................................................................... E-58
30. Centra 2000 ..................................................................... E-59
31. CIM Database ................................................................... E-59
32. CIM Series/400 ................................................................ E-59
33. CMstat ............................................................................ E-59
34. EDB-CAD ........................................................................ E-59
35. Engineering:EXPRESS ......................................................... E-59
36. Express ............................................................................ E-59
37. Linkage .............................................................................. E-60
38. Mezzanine / CURO Document Management System .............. E-60
39. NovaManage ..................................................................... E-60
40. Open Data Manager ........................................................... E-60
41. Open ODS ........................................................................ E-61
42. PreView ............................................................................ E-61
43. Piramis ............................................................................. E-61
44. Productivity Edge ............................................................... E-61
45. Profile ............................................................................. E-62
46. Pro/PDM ........................................................................... E-62
47. TDM ................................................................................ E-62
48. Win / Pro Cube .................................................................. E-62

Description PDM systems

Appendix E-1
1. Autodesk WorkCenter

1.1 General information

Autodesk WorkCenter is developed by Autodesk Corporation in the United States. Autodesk Corporation was established in 1982. They experienced that users of their AutoCAD needed some form of file management and 2.5 years ago Autodesk started the development of Autodesk WorkCenter. The development team consists of twelve employees and some external companies who programmed certain modules according to our specifications. Development was done in close cooperation with fifteen large AutoCAD users. The aim was to develop until everyone involved was satisfied.

Autodesk WorkCenter is distributed in the Benelux by Autodesk B.V. This company was established in 1990 and by the end of 1994 Autodesk has one product manager and one technical supporter for Autodesk WorkCenter. This was only preliminary, because full sales of Autodesk WorkCenter will not start until April/March of 1995.

Autodesk's approach to PDM is from an engineering point of view. Autodesk wants to supply tools for the engineering process. Autodesk WorkCenter is positioned between a complete PDM system with high-end functionality and a low-end file manager. Autodesk WorkCenter has a user dependable interface, is object oriented and has a full AutoCAD integration. Currently operating on Novell Netware 3.12, Autodesk is working on availability for Novell Netware 4.0, NT server and other Networks.

1.2 Address information

Developer
Autodesk Inc.
111 McInnis Parkway
San Rafael, CA 94903
USA
tel. +1 -415-507-5000
fax. +1 -415-507-5100

Supplier
Autodesk Benelux B.V.
Druivenstraat 1
P.O. Box 7470
4800 GL Breda
The Netherlands
tel. 076 - 710125
fax. 076 - 710925

Description PDM systems
1.3 System specifications Autodesk WorkCenter, beta release (1st Quarter 1995)

Platforms
- server: PC, processor type 80386 or higher
- client: PC, processor type 80386 or higher
- stand alone:

Memory
- internal: = < 16 MB
- external: = < 600 MB

Operating systems:
- Windows NT
- Windows 3.xx

Database engines:
- Sybase

Network systems:
- 3Com
- Banyan VINES
- LANtastic
- LANmanager
- Novell

CAD/CAM/CAE interface:
- AutoCAD

MRP/PPS interface:

Base Modules:
- Autodesk WorkCenter

Extra Modules:

3.4 Price indication

Base licence
- 1st user: Hfl. 1.850,-
- extra user: Hfl. 1.850,-

Full licence
- 1st user: Hfl. 1.850,-
- extra user: Hfl. 1.850,-
2. AutoEDMS

2.1 General information

The developer of AutoEDMS is ACS-Telecom, USA. ACS-Telecom was founded in 1981. At this moment ACS-Telecom has three employees in sales and six in technical support. AutoEDMS has been implemented mainly in medium and large size companies.

The Dutch supplier for AutoEDMS is CAD Plus. CAD Plus which was established in 1981. In 1990 CAD Plus redefined their objectives and the focus turned to AutoCAD. In 1991 they became an AutoCAD system centre which is the most important AutoCAD representation for a company to receive. In 1992/93 CAD Plus began expanding the use of Unix systems as a basis for AutoCAD. In 1994 CAD Plus was looking for a partner to take over. In May of 1994 Teser Holland, one of the largest CAD dealers in the Benelux, was taken over. Teser Holland was active in the EDMS market since 1987. For this reason, a business unit within CAD Plus was created, based on the work of former Teser. The unit consists of two employees in sales and three in support. In 1995 an expansion of six employees in support is planned.

Another company called CAD Plus components is occupied with all sales that can be delivered directly off-the-shelf. CAD Plus (20 employees) however is fully capable of dealing with the specific customer problems. The mechanical engineering market is the main business area in which CAD Plus is active.

AutoEDMS is oriented on the engineering environment but has an horizontal approach and can be the basis of many programs. The philosophy behind AutoEDMS is to support a company from creation of documents till distribution of same.

AutoEDMS is a flexible product that can be adjusted to customer wishes and also their hard- and software. It is available in the Windows environment and the Windows lead will be taken.

As can be seen on the next page AutoEDMS is available for many platforms, operating systems and networks.

2.2 Address information

Developer
ACS Telecom
25825 Eshelman Avenue
Lomita, CA 90717
USA
tel. +1 -310-325-3055
gax. +1 -310-325-3059

Supplier
CAD PLUS B.V.
Coenecoop 4
P.O. Box 435
2740 AK Waddinxveen
The Netherlands
tel. 01828 - 16700
gax. 01828 - 32796

Appendix E-4 Description PDM systems
2.3 System specifications AutoEDMS, 3.0 (1st Quarter 1994)

**Platforms**
- **server:**
  - Digital VAX station
  - Digital DEC station
  - HP-9000
  - IBM RS/6000
- **client:**
  - PC, processor type 286 or higher
- **stand alone:**
  - PC, processor type 286 or higher

**Memory**
- **internal:**
  - = < 4 MB
- **external:**
  - < 40 MB

**Operating systems:**
- HP-UX
- Irix
- MS-DOS
- MS-Windows 3.xx
- HP-UX
- Irix
- MS-DOS
- MS-Windows 3.xx

**Database engines:**
- Btrieve
- Solaris
- Ultrix
- VMS
- Windows NT

**Network systems:**
- 3Com
- Banyan VINES
- DECnet
- Ethernet
- IBM-PCLAN
- 3Com
- Banyan VINES
- DECnet
- Ethernet
- IBM-PCLAN

**CAD/CAM/CAE interface:**
- AutoCAD
- Generic Cadd
- MicroStation
- PC-Draft
- AutoCAD
- Generic Cadd
- MicroStation
- PC-Draft

**MRP/PPS interface:**
- SAP
- Triton
- SAP
- Triton

**Base Modules:**
- AutoEDMS
- CAD Viewing
- DOC Viewing
- AutoEDMS
- CAD Viewing
- DOC Viewing

**Extra Modules:**
- Redlining
- Engineering
- Redlining
- Engineering

2.4 Price indication

**Base licence**
- 1st user: Hfl. 1.650,-
- extra user: Hfl. 1.125,-

**Full licence**
- 1st user: Hfl. 1.650,-
- extra user: Hfl. 1.125,-
3. Automanager Organizer

3.1 General information

For general information about the supplier of AutoManager Organizer, Cyco Automation, see also the section on AutoManager WorkFlow.

AutoManager Organizer is a relatively small PDM system that has been on the market since July 1994. This system is not a workflow system, but an organizer. Its main features are retrieval, searching and redlining. All file related action is taken over by AutoManager Organizer.

A special feature is the comparison facility. A drawing and for example its revised version can be compared by displaying them both at the same time. The changes are indicated by usage of different colours.

3.2 Address information

Developer
Cyco Software
Handelskade 49
2288 BA Rijswijk
The Netherlands
tel. 070 - 3954179
fax. 070 - 3191344

Supplier
Cyco Automatisering
Adm. Banckertweg 2a
P.O. Box 9595
2300 RB Leiden
The Netherlands
tel. 071 - 222707
fax. 071 - 224979
3.3 System specifications  AutoManager Organizer 1.1 (3rd Quarter 1994)

Platforms  
server: PC, processor type 80286 or higher  
client: PC, processor type 80286 or higher  
stand alone: PC, processor type 80286 or higher

Memory  
internal: =< 4 MB  
external: < 40 MB

Operating systems: MS-DOS  
MS-Windows 3.xx

Database engines: dBase III & IV

Network systems: Networks that support ACAD

CAD/CAM/CAE interface: AutoCAD

MRP/PPS interface: 

Base Modules: AutoManager Organizer

Extra Modules: 

3.4 Price indication

Base licence  
1st user: Hfl. 495,-  
extra user: Hfl. 395,-

Full licence  
1st user: Hfl. 495,-  
extra user: Hfl. 395,-

( Discount for 5 and 20 users )
4. **Automanager WorkFlow**

4.1 **General information**

Cyco Europe supplies AutoManager WorkFlow through a network of distributors. AutoManager WorkFlow is developed by Cyco Software which is part of Cyco Holding. Cyco Software is one of 11 strategic developers of AutoDesk Inc. Cyco Automatisering is a major supplier of AutoManager WorkFlow in the Netherlands. Cyco also has representatives in the USA and a development department in Russia.

Cyco Automatisering has three areas of business: CAD systems, Networks and Document management. Their ideal is to completely integrate these three. Cyco supplies advise, customised systems, support and training. Cyco Automatisering wants to integrate administrative and technical management. For 7 years now, Cyco Automatisering is involved in the PDM technology and has experience in implementation.

Originally AutoManager Workflow came on the software market as AutoBase in February of 1991. The philosophy of AutoManager Workflow is to offer an open and flexible platform. Amongst others, this is achieved by means of an included 'screen-painter' with which every inputscreen can be defined in a user-friendly manner.

The Automanager 'family' consists of AutoManager Classic (viewing), AutoManager Professional (viewing, printing, plotting and redlining), AutoManager Organizer (search, retrieval and redlining) and AutoManager WorkFlow (full PDM functionality with drawing and document management).

Several AutoManager Workflow applications have been made with AutoManager in the background. In this Context (PDM) the EuroEMS application of 2EPS is very interesting. Besides standard AutoManager Workflow functionalities, EuroEMS can manage product structures and Bills Off Material. See EuroEMS section.

---

4.2 **Address information**

**Developer**

Cyco Software  
Handelskade 49  
2288 BA Rijswijk  
The Netherlands  
tel. 070 - 3954179  
fax. 070 - 3191344

**Supplier**

Cyco Automatisering  
Adm. Banckertweg 2a  
P.O. Box 9595  
2300 RB Leiden  
The Netherlands  
tel. 071 - 222707  
fax. 071 - 224979
4.3 System specifications AutoManager Workflow 3.12 (2nd Quarter 1994)

Platforms
- server: PC, processor type 80286 or higher
- Sun SparcStation2
- client: PC, processor type 80286 or higher
- Sun SparcStation2
- X-terminal
- stand alone: PC, processor type 80286 or higher
- Sun SparcStation2

Memory
- internal: =< 4 MB
- external: < 40 MB

Operating systems:
- MS-DOS
- MS-Windows 3.xx
- OS/2
- Solaris

Database engines:
- dBase III & IV

Network systems:
- LANtastic
- Novell
- PCNFS

CAD/CAM/CAE interface:
- AutoCAD
- AutoCAD LT
- Generic Cadd
- Microstation

MRP/PPS interface:

Base Modules:
- AutoManager Workflow

Extra Modules:

4.4 Price indication

Base licence
- 1st user: Hfl. 2.295,-
- extra user: Hfl. 1.535,-

Full licence
- 1st user: Hfl. 2.295,-
- extra user: Hfl. 1.535,-

Discount for 5 and 20 users
Implementation costs for 1e licence: 1.350,-
5. BravoFRAME

5.1 General information

Developer of BravoFRAME is the German company Hosoft GmbH. Hosoft is a flow off from Applicon in Germany. Applicon employed a group of 30 people, who developed applications for the German market. This group established Hosoft in 1986, with PDM as its main business.

In 1979, Applicon started development of Bravo, which is a CAD system with management functionality. Bravo was completed in 1982.

In 1986 Hosoft developed a classification system for the library environment, called CORA. In 1992 Applicon was in need of a PDM system which Hosoft developed. The outcome was CORA II, a product that is based on CORA and includes drawing management. Applicon has renamed CORA II to BravoFRAME.

Supplier / reseller of BravoFRAME in the Benelux is Landré & Glinderman. This company offers CIM (Computer Integrated Manufacturing) concepts. Landré & Glinderman sells CAD/CAM, PDM, planning, logistics and DNC solutions. The Applicon employees of the PDM system BravoFRAME in the Netherlands have been taken over by Landré & Glinderman in 1993. Hosoft and Applicon are both business partners for BravoFRAME. A skinned version of CORA II is Mona Lisa, a light PDM system. Mona Lisa is also a Hosoft product.

BravoFRAME has a good method of classification, a strong integration with Bravo and good viewing applications. Bravo and BravoFRAME are deeply integrated, one cannot distinguish two systems. BravoFRAME however is a completely independent PDM system and can operate with other CAD systems than Bravo.

5.2 Address information

Developer
Hosoft GmbH
Weltenburger Straße 70
D-8000 München 80
Germany
tel. 089-9102096
fax. 089-913027

Supplier
Landré & Glinderman N.V.
Visseringsweg 40
Postbus 187
1112 AD Diemen
The Netherlands
tel. 020-5696569
fax. 020-5696444

Appendix E-10 Description PDM systems
5.3 System specifications BravoFRAME 4.5 (3rd Quarter 1994)

Platforms

server:
- Digital VAXstation
- Digital DECstation
- Digital Alpha AXP
- Silicon Graphics

client:
- PC, processor type 80286 or higher
- Digital VAXstation
- Digital DECstation
- Digital Alpha AXP
- PowerPC
- Silicon Graphics
- X-Terminal

stand alone:
- Digital VAXstation
- Digital DECstation
- Digital Alpha AXP
- Silicon Graphics

Memory

internal: = < 16 MB
external: = < 600 MB

Operating systems:
- Irix
- Ultrix
- MS-DOS
- VMS
- MS-Windows
- Windows NT

Database engines:
- Ingres
- RDB

Network systems:
- DECnet
- PCSA/Pathworks
- Ethernet
- TCP/IP
- NFS

CAD/CAM/CAE interface:
- Bravo
- Cadra
- Euclid
- Pro/Engineer

MRP/PPS interface:

Base Modules:
- BravoFRAME

Extra Modules:
- Product Structure Management
- SPECsheet
- Data Export
- Data Import
- Report formatter

5.4 Price indication

Base licence
1st user: Hfl. 44.100,-
extra user: Hfl. 2.260,-

Full licence
1st user: Hfl. 83.005,-
extra user: Hfl. 2.260,-
6. CADIM

6.1 General information

Developer of CADIM/EDB is Eigner and Partner in Germany. Eigner was established in 1985 and was acquired by Bremen Vulkan Verbund A.G. The key markets for CADIM are the machinery and automotive industry, but also the electric and electronic industry. Approximately one hundred customers currently use CADIM/EDB.

PDM Solutions B.V. is the company that represents CADIM/EDB in the Netherlands. From 1987 till 1994 CADIM/EDB was represented by 3T (Twente Technology Transfer). The employees of 3T changed office to a new company called PDM Solutions, which they established in 1994. PDM Solutions is part of the PS Group Holding and has dedicated itself completely to PDM. There are two employees, both in sales and support. The PS group holds several organisations in information technology so a lot of know-how is present. The old company 3T advised organisations in relation to CAD. Experience showed that CAD was more than just drafting, Data Management became necessary and Product Data Management in particular. 3T came in contact with Eigner and Partner and started representation of their product, CADIM/EDB.

CADIM has many integrations and a functional modular build. It can start with little functionality as a low-end system (CADIM/ISAM, CADIM/DB) and can grow from there to an organisation wide, high functionality system (CADIM/EDB). CADIM has a thorough flexible foundation and STEP/AP203 is fully integrated, Eigner is working on AP 214 integration. Product structure management is a very strong feature of this system. Also important is the fact that it can function under the most important operating systems and a number of large database-engines.

6.2 Address Information

Developer
Eigner + Partner GmbH
Ruschergraben 133
D - 76139 Karlsruhe
Germany

tel. 00-49-721-62910
fax. 00-49-721-629188

Supplier
PDM Solutions BV
Radioweg 2
Postbus 50069
1305 AB Almere
The Netherlands

tel. 036-5368866
fax. 036-5360554
### 6.3 System specifications  
**CADIM/EDB 2.0 (4th Quarter 1994)**

<table>
<thead>
<tr>
<th>Platforms</th>
<th>Memory</th>
<th>Operating systems</th>
<th>Database engines</th>
<th>Network systems</th>
<th>CAD/CAM/CAE interface</th>
<th>MRP/PPS interface</th>
<th>Base Modules</th>
<th>Extra Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>server:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EDB.BAS</td>
<td>EDB.DVS</td>
</tr>
<tr>
<td>Digital VAXstation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EDB.KST</td>
<td>EDB.SML</td>
</tr>
<tr>
<td>Digital DECstation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Alpha AXP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HP-9000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>client:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EDB.LGV</td>
<td>EDM.IEF</td>
</tr>
<tr>
<td>PC, processor type 80386 or higher</td>
<td>&gt; 16 MB</td>
<td>Clix</td>
<td>Informix</td>
<td>DECnet</td>
<td>AutoCAD</td>
<td>Mapics</td>
<td>SAP</td>
<td></td>
</tr>
<tr>
<td>Digital VAXstation</td>
<td></td>
<td>HP-UX</td>
<td>HP-UX</td>
<td>Ethernet</td>
<td>Bravo</td>
<td>Bravo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital DECstation</td>
<td></td>
<td>Irix</td>
<td>Irix</td>
<td></td>
<td>CADAM</td>
<td>CADAM</td>
<td></td>
<td>EDB.BAS</td>
</tr>
<tr>
<td>Digital Alpha AXP</td>
<td></td>
<td>MS-DOS</td>
<td>MS-DOS</td>
<td></td>
<td>CATIA</td>
<td>CATIA</td>
<td></td>
<td>EDB.DVS</td>
</tr>
<tr>
<td>HP-9000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DOGS</td>
<td>DOGS</td>
<td></td>
<td>EDB.KST</td>
</tr>
<tr>
<td>IBM RS/6000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>stand alone:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PC, processor type pentium</td>
<td>&gt; 600 MB</td>
<td>Digital VAXstation</td>
<td>Digital DECstation</td>
<td>Digital Alpha AXP</td>
<td>HP-9000</td>
<td>HP-9000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBM RS/6000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Base licence | 1st user: | Hfl. 13.915,- | Extra user: | Hfl. 1.265,- |
| Full licence | 1st user: | Hfl. 48.300,- | Extra user: | Hfl. 5.750,- |

**Description PDM systems**
7. D-Engine

7.1 General information

Developer and main supplier of this PDM system is Done Centre. This company is part of the Done Group, which among others also includes Done Automation and Done Engineering.

In the eighties Done Centre had a document management system called Welldone, which is the forerunner of D-Engine. Done Centre experienced shortcomings in Welldone and started development of a new PDM system in 1991. D-Engine was the outcome and was finished in the summer of 1992. The new product, D-Engine, has been completely reprogrammed and is now independent from CAD systems. Development of D-Engine was done by three people and is now the most important product of Done Centre.

Suppliers of D-Engine are first and foremost Done Centre and Automation. Within the Done group there is a good exchange of information and use of each others experience which benefits the clients.

D-Engine is often customised for its clients. Although it has several standard views, Done Centre and Automation feel that it is very important to deliver a system that has been especially adjusted for one organisation. An important part of this adjustment is the user-interface which is a central point of interest for Done Centre. This can in most cases be done within a week.

Also good points about D-Engine are speed, always linear search times no matter how many documents, and the amount of internal memory (<2MB) and external memory (<5MB) required. Another feature is the close integration with Wordperfect. Simply selecting an address and standard letter in the database and starting Wordperfect, will give you Wordperfect with the standard letter and the address already retrieved.

Future plan is to develop D-Engine for the Windows environment. First steps have already been taken and expected release date of a beta version is the last quarter of 1995.

7.2 Address information

<table>
<thead>
<tr>
<th>Developer</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Done Centre B.V.</td>
<td>Done Centre B.V.</td>
</tr>
<tr>
<td>Het rond 18</td>
<td>Het rond 18</td>
</tr>
<tr>
<td>Postbus 7133</td>
<td>Postbus 7133</td>
</tr>
<tr>
<td>2701 AC Zoetermeer</td>
<td>2701 AC Zoetermeer</td>
</tr>
<tr>
<td>tel. 079-423443</td>
<td>tel. 079-423443</td>
</tr>
<tr>
<td>fax. 079-423111</td>
<td>fax. 079-423111</td>
</tr>
</tbody>
</table>

Appendix E-14 Description PDM systems
7.3 System specifications D-Engine 2.5 (2nd Quarter 1994)

Platforms
- server: PC, processor type 80286 or higher
- client: PC, processor type 80286 or higher
- stand alone: PC, processor type 80286 or higher

Memory
- internal: < 4 MB
- external: < 40 MB

Operating systems: MS-DOS

Database engines: Faircom C-Tree

Network systems:
- Ethernet
- LANtastic
- NetBIOS
- Novell

CAD/CAM/CAE interface:
- AutoCAD
- Microstation

MRP/PPS interface:

Base Modules:
- D-Engine

Extra Modules:

7.4 Price indication

Base licence
- 1st user: Hfl. 2.395,-
- extra user: Hfl. 1.390,-

Full licence
- 1st user: Hfl. 2.395,-
- extra user: Hfl. 1.390,-
8. Document Manager

8.1 General information

Development of Document Manager started seven years ago and was done by Cimage Corporation in the United States and the United Kingdom. In the U.S. a staff of 160 employees and in the U.K. a staff of 58 employees, is working on Document Manager. A large amount of these people work in development.

Document Manager is supplied in the Netherlands by Delaware Computing Nederland B.V. They have been in business for thirteen years now and have 250 employees in Belgium, the Netherlands, Germany, Switzerland and the U.S. Delaware will continue to grow but has no plans of exploring new markets. Business partners are Intergraph for MicroStation and EMS, V+H Informatica for MTMS in Belgium.

In 1990 Delaware became interested in PDM after a case study. A product control system was selected and Delaware started representation. The representation consists of one employee in sales and three in technical support. Delaware operates in Belgium and the Netherlands for mainly the petrochemical industry. In the first quarter of 1995 version 2.0 will be released. Document Manager's main functionality lies in engineering. During implementation of Document Manager, the program is customised to fit the needs of the customer. The remaining wishes, which cannot be met by customisation, are met by generating program parts.

Delaware would like to stress the openness of the product. It has a modular structure and can be tailored. Strong technical support is provided. In the past they have had a lack of marketing for the product but that is being worked on.

8.2 Address information

Developer
Cimage Corporation
3885 Research Park Drive
ANN Arbor, MI 48108
United Stated of America
tel. +1 - 313 - 761 6550
fax. +1 - 313 - 761 6551

Supplier
Delaware Computing Nederland B.V.
Meentwal 1
3432 GL Nieuwegein
The Netherlands
tel. 03402 - 31822
8.3 System specifications Document Manager 1.4 (4th Quarter 1993)

Platforms

server: PC, processor type 80386 or higher
Digital DECstation
IBM RS/6000

client: PC, processor type 80386 or higher
Apple Macintosh
Digital DECstation
HP-9000
IBM RS/6000
Sun SparcStation2
Sun ClassicX
X-Terminal

stand alone: PC, processor type 80386 or higher
Digital DECstation
HP-9000
IBM RS/6000
Sun SparcStation2

Memory

internal: =< 16 MB

external: > 600 MB

Operating systems:

Apple-OS
HP-UX
MS-DOS
MS-Windows 3.xx

Database engines:

Informix
Sybase

Network systems:

Novell
TCP/IP

CAD/CAM/CAE interface:

AutoCAD
Microstation

MRP/PPS interface:

Triton

Base Modules:

Document Manager Server
Workflow Server
Full Text Retrieval Server

Extra Modules:

View / Markup
FTR Access
Workflow Access

8.4 Price indication

Base licence 1st user: Hfl. 10.000,-
(extra user: In between Hfl. 400,- and Hfl. 5.000,-)

Full licence 1st user: Hfl. 50.000,-
(extra user: Hfl. 6.000,-)

Description PDM systems

Appendix E-17
9. Documentum

9.1 General information

The Developer of Documentum is a company in the United States called Documentum. That company was founded by Xerox and is now 4 years old. From April 1994 till November of 1994 Documentum has grown from thirty employees to over a hundred.

In April of 1989 Source Information Technology was set up as an organisation for the Unix market. Source has an office in Brussels and one in Zoetermeer. Five people have sales related activities and five technical support activities. Two years ago Source Information started projects concerning document management. Their perspective towards PDM was mainly document management. A successful industry in which Documentum has been applied is the pharmaceutical industry. Main reason for success was the fact that this PDM system can create compound structures, thereby being able to control the massive amounts of documents in this industry. One year ago, taking into account previous experience and market opportunities, Source specialized in the engineering side of PDM.

Source is a competent seller of the Documentum product, meaning that they can solve customer problems on the information technology field. Using a set of standard products like Documentum, Source provides full system integration and project control. Strategic business partners are Sun Microsystems, Xerox and Oracle Corporation.

Important note

The PDM system Documentum is a system with a very open structure. This means that it is a product that provides a basis for all other company programs to build on. Documentum is like the glue for all available programs within an organisation, it provides an infrastructure. In this respect Documentum differs from most PDM systems. Functionality that we know to be present in the product is a basis for what Source can build on top of that.

Documentum is available in the Windows environment, has its own query language called 4DQL and is Object Oriented.

9.2 Address information

**Developer information**

Documentum Inc.
4683 Chasot Drive 102
Pleasanton, CA
California
USA

tel. +1 - 510-463-6841
fax. +1 - 510-463-6850

**Supplier information**

Source Information Technology
Koperstraat 35
P.O. Box 720
2700 AS Zoetermeer
The Netherlands

tel. 079 - 615511
fax. 079 - 615509
### 9.3 System specifications

**Documentum, 2.0 (4th Quarter 1994)**

<table>
<thead>
<tr>
<th>Platforms</th>
<th>server:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HP-9000</td>
</tr>
<tr>
<td></td>
<td>IBM RS/6000</td>
</tr>
<tr>
<td></td>
<td>SunSparcStation2</td>
</tr>
<tr>
<td></td>
<td>Sun ClassicX</td>
</tr>
<tr>
<td>client:</td>
<td>PC, processor type 80386 or higher</td>
</tr>
<tr>
<td></td>
<td>Apple Macintosh</td>
</tr>
<tr>
<td></td>
<td>Apple Classic</td>
</tr>
<tr>
<td></td>
<td>HP-9000</td>
</tr>
<tr>
<td></td>
<td>IBM RS/6000</td>
</tr>
<tr>
<td></td>
<td>SunSparcStation2</td>
</tr>
<tr>
<td></td>
<td>Sun ClassicX</td>
</tr>
<tr>
<td></td>
<td>X-terminal</td>
</tr>
<tr>
<td>stand alone:</td>
<td>.</td>
</tr>
</tbody>
</table>

| Memory | internal: | > 16 MB |
|        | external:  | > 600 MB |

**Operating systems:**

- HP-UX
- Solaris
- Apple-OS
- MS-Windows 3.xx
- AIX

**Database engines:**

- ORACLE
- Sybase

**Network systems:**

- Ethernet
- NFS
- PCNFS
- TCP/IP

**CAD/CAM/CAE interface:**

- .

**MRP/PPS interface:**

- .

**Base Modules:**

- Server

**Extra Modules:**

- Clients/Workspace
- Verity Topic

### 9.4 Price indication

<table>
<thead>
<tr>
<th>Base licence</th>
<th>1st user:</th>
<th>Hfl. 4.000,-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>extra user:</td>
<td>Hfl. 4.000,-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Full licence</th>
<th>1st user:</th>
<th>Hfl. 4.000,-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>extra user:</td>
<td>Hfl. 4.000,-</td>
</tr>
</tbody>
</table>

(Minimum number of users is a 32 licence package)
10. Docuplex

10.1 General information

Xerox Engineering is the developer and supplier of the PDM system Docuplex in the Netherlands. Xerox has equal departments all over Europe. Approximately five years ago Fuji Xerox in Japan started development of a document management system when the need for same was established. After some time Rank Xerox enhanced the system by developing a user friendly desktop, which made the product very accessible.

Xerox Engineering has many customers with a lot of documents. The customer problems grew bigger as their physical document stock extended. They needed conversion of physical documents to electronic documents, storage of documents and management of documents. Two years ago Xerox Engineering further developed Docuplex for the engineering environment and started selling it. Xerox Engineering wants to start using Docuplex as the spearhead of their enterprise. In the near future they want to make Docuplex the centre of their entire product line which also includes large volume plotters, copiers and scanners. At this moment Xerox Engineering has 30 employees in the Netherlands of which one is technical supporter for Docuplex and six employees are selling Docuplex. Business partners are for instance Cap Volmac for system integration and C.M.G. for the organisational aspect.

Docuplex is an electronic translation of a physical archive. Integrated into Docuplex is a proprietary CAD-system. The engineering document life cycle for Docuplex is as follows: Creation, verification/release, archiving, indexing, access control, searching, retrieval and consultation. Although this entire life cycle can be implemented with Docuplex, it is especially suitable for retrieval and consulting. Other features are the possibility of using distributed systems, good in- and export functionality and linking with Xerox I/O equipment. Docuplex has a modular structure. The next version will among others contain the module, ED-job Ticket, a new application that speeds up production and distribution of documents. Another example is 'Extended Document Searching', an enhancement of present search functionality.

10.2 Address information

<table>
<thead>
<tr>
<th>Developer information</th>
<th>Supplier information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xerox Engineering systems</td>
<td>Xerox Engineering systems</td>
</tr>
<tr>
<td>P.O. Box 92</td>
<td>P.O. Box 92</td>
</tr>
<tr>
<td>3454 ZH de Meern</td>
<td>3454 ZH de Meern</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>The Netherlands</td>
</tr>
<tr>
<td>tel. 03406 - 22020</td>
<td>tel. 03406 - 22020</td>
</tr>
<tr>
<td>fax. 03406 - 64787</td>
<td>fax. 03406 - 64787</td>
</tr>
</tbody>
</table>
10.3 System specifications  Docuplex 7.03 (4th Quarter 1994)

Platforms
- server: Sun SparcStation2
- client: PC, processor type 80486 or higher
- X-Terminal
- stand alone: 

Memory
- internal: > 16 MB
- external: > 600 MB

Operating systems:
- Solaris
- Windows 3.xx

Database engines:
- ORACLE

Network systems:
- NFS
- Novell
- PCNFS
- PCSA/Path works
- TCP/IP

CAD/CAM/CAE interface: 

MRP/PPS interface: 

Base Modules:
- RDMS
- ED. Desktop Manager

Extra Modules: 

10.4 Price indication

Base licence
- 1st user: Hfl. 75.000,-
- extra user: Hfl. 5.000,-

Full licence
- 1st user: Hfl. 75.000,-
- extra user: Hfl. 5.000,-
11. EDM

11.1 General information

The company representing EDM (Engineering Data Management) in the Netherlands is Tree C.. Technology which was established in 1994. Tree C.. has evolved from a division of Computervision to an independent company. Tree C.. represents and supports all software developed by Computervision Corporation in the United States. Tree C.. has twelve employees of which 7 in support and 2 in sales. Tree C.. Technology does not only supply EDM but also has a lot of know-how and experience in implementation, thereby making it a value added reseller. They can supply a complete solution for the engineering process. Their goal is to improve quality, reduce costs and shorten the time-to-market. Concurrent engineering is the key to this goal and EDM is needed to manage the entire project. Business partners are Silicon graphics, Hewlett & Packard, Sun and Digital Equipment.

Computervision has implemented EDM in several Fortune 500 companies. With some they have a strategic alliance in order to specify future developments in both EDM and Computervision’s CAD, CAE, CAM applications.

Computervision has been working on PDM for ten years now and approximately 30 employees work on development of EDM. EDM has worldwide implementation in mostly engineering environments.

EDM started out as a PDM system especially tuned for CADDs. EDM and CADDs 5 can be used tightly integrated to support the concurrent engineering tools from Computervision. But EDM can also be used to support other applications like MEDUSA and Dimension III from Computervision, and applications from other vendors. Tree C.. has developed an integration between EDM and Dimension III.

EDM is now a system completely independent from any CAD system. Although EDM was developed for the engineering environment, it also provides an infrastructure for other applications.

It is an open system which is hardware independent. Exception are the engineering features which have consciously been kept very closed. It has a standard relational database, Oracle, and can work in a distributed heterogeneous environment.

11.2 Address information

<table>
<thead>
<tr>
<th>Developer</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computervision Corporation</td>
<td>Tree C.. Technology B.V.</td>
</tr>
<tr>
<td>100 Crosby Drive</td>
<td>Kosterijland 10b</td>
</tr>
<tr>
<td>Bedford, MA 01730 - 1480</td>
<td>3981 AJ Bunnik</td>
</tr>
<tr>
<td>United States of America</td>
<td>The Netherlands</td>
</tr>
<tr>
<td>tel. +1 -617-275-1800</td>
<td>tel. 03405 - 69600</td>
</tr>
<tr>
<td></td>
<td>fax. 03405 - 72093</td>
</tr>
</tbody>
</table>
11.3 System specifications  EDM, 6.0 (4th Quarter 1994)

Platforms  
- server: HP/Apollo
- Sun SparcStation
- client: PC, processor type 80386 or higher
- Digital VAXstation
- Digital DECstation
- Digital Alpha AXP
- HP/Apollo
- Sun SparcStation2
- Sun ClassicX
- X-terminal

Memory  
- internal: > 600MB
- external: 

Operating systems:  
- HP-UX
- Solaris
- MS-Windows 3.xx
- OSF/1
- VMS
- Windows NT

Database engines:  
- Netware sql server

Network systems:  
- Ethernet
- TCP/IP

CAD/CAM/CAE interface:  
- Medusa(prime)

MRP/PPS interface:  
- 

Base Modules:  
- Design document manager
- Design release manager
- EDMVault Entry level

Extra Modules:  
- EDMProjects
- EDMProgramming
- EDMVault
- EDMNavigator
- EDMClient

11.4 Price indication

Base licence  
- 1st user: Hfl. 30.000,-
- extra user: Hfl. 5.900,-

Full licence  
- 1st user: Hfl. 30.000,-
- extra user: Hfl. 7.900,-

(Pricing of EDM is highly dependent on the organisation size, the required modules and the extent of customer specific customisation and implementation. The above prices are not very accurate, because the pricing structure of EDM is different from the structure in this publication.)
12. EuroEMS

12.1 General information

EuroEMS is a product that has been and is being developed and supplied by 2EPS in the Netherlands. Some five years ago a group of three people started development and for four years 2EPS has dedicated itself almost completely to development of EuroEMS. In 1994 exploitation of the product began, with one person in sales and four in technical support / development. The product is designed for the mechanical engineering and machine building industry. The basis for EuroEMS is EMS Cart. EMS Cart is a version of AutoManager Workflow that has been finely tuned to provide EuroEMS with the needed workflow. By building applications on top of AutoManager Workflow, EuroEMS has enhanced the functionality of foresaid. End of 1994 EuroEMS will start a pilot based on AutoDesk Workcenter. EuroEMS will be both based on AutoManager Workflow and Workcenter in the future, after successful pilot. In the first quarter of next year 2EPS will release the Windows version of EuroEMS. Also yet to come are EMS Spareparts, Offer and Manuals.

EuroEMS has a modular system design. The first and probably the most important module is EMS Structure. This module creates product structures and BOM’s.

The second module is E-Pas from Exact, a logistics support module. The engineering database of EuroEMS is consistent on a 1:1 basis with the logistics database of E-Pas and is fully integrated.

The third module is EMS Memo. From the point of view that too much information is lost during the engineering process, the memo module provides an architecture to document all stages of the engineering process. EMS Memo makes, besides the documentation, all engineering notes easily accessible. 2EPS refers to this as knowledge management.

The last module discussed here is EMS Cost. An essential part of engineering is of course the price. The cost module EuroEMS allows, ‘economically controlled engineering’, meaning that during the engineering process, price information can be generated at any given time.

The strongest functionalities of EuroEMS are the hierarchical structure and the system to control Engineering notes. 2EPS wants to extend their PDM system to a system that includes more, e.g. an administrative or sales environment.

12.2 Address information

<table>
<thead>
<tr>
<th>Developer</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 EPS B.V.</td>
<td>2 EPS B.V.</td>
</tr>
<tr>
<td>Krijtwal 45</td>
<td>Krijtwal 45</td>
</tr>
<tr>
<td>P.O. Box 162</td>
<td>P.O. Box 162</td>
</tr>
<tr>
<td>3430 AD Nieuwegein</td>
<td>3430 AD Nieuwegein</td>
</tr>
<tr>
<td>tel. 03402 - 32444</td>
<td>tel. 03402 - 32444</td>
</tr>
<tr>
<td>fax. 03402 - 51902</td>
<td>fax. 03402 - 51902</td>
</tr>
</tbody>
</table>

The Netherlands

Appendix E-24 Description PDM systems
12.3 System specifications EuroEMS 3.2 (1st Quarter 1995)

Platforms
- server: PC, processor type 386 or higher
- PowerPC
- client: PC, processor type 386 or higher
- PowerPC
- stand alone: PC, processor type 386 or higher
- PowerPC

Memory
- internal: = < 16 MB
- external: = < 120 MB

Operating systems:
- MS-Dos
- MS-Windows 3.xx

Database engines: DBase III en IV

Network systems:
- Ethernet
- IBM-PCLAN
- LANtastic
- Novell

CAD/CAM/CAE interface:
- AutoCAD
- Generic CAD
- Microstation

MRP/PPS interface:
- E-Pas (standard)
- Triton (optional)
- Prodin (optional)

Base Modules:
- EuroEMS

Extra Modules:
- EuroEMS / E-Pas link
- EuroEMS / Genius link
- EuroEMS / Triton link (optional)
- EuroEMS / Prodin link (optional)

12.4 Price indication

Base licence
- 1st user: Hfl. 4750,-
- extra user: Hfl. 3410,-

Full licence
- 1st user: Hfl. 7550,-
- extra user: Hfl. 3410,-
13. Formtek

13.1 General information

The developer of FORMTEK is Inc. Lockheed Company, which is a developer and integrator of enterprise wide information management, product data management, and workflow solutions, throughout the world. Founded in 1982, FORMTEK originated out of Carnegie-Mellon University.

FORMTEK is an international company with offices in e.g. California, Pennsylvania, Washington, Belgium, Sweden, and Japan. Today, the installed base of FORMTEK consists of thousands of users throughout the world.

FORMTEK was acquired by the Lockheed Corporation in October 1989. FORMTEK: TDM is an information management system based on a pure client/server design.

All product data can be accessed from the FORMTEK: TDM vault. Through the use of FORMTEK's workflow applications, product data can be moved through complex processes on-line for review and approval. Product structure and configuration management software from Metaphase Technology, Inc. has been integrated with TDM, enabling the creation and manipulation of bills of material on-line, and the management of engineering information and structures, to address such concepts as effectiveness of changes to structures, compatibility of modified components in a structure, and engineering change control.

13.2 Address information

Developer
FORMTEK, Inc.
Fostu Plaza V11, Andersen Drive
Pittsburg PA 15220 - 2746
USA
tel. 412 937 4900
fax. 412 937 4946

Supplier
FORMTEK Europe n.v.
Zandvoortstraat 12a
2800 Mechelen
Belgium
tel. 32 15 209607
fax. 32 15 209606
13.3 **System specifications**

<table>
<thead>
<tr>
<th>Platforms</th>
<th>Formtek</th>
<th>Sun SparcStation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>server:</strong></td>
<td>HP-9000</td>
<td>Silicon Graphics</td>
</tr>
<tr>
<td></td>
<td>Silicon Graphics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PC, processor type 80386 or higher</td>
<td>Pentium</td>
</tr>
<tr>
<td><strong>client:</strong></td>
<td>PowerPC</td>
<td>Appel Macintosh</td>
</tr>
<tr>
<td></td>
<td>HP-9000</td>
<td>IBM RS/6000</td>
</tr>
<tr>
<td></td>
<td>Sun SparcStation</td>
<td>Silicon Graphics</td>
</tr>
<tr>
<td><strong>X-terminal</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Memory**      |                  |                |
| **internal:**   | $\leq 16$MB (client) and $> 16$ MB (server) |                |
| **external:**   | $\leq 600$ MB   |                |

| **Operating systems:** | Apple-OS | MS-Windows 3.xx |
|                       | HP-UX    | Irix            |
|                       | Solaris  | Xenix           |
|                       | SUN-OS   | AIX             |

| **Database engines:** | DB2 | Sybase |
|                      | ORACLE |       |

| **Network systems:** | 3Com | Ethernet |
|                     | NFS  | Appletalk |
|                     | Novell | PCNFS |
|                     | TCP/IP | WinSock |

| **CAD/CAM/CAE interface:** | AutoCAD | CATIA |
|                            | CADDS   | Cadence |
|                            | l-DEAS  | Medusa (prime) |
|                            | Mentor graphics | PRO/Engineer |

| **MRP/PPS interface:** | Avalon | CIIM |
|                       | SAP    | Triton |
|                       | Artemis |       |

| **Base Modules:**     | TDM: Access |                     |
| **Extra Modules:**    | TDM: Review  | TDM: Process Control |
|                       | TDM: High Security | TDM: Distribution |

13.4 **Price indication**

<table>
<thead>
<tr>
<th></th>
<th>1st user:</th>
<th>Full licence 1st user:</th>
<th>extra user:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Base licence</strong></td>
<td>$24,999.- (server)</td>
<td>$207,999.-</td>
<td>$10,500.- (client)</td>
</tr>
<tr>
<td><strong>Full licence</strong></td>
<td>$68,699.- (unlimited seats)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Pricing of FORMTEK is highly dependent on the organisation size, the required modules and the extent of customer specific customisation and implementation.)

Description PDM systems

Appendix E-27
14. FYI

14.1 General information

FYI, short for "For Your Information", is developed by a US company called Identitech. FYI is being developed in cooperation with NASA. The development of FYI started in 1988 and is done by approximately 15 employees.

FYI is a document management system that is represented in the Netherlands by Logisterion since 1991. They are a subsidiary company of the Kramers & Ruys group. Since 1989 Logisterion has been involved with document management.

Their first data management system was Synchrony which operated in VAX-environments. After some time a solution for PC users in a network was required. FYI was selected by Logisterion and became an integral part of their software scope.

Logisterion is a system integrator that can supply complete automation solutions. Through experience they believe that implementations of PDM systems start with small departments and pilots. From there it can grow throughout the organisation. Presently Logisterion works with five employees in technical support and four in sales. The intention is to hire four new employees. Partners are available to provide know-how for business process redesign if necessary. A user group has not yet been established but will be in the near future.

The base concept for FYI is to support document management in general and the processes involved. FYI has an extensive functionality for workflow control. FYI is an open product that directly supports multiple databases. The document browser has been improved in the new version 2.2 which has recently been released.

14.2 Address information

Developer information
Identitech, Inc.
1333 Gateway Drive, Suite 1000
Melbourne, FL 32901
United States of America
tel. +1 - 407-951-9503
fax. +1 - 407-951-9505

Supplier information
Logisterion B.V.
Stationsweg 45
P.O. Box 29080
3001 GB Rotterdam
The Netherlands
tel. 010 - 2170700
fax. 010 - 4139693

Appendix E-28 Description PDM systems
14.3 System specifications

Platforms

- server: PC, processor type 80486 or higher
- Digital VAXstation
- HP-9000
- PowerPC
- Sun SparcStation2

- client: PC, processor type 80386 or higher
- PowerPC
- stand alone: 

Memory

- internal: = < 16 MB
- external: = < 120 MB

Operating systems:

- HP-UX
- Windows 3.xx
- UNIX ITT
- VMS
- Windows NT

Database engines:

- ORACLE
- Sybase
- Gupta sql server

Network systems:

- Banyan VINES
- Ethernet
- LANtastic
- LANmanager
- NetBIOS
- Novell
- PCSA/Pathworks
- TCP/IP

CAD/CAM/CAE interface:

- AutoCAD

MRP/PPS interface:

- 

Base Modules:

- FYI object server
- FYI Clients

Extra Modules:

- Mass-Scan
- Index
- Workflow

14.4 Price indication

Base licence 1st user: In between Hfl. 50.000,- and Hfl. 100.000,-
(depending on the implementation)

extra user: Starting licence is for 5 users and 1 server

Full licence 1st user: In between Hfl. 50.000,- and Hfl. 100.000,-
(depending on the implementation)

extra user: Starting licence includes 5 users and 1 server
15. **HP/PE WorkManager**

15.1 **General information**

Hewlett Packard Precision Engineering/WorkManager is a development of Hewlett Packard USA. The vision of Hewlett Packard with WorkManager is to provide an open environment for the support of the engineering environment. Hewlett Packard uses VARs (Value Added Resellers) for the distribution of WorkManager.

Distributor for HP/PE WorkManager is Betagraphics, an automation company. Betagraphics is a company with 30 employees and nine years of experience in CAD/CAM implementations. Eight people are assigned to PDM of which six in technical support and two in sales. Their first document management system was D.M.S., a product Betagraphics developed themselves. However Betagraphics' customers didn't see the document management problem yet. After a while Hewlett & Packard entered the PDM market with HP/PE WorkManager. Betagraphics chose not to develop their own product any further, but to represent WorkManager.

In enterprise wide projects for large companies, Oracle acts as a project leader. Betagraphics feel that their projects are more successful due to present knowledge about organisations. A standard procedure is the project analyses in which they thoroughly define all aspects of a project and also the information streams in the organisation. Their strategy is to connect to the working methods of the customers. Betagraphics is active in the Netherlands in three main business segments; public utility companies, engineers offices and industrial engineering.

HP PE/WorkManager replaced the HP/DMS system in 1993. Although WorkManager started out as a document management system, it has evolved to a very complete PDM system, with for instance product structures, article database, integrations with CAD and a very open structure. WorkManager integrates with other PE/products such as ME-10, Solid designer and ME-30, but also other integrations are provided. WorkManager has integrations to other company processes, such as logistics, administration and process planning.

The new version of WorkManager, which is to be released shortly, will also have a more graphical user-interface.

15.2 **Address information**

**Developer information**

Hewlett-Packard Company  
19111 Pruneridge Avenue  
Cupertino CA 95014-0683  
USA  
tel. +1 408 - 7258900  
fax. +1 408 - 4474880

**Supplier information**

Betagraphics bv  
Amarilstraat 20  
Hengelo  
The Netherlands  
tel. 074 - 434245  
fax. 074 - 438499
15.3 System specifications

HP/PE WorkManager 2.1 (4th Quarter 1994)

Platforms

server:
- HP-9000
- IBM RS/6000
- Sun SparcStation2

client:
- PC, processor type 80486 or higher
- Digital Alpha AXP
- HP-9000
- IBM RS/6000
- Sun SparcStation2
- Sun ClassicX
- X-Terminal

stand alone:

Memory

internal: > 16 MB
external: =< 600 MB

Operating systems:

- HP-UX
- MS-Windows 3.xx
- Solaris
- Windows NT

Database engines:

- Allbase
- Ingres
- Sybase
- Informix
- ORACLE

Network systems:

- HP network
- NFS
- Novell
- PCNFS
- TCP/IP

CAD/CAM/CAE interface:

- AutoCAD
- I-DEAS
- ME10/ME30
- PRO/Engineer

MRP/PPS interface:

- SAP
- Triton

Base Modules:

- Server Process Document

Extra Modules:

- Packet Configuration History Classification

15.4 Price indication

Base licence

1st user: Hfl. 2.500,-
extra user: Hfl. 2.500,-

Full licence

1st user: Hfl. 12.500,-
extra user: Hfl. 12.500,-
16. Information Manager

16.1 General information

The current developer of Information Manager is EDS, which is part of General Motors. The origin of the product goes back to McDonald Douglas. They had a business unit that was active in CAD/CAM (Unigraphics) and data management. In 1986 a client specific application was built and in 1989 this application was turned into a general purpose solution. The result was the bases for the current Information Manager. At the end of 1990 the business unit, including all personnel, was transferred from McDonald Douglas to EDS. In 1991 several product modules were redesigned. Approximately 70 employees were involved with the development.

In the Netherlands Information Manager is represented by EDS Nederland. They supply the product themselves, but also together with partners. Customers can always go back to EDS for support if necessary. During implementation, business process redesign can be carried out if required. EDS Nederland works in close cooperation with the rest of EDS during such redesigns. B.P.R. however is only done after all information in a company is organised. EDS Nederland feels that one of the most important issues with a project is always the user acceptance. They try to activate and involve the employees as much as possible.

Information Manager consists of three main modules. The centre of the product is Doc Man. This module’s main contents is retrieval and search functions. There is a product structure management module which contains for example configuration management. Last main module is EPM, Enterprise Process Modelling.

In 1995, the new version 3.1 will be available. This version will contain Genius 4000. This module can provide classification capabilities to Information Manager.

16.2 Address information

Developer
EDS Unigraphics Division
13736 Riverport Drive
Maryland Height
MO 63043
United States of America
tel. +1 314 3448718
fax. +1 314

Supplier
Electronic Data Systems (EDS) Nederland BV
K.P. van de Mandeelaan 130-144
Postbus
3006 AD Rotterdam
The Netherlands
tel. 010 - 4987654
fax. 010 - 4987777
### 16.3 System specifications

**Platforms**

<table>
<thead>
<tr>
<th>Server</th>
<th>Digital VAXstation</th>
<th>Digital Alpha AXP</th>
<th>IBM RS/6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Alpha AXP</td>
<td>HP-9000</td>
<td>Silicon Graphics</td>
<td>Sun SparcStation2</td>
</tr>
<tr>
<td>HP-9000</td>
<td>HP-9000</td>
<td>IBM RS/6000</td>
<td>Sun SparcStation2</td>
</tr>
<tr>
<td>Apple Macintosh</td>
<td>Apple classic</td>
<td>Silicon Graphics</td>
<td>Sun Classicx</td>
</tr>
<tr>
<td>Digital VAXstation</td>
<td>Digital Alpha AXP</td>
<td>X-terminal</td>
<td>IBM RS/6000</td>
</tr>
<tr>
<td>Digital Alpha AXP</td>
<td>HP-9000</td>
<td>Silicon Graphics</td>
<td>Sun SparcStation2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Client</th>
<th>PC, processor type 286 or higher</th>
<th>Apple Macintosh</th>
<th>Apple classic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple classic</td>
<td>Digital VAXstation</td>
<td>Digital Alpha AXP</td>
<td>X-terminal</td>
</tr>
<tr>
<td>Digital VAXstation</td>
<td>Digital Alpha AXP</td>
<td>HP-9000</td>
<td>IBM RS/6000</td>
</tr>
<tr>
<td>Digital Alpha AXP</td>
<td>HP-9000</td>
<td>Silicon Graphics</td>
<td>Sun SparcStation2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stand alone</th>
<th>Digital VAXstation</th>
<th>Digital Alpha AXP</th>
<th>IBM RS/6000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Alpha AXP</td>
<td>HP-9000</td>
<td>Silicon Graphics</td>
<td>Sun SparcStation2</td>
</tr>
<tr>
<td>HP-9000</td>
<td>HP-9000</td>
<td>IBM RS/6000</td>
<td>Sun SparcStation2</td>
</tr>
</tbody>
</table>

**Memory**

<table>
<thead>
<tr>
<th>Internal</th>
<th>&gt; 16 MB</th>
<th>OSF/1</th>
</tr>
</thead>
<tbody>
<tr>
<td>External</td>
<td>= &lt; 600 MB</td>
<td>Solaris</td>
</tr>
</tbody>
</table>

**Operating systems**

<table>
<thead>
<tr>
<th>Apple-OS</th>
<th>HP-UX</th>
<th>Irix</th>
<th>MS-DOS</th>
<th>MS-Windows 3.xx</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Database engines**

<table>
<thead>
<tr>
<th>Ingres</th>
<th>ORACLE</th>
</tr>
</thead>
</table>

**Network systems**

<table>
<thead>
<tr>
<th>3Com</th>
<th>TCP/IP</th>
<th>DECnet</th>
<th>Ethernet</th>
<th>IBM-PCLAN</th>
<th>LANtastic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CAD/CAM/CAE interface**

<table>
<thead>
<tr>
<th>AutoCAD</th>
<th>CADAM</th>
<th>MicroCADAM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MRP/PPS interface**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>

**Base Modules**

<table>
<thead>
<tr>
<th>Iman Base</th>
</tr>
</thead>
</table>

**Extra Modules**

<table>
<thead>
<tr>
<th>PSE</th>
<th>EPM</th>
<th>SML</th>
<th>PC Client</th>
</tr>
</thead>
</table>

### 16.4 Price indication

**Base licence**

<table>
<thead>
<tr>
<th>1st user</th>
<th>Hfl. 4.000,-</th>
</tr>
</thead>
<tbody>
<tr>
<td>extra user</td>
<td>Hfl. 4.000,-</td>
</tr>
</tbody>
</table>

**Full licence**

<table>
<thead>
<tr>
<th>1st user</th>
<th>Hfl. 5.000,-</th>
</tr>
</thead>
<tbody>
<tr>
<td>extra user</td>
<td>Hfl. 5.000,-</td>
</tr>
</tbody>
</table>
17. I/PDM-PDU

17.1 General information

Developer and supplier of I/PDM-PDU is Intergraph. Intergraph Corporation was established in the US in 1969 and started as a small company supporting Nasa. In the early seventies IGDS was defined as a basis for various drafting and design tools. The IGDS system was extended with 3D capabilities and B-Spline surfaces to meet the needs of mechanical designers. The MEDS product was launched in the late seventies. The users of the MEDS system experienced the need for file management and in the last quarter of 1984 a product called EDMS was launched. MEDS and EDMS had a very tight integration. In the early eighties Intergraph developed a new CAD core based on object technology which resulted in the I/EMS 3D modelling product which replaced MEDS in 1986. In 1987 EDMS was replaced by I/PDM-PDU. Intergraph Benelux b.v. has 110 employees of which 11 are assigned to sales and support of the above mentioned products.

I/PDM has grown from file management and product structure to a complete PDM system. MRP and PPS are excluded because Intergraph considers these as non core PDM functions and focuses on neutral interfaces to third party products in this area. Intergraph has experience in implementation of PDM systems and can also be of service if business process redesign is required, especially when the product philosophy is followed.

The I/PDM-PDU system consists of a client (I/PDU) and a server (I/PDM) part. I/PDU is an extension to I/EMS. The I/PDM server part is built on top of I/NFM, the Network File Manager. I/NFM is the generic base for a wide range of applications developed by Intergraph or its partners (See also R/Solution).

Intergraph has the philosophy to sell complete solutions varying from 1 to over 1000 seats per company. A new range of low-cost PC based applications was developed to meet the customer needs for Document and Data Management. This range of DM/* products can work with or without the I/NFM basis and thus offering a solution for both small and large companies. Typical DM applications are DM/MANAGER, DM/VIEW AND DM/REDLINE that offer low-cost view/redline seats.

I/PDM-PDU sells on industry standard UNIX HP platforms from SUN and Silicon Graphics. In 1995 platform support will be extended with Intel based Workstations running Solaris x86. The DM products run on Windows 3.xx and Windows NT. Versions running under Solaris are scheduled for Q2 1995.

To meet the growing need for EDMS technology Intergraph has announced the DM2 series of PDM products. The DM2 products are based on Methaphase technology and will eventually replace I/PDM and I/NFM. For 1995 the products; DM/Server, DM/Manager, Bulk load, DM Workflow, DM/View, DM/Redline, DM/Structure, Bulk Migration and DM/API are announced.

17.2 Address information

Developer
Intergraph Corporation
Huntsville, Alabama
35894 - 0001
United States of America
tel. +1 -205-730-2000

Supplier
Intergraph Benelux B.V.
Siriusdreef 2
Postbus 333
2130 AH Hoofddorp
The Netherlands
tel. 02503-66666
fax. 02503-66665

Description PDM systems
### 17.3 System specifications I/PDM 3.1 (4th Quarter 1994)

<table>
<thead>
<tr>
<th>Platforms</th>
<th>server:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PC, Processor type 80386 or higher</td>
</tr>
<tr>
<td></td>
<td>Silicon Graphics</td>
</tr>
<tr>
<td></td>
<td>Sun SparcStation2</td>
</tr>
<tr>
<td></td>
<td>Clipper</td>
</tr>
<tr>
<td>client:</td>
<td>.</td>
</tr>
<tr>
<td>stand alone:</td>
<td>.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Memory</th>
<th>internal:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; 16 MB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Memory</th>
<th>external:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>= &lt; 600 MB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operating systems:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clix</td>
</tr>
<tr>
<td>Irix</td>
</tr>
<tr>
<td>MS-DOS</td>
</tr>
<tr>
<td>MS-Windows 3.xx</td>
</tr>
<tr>
<td>Solaris</td>
</tr>
<tr>
<td>Windows NT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Database engines:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB2</td>
</tr>
<tr>
<td>Ingres</td>
</tr>
<tr>
<td>RDB</td>
</tr>
<tr>
<td>Informix</td>
</tr>
<tr>
<td>ORACLE</td>
</tr>
<tr>
<td>Sybase</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Network systems:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DECnet</td>
</tr>
<tr>
<td>Ethernet</td>
</tr>
<tr>
<td>Novell</td>
</tr>
<tr>
<td>PCNFS</td>
</tr>
<tr>
<td>TCP/IP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAD/CAM/CAE interface:</th>
</tr>
</thead>
<tbody>
<tr>
<td>AutoCAD</td>
</tr>
<tr>
<td>I/EMS</td>
</tr>
<tr>
<td>Microstation</td>
</tr>
</tbody>
</table>

| MRP/PPS interface:     | . |

<table>
<thead>
<tr>
<th>Base Modules:</th>
</tr>
</thead>
<tbody>
<tr>
<td>I/PDM</td>
</tr>
<tr>
<td>I/PDU</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Extra Modules:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM/Manager</td>
</tr>
<tr>
<td>DM/View</td>
</tr>
<tr>
<td>DM/Redline</td>
</tr>
<tr>
<td>DM/Capture</td>
</tr>
</tbody>
</table>

### 17.4 Price indication

<table>
<thead>
<tr>
<th>Base licence</th>
<th>1st user:</th>
<th>Hfl. 63.820,-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>extra user:</td>
<td>Hfl. 4.725,-</td>
</tr>
<tr>
<td>Full licence</td>
<td>1st user:</td>
<td>Hfl. 76.375,-</td>
</tr>
<tr>
<td></td>
<td>extra user:</td>
<td>Hfl. 9.255,-</td>
</tr>
</tbody>
</table>
18. Keyfile

18.1 General information

Keyfile is developed by the american company Keyfile. It has approximately 200 employees of which 40 in development.

This Document Information System (DIS), is represented by Borsu Systema. Being occupied with information technology since 1948, they have a lot of experience. They can supply the entire trajectory of automation. Borsu Systema is part of the Royal Borsumij Wehry-group which is a multinational.

In 1987 Borsu Systema developed their own PDM system called Docman, a product they still sell. In 1991 Borsu Systema became a Value Added Reseller of Keyfile in the Benelux.

Their experience is that companies need a standard product with an open structure. With keyfile, Systema wants to achieve standardisation of customisation. After implementation Borsu Systema transfers the service of the system over to IMD a daughter company of a hundred employees in Hoofddorp. This way of working is part of their ideal, which is to develop software. Nevertheless, they are always available for problems that go beyond service.

Other product types are CAD systems, MRP systems, PPS systems, OCR and FTR. Business partners are for instance Hewlett and Packard for O.E.M. (Original Equipment Manufacturer) and Fujitsu for scanners.

Keyfile was developed in approximately 1990. The main functionalities are storage, retrieval, imaging and workflow. It has a vault and infrastructure suitable for enterprise wide implementation. Important features are that the integration is standardised, that Keyfile is a Microsoft follower and that the system can maintain distributed systems.

18.2 Address information

<table>
<thead>
<tr>
<th>Developer information</th>
<th>Supplier information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyfile Corporation</td>
<td>Borsu Systema B.V.</td>
</tr>
<tr>
<td>22 Cotton road</td>
<td>Albert Einsteinweg 4</td>
</tr>
<tr>
<td>Nashua, NH 03063</td>
<td>P.O. Box 178</td>
</tr>
<tr>
<td>United States of America</td>
<td>8200 AD Lelystad</td>
</tr>
<tr>
<td>tel. +1-603-883-3800</td>
<td>The Netherlands</td>
</tr>
<tr>
<td>fax. +1-603-889-9259</td>
<td>tel. 03200 - 72200</td>
</tr>
<tr>
<td></td>
<td>fax. 03200 - 52042</td>
</tr>
</tbody>
</table>

Appendix E-36
18.3 System specifications

Keyfile 2.3 (3rd Quarter 1994)

Platforms

- server: PC, processor type 80386 or higher
- HP-9000
- client: PC, processor type 80386 or higher
- stand alone: PC, processor type 80386 or higher

Memory

- internal: = < 16 MB
- external: > 600 MB

Operating systems:

- HP-UX
- MS-Windows 3.xx
- OS/2
- Windows NT (2nd quarter 1995)

Database engines:

- dBase III/IV
- Btrieve
- Foxpro
- Informix
- Ingres
- Netware SQL server
- ORACLE
- Sybase
- OODBMS

Network systems:

- Banyan VINES
- LANmanager
- NetBIOS
- Novell
- TCP/IP

CAD/CAM/CAE interface:

MRP/PPS interface:

Base Modules:

- Personal edition
- Workgroup edition
- Enterprise edition

Extra Modules:

- Batch scan
- Jukebox support
- OCR support
- MHS support

18.4 Price indication

Base licence

- 1st user: Hfl. 2900,-
- extra user: Hfl. 2000,-

Full licence

- 1st user: Hfl. 11190,- CAD support, optical disk, OCR, MHS/VIM
- support
- extra user: Hfl. 3500,- CAD support
19. LT Manager

19.1 General information

For general information about the supplier of LT Manager, CADplus, we refer to the section on AutoEDMS.

LT Manager is a relatively small PDM system that has been on the market since 1994. The main features of this fully windows compatible system are security (restrictions to operations), retrieval, searching and revision and version control. To control the creation and placement of drawing files, LT Manager can automatically generate new filenames according to manager-defined formats.

19.2 Address information

Developer
EDM Consultants
15 Silver Street Great Barford
Bedfordshire MK 44
3HU England

tel. 0234 - 870088
fax. 0234 - 871235

Supplier
CAD PLUS B.V.
Coenecoop 4
P.O. Box 435
2740 AK Waddinxveen
The Netherlands

tel. 01828 - 16700
fax. 01828 - 32796
### 19.3 System specifications

**LT Manager**

<table>
<thead>
<tr>
<th>Platforms</th>
<th>Server:</th>
<th>PC, processor type 286 or higher</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Client:</td>
<td>PC, processor type 286 or higher</td>
</tr>
<tr>
<td>Stand Alone</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Memory</th>
<th>Internal:</th>
<th>=&lt; 2 MB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>External:</td>
<td>&lt; 40 MB</td>
</tr>
</tbody>
</table>

**Operating systems:** MS-Windows 3.xx.

**Database engines:** Proprietary

**Network systems:** Novell

**CAD/CAM/CAE interface:**
- AutoCAD
- AutoCAD LT

**MRP/PPS interface:**

**Base Modules:** LT Manager

**Extra Modules:**

### 19.4 Price indication

**Base licence**
- 1st user: Hfl. 695,-
- Extra user: Hfl. 695,-

**Full licence**
- 1st user: Hfl. 695,-
- Extra user: Hfl. 695,-
20. Manta

20.1 General information

Developer of Manta is an Israeli company called B.A. Intelligence Networks Ltd. or BAIN, which was established in 1986 as a software and system house specializing in industrial and engineering applications. BAIN has over eight years of industrial experience and invests 30% of its revenues in R & D. Since 1990 BAIN has used all its technology and capabilities to develop Manta. They also entered into joint ventures to develop specialized software products for various end-user industries.

Representation of Manta in the Netherlands is done by Logos and Greenock. Several years ago, Logos worked on a project involving a document management system resulting in a demonstration system. The experience and technology gained was used for the development of MicroManager. This product became outdated and in 1993 Logos decided not to develop MicroManager any further. A new PDM system, Manta, was chosen in August of 1994. Reason for this choice was the user friendly interface and the fact that Manta supports among others CAD integration with Microstation and AutoCAD and can operate (stand-alone) on PC platforms. At this moment two people are active in sales and one in technical support. Expansion of Logos in technical support is planned. Logos and Greenock also sell AutoManager WorkFlow.

Greenock has been a sales and service organisation for drafting, product automation, CAD and CAM. Greenock is specialized in complete solutions for industrial production engineering companies. They supply hard- and software and take care of complete implementation, maintenance, service and support of CAD/CAM systems and LAN/WAD's. On the basis of customer specific wishes, Greenock does turn-key projects.

The philosophy of Logos concerning PDM is that divisions will grow together more and more and that integrated systems are very useful and needed. At first the problem is often document management, but later on it seems that larger implementation of PDM is required and/or wanted. Manta can be implemented at small scale and can grow to large implementation, thereby making it an appropriate system for Logos' philosophy.

Manta consists of several integrated modules, including configuration management, product structure management and a CAD/CAM design framework. Manta can be easily implemented and used, has a good Graphical User Interface and is designed to support product development and engineering efforts throughout the product life cycle.

20.2 Address information

<table>
<thead>
<tr>
<th>Developer</th>
<th>Supplier information</th>
<th>Supplier information</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. Intelligence Networks Ltd.</td>
<td>Logos industr. autom.</td>
<td>Greenock B.V.</td>
</tr>
<tr>
<td>1 Hamasger Street</td>
<td>Papsouwseana 119</td>
<td>Hardwareweg 5</td>
</tr>
<tr>
<td>43653 Raanana</td>
<td>P.O. Box 627</td>
<td>P.O. Box 21600</td>
</tr>
<tr>
<td>Israel</td>
<td>2624 AK Delft</td>
<td>3802 RP Amersfoort</td>
</tr>
<tr>
<td>+972 - 9 - 911133</td>
<td>The Netherlands</td>
<td>The Netherlands</td>
</tr>
<tr>
<td>+972 - 9 - 916734</td>
<td>tel. 015 - 573777</td>
<td>tel. 033 - 560660</td>
</tr>
<tr>
<td></td>
<td>fax. 015 - 578200</td>
<td>fax. 033 - 560766</td>
</tr>
</tbody>
</table>

Appendix E-40

Description PDM systems
### 20.3 System specifications

**Manta 1.1 (4th Quarter 1994)**

<table>
<thead>
<tr>
<th>Platforms</th>
<th>server:</th>
<th>PC, processor type 80486 or higher</th>
<th>Control Data</th>
<th>Digital VAXstation</th>
<th>Digital DECstation</th>
<th>Digital Alpha AXP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>client:</td>
<td>PC, processor type 80386 or higher</td>
<td>Control Data</td>
<td>Digital VAXstation</td>
<td>Digital DECstation</td>
<td>Digital Alpha AXP</td>
</tr>
<tr>
<td></td>
<td>stand alone:</td>
<td>PC, processor type 80386 or higher</td>
<td>Control Data</td>
<td>Digital VAXstation</td>
<td>Digital DECstation</td>
<td>Digital Alpha AXP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Memory</th>
<th>internal:</th>
<th>&gt; 16 MB</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>external:</td>
<td>&lt; 40 MB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operating systems:</th>
<th>HP-UX</th>
<th>Solaris</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Irix</td>
<td>Ultrix</td>
</tr>
<tr>
<td></td>
<td>Irix</td>
<td>VMS</td>
</tr>
<tr>
<td></td>
<td>MS-Windows 3.xx</td>
<td>Windows NT</td>
</tr>
<tr>
<td></td>
<td>OSF/1</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Database engines:</th>
<th>Ingres</th>
<th>RDB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Netware SQL server</td>
<td>Sybase</td>
</tr>
<tr>
<td></td>
<td>ORACLE</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Network systems:</th>
<th>Banyan VINES</th>
<th>PCSA/Path works</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NFS</td>
<td>TCP/IP</td>
</tr>
<tr>
<td></td>
<td>Novell</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAD/CAM/CAE interface:</th>
<th>AutoCAD</th>
<th>Microstation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Euclid</td>
<td>PRO/Engineer</td>
</tr>
<tr>
<td></td>
<td>Medusa</td>
<td>Unigraphics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MRP/PPS interface:</th>
<th>SAP</th>
<th>MFG/Pro</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Triton</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Base Modules:</th>
<th>Manta</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Extra Modules:</th>
<th>-</th>
</tr>
</thead>
</table>

### 20.4 Price indication

<table>
<thead>
<tr>
<th>Base licence</th>
<th>1st user:</th>
<th>Hfl. 3.950,-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>extra user:</td>
<td>Hfl. 3.000,-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Full licence</th>
<th>1st user:</th>
<th>Hfl. 5.950,- (includes ORACLE on PC)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>extra user:</td>
<td>Hfl. 4.000,-</td>
</tr>
</tbody>
</table>

Description PDM systems

Appendix E-41
21. Metaphase

21.1 General information

Metaphase is a system that is supplied by Control Data & SDRC. Together, these firms founded a joint venture in 1992 to develop the PDM system, Metaphase. This joint venture has 80 employees in development. SDRC as well as Control Data had a PDM system before Metaphase. SDRC had DMCS en Control Data had EDL. Metaphase has the best technology and features of both systems, although the programming has been completely renewed. Aspects taken from EDL are Object Oriented, the User-Interface and the distributed database, from DMCS the product structures and the flexible datamodel. All these aspects together form the strongholds of Metaphase. This system is an enterprise wide framework that provides an infrastructure. The main functionalities are data management and process control or workflow. Applications can be integrated or interfaced.

Control Data
This company of 45 employees in the Netherlands (established in 1957) has been involved with the PDM technology since the end of the seventies. In this period they were working on a project for a large airplane company. The project functioned as an accelerator for the PDM technology. The result of this project was EDL, which was commercialized and came into the market in 1981. Right now Control Data has 4 commercial and 10 supporting employees for the PDM market in the Netherlands. In Europe that number is one hundred. They have know-how in business processes, integrations of applications, storage management and electronic commerce. Control Data wants to enter new markets such as health care, pharmaceutical and process industry. They want to do enterprise wide implementation of PDM. For this review Metaphase 2.0 was demonstrated by Control Data.

SDRC
SDRC is the other partner in the Metaphase joint venture. SDRC has experience in CAD/CAM/CAE systems (I-deas) and in data management. Before joining the Metaphase development SDRC had developed an distributed the DMCS system for product data management.

21.2 Address information

<table>
<thead>
<tr>
<th>Developer information</th>
<th>Supplier information</th>
<th>Supplier information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metaphase Technology, Inc</td>
<td>Control Data</td>
<td>SDRC</td>
</tr>
<tr>
<td>4201 Lexington Avenue North</td>
<td>Olof Palmestraat 20</td>
<td>Marsh &amp; McLennan Building</td>
</tr>
<tr>
<td>Arden Hills, MN 55126</td>
<td>P.O. Box 197</td>
<td>Rivium Quadrant 81</td>
</tr>
<tr>
<td>United States of America</td>
<td>2600 AD Delft</td>
<td>2909 LC Capelle a.d. IJssel</td>
</tr>
<tr>
<td>tel. +1-612-482-6736</td>
<td>tel. 015 - 153130</td>
<td>tel. 010 - 4472088</td>
</tr>
<tr>
<td>fax. +1-612-482-2000</td>
<td>fax. 015 - 153131</td>
<td>fax. 010 - 2023434</td>
</tr>
</tbody>
</table>
### 21.3 System specifications

**Metaphase 2.0 (4th Quarter 1994)**

<table>
<thead>
<tr>
<th>Platforms</th>
<th>server:</th>
<th>Control Data</th>
<th>Digital Alpha AXP</th>
<th>HP-9000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>client:</td>
<td>PC, processor type Pentium</td>
<td>IBM RS/6000</td>
<td>Silicon Graphics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Digital Alpha AXP</td>
<td>Sun SparcStation2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>stand alone:</td>
<td>Control Data</td>
<td>Silicon Graphics</td>
<td>Sun SparcStation2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Digital Alpha AXP</td>
<td>IBM RS/6000</td>
<td>HP-9000</td>
</tr>
<tr>
<td>Memory</td>
<td>internal:</td>
<td>= &lt; 16 MB</td>
<td>ORACLE</td>
<td>Sybase</td>
</tr>
<tr>
<td></td>
<td>external:</td>
<td>= &lt; 600 MB</td>
<td>System5</td>
<td></td>
</tr>
<tr>
<td>Operating systems:</td>
<td>Apple-OS</td>
<td>HP-UX</td>
<td>Irix</td>
<td>Ultrix</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Irix</td>
<td></td>
<td>Windows NT</td>
</tr>
<tr>
<td></td>
<td>Irix</td>
<td>MS-Windows 3.xx</td>
<td>ORACLE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MS-Windows 3.xx</td>
<td>OS/2</td>
<td>ORACLE</td>
<td></td>
</tr>
<tr>
<td>Database engines:</td>
<td>ORACLE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Progress</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network systems:</td>
<td>DECnet</td>
<td>Ethernet</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ethernet</td>
<td>PC-networks supporting Winsock</td>
<td>TCP/IP</td>
<td>NFS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAD/CAM/CAE interface:</td>
<td>AutoCAD</td>
<td>CATIA</td>
<td>PRO/Engineer</td>
<td>Mentor Graphics</td>
</tr>
<tr>
<td></td>
<td>SAP</td>
<td>BPCS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MRP/PPS interface:</td>
<td>OMF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base Modules:</td>
<td>LCMS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extra Modules:</td>
<td>PSM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PSM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>APC</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 21.4 Price indication

<table>
<thead>
<tr>
<th>Description</th>
<th>Base licence 1st user:</th>
<th>Hfl. 6.000,-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>extra user:</td>
<td>Hfl. 6.000,-</td>
</tr>
<tr>
<td></td>
<td>Full licence 1st user:</td>
<td>Hfl. 8.500,-</td>
</tr>
<tr>
<td></td>
<td>extra user:</td>
<td>Hfl. 8.500,-</td>
</tr>
</tbody>
</table>

Appendix E-43
22. NOW24

22.1 General information

Supplier of NOW24 in the Benelux is Twinsoft. Twinsoft was established in 1986, as a joint venture between Tandem and Volmac Software Group NV (now Cap/Volmac). Twinsoft was called Twinac Software B.V. when they started. This company is occupied with service for Tandem computers. Beside service, Twinsoft also offers NOW24 (NonStop Object & Workflow management, MIND (Event Driven Database Marketing), and CONTROL (Version management of software for engineering environments). Twinsoft has 83 employees.

NOW24 has a standard integration with Document- and Process management.

7 x 24 Repository for workstation files, NOW takes advantage of the Tandem features of fault tolerance and data integrity to provide a reliable place to reference, store and retrieve workstation files.

Cost effective storage, NOW provides a practical storage alternative to costly, scattered, and unmanageable disk drives on workstations. You can store files on Tandem magnetic, or on optical drives connected to any LAN file server that supports TCP/IP and uses FTP.

Open graphical client interface, NOW allows MacIntosh, Windows and UNIX users to access files through a central repository. Pull-down menus, radio buttons and point and click technology make document check-in en check-out quick and easy.

Open document interface, NOW manages documents rather than manipulating their contents. It interfaces to workstations OS software via FTP. These two features make it possible to interface to a wide range of word processing, graphical, spreadsheet and imaging applications.

Transactional workflow, NOW applies Tandem's strength in transaction processing to workflow steps. Business rules and procedures are loaded into non-stop SQL tables and then executed, providing a fault tolerant workflow engine.

Scalability, NOW utilises Tandem's 'Open Architecture' to provide totally scalable solutions from small departmental groups to enterprise wide implementations.

Graphical Workflow Builder, now has the ability to create and manage workflow via a graphical workflow designer.

22.2 Address information

Developer
DIMIS
The willows mark road
Hemel Hempstead
HArtfordshire HP2 7BW
tel. +44-4422-34900
fax. +44-4422-43308

Supplier
Twinsoft
Havenweg 24a
4131 NM Vianen
the Netherlands
tel. 03473 - 70164
fax. 03473 - 70088

Description PDM systems
22.3 System specifications NOW24 3.0 (3rd Quarter 1994)

Platforms

server: Tandem
PC, processor type 80386 or higher
Apple Macintosh
Sun SparcStation2

client: 

stand alone: 

Memory

internal: = < 4 MB
external: < 600 MB

Operating systems:
Nonstop kernel (Guardian)
Apple-OS
MS-Windows 3.xx
System5

Database engines:
Nonstop SQL

Network systems:
TCP/IP

CAD/CAM/CAE interface: 

MRP/PPS interface: 

Base Modules:
NOW24
Object Manager
Workflow Manager

Extra Modules: 

22.4 Price indication

Base licence 1st user: Hfl. 6,000,-
extra user: Hfl. 6,000,-

Full licence 1st user: Hfl. 9,000,-
extra user: Hfl. 9,000,-
23. PAFEC EDM

23.1 General information

PAFEC is an Engineering Data Management system that offers increased control over engineering data, leading to cost reductions and productivity improvements. The system is based on standard relational database technology, but can be configured to address specific applications such as change control, release control and archiving.

Strong emphasis is placed on providing users with a friendly and productive working environment. Graphical representation of data is used wherever possible in order to provide an efficient and approachable data management environment for all users.

A stepwise approach to the implementation of an EDM strategy can be adopted. Whilst being capable of providing comprehensive corporate level EDM solutions, PafecEDM also offers a compatible, low cost entry point solution called PafecACCESS.

23.2 Address information

Developer
Pafec Ltd.
Strelley Hall
Nottingham
United Kingdom
tel. 0602-357055

Supplier
Betagraphics
Amarilistraat 20
Hengelo
tel. 074-434245
fax. 074-438499
23.3 System specifications PAFEC EDM 3.1 (4th quarter 1994)

Platforms

- **server:** PC, processor type pentium
- Digital DECstation
- Digital Alpha AXP
- **client:** PC, processor type 80486 or higher
- Digital DECstation
- Digital Alpha AXP
- Sun ClassicX
- **stand alone:** PC, processor type 80486 or higher
- Digital DECstation
- Digital Alpha AXP
- Sun ClassicX

Memory

- **internal:** > 16 MB
- **external:** =< 600 MB

Operating systems:

- HP-UX
- Ms-Windows 3.xx
- Solaris
- Ultrix

Database engines:

- Ingres
- ORACLE

Network systems:

- DECnet
- HP-netwerk

CAD/CAM/CAE interface:

- AutoCAD
- DOGS
- ME10/ME30

MRP/PPS interface:

- Document Manager
- Personel Manager

Extra Modules:

- Workmanager
- Markup

23.4 Price indication

**Base licence**

- 1st user: Hfl. 10.500,-
- extra user: Hfl. 10.500,-

**Full licence**

- 1st user: Hfl. 15.000,-
- extra user: Hfl. 15.000,-
24. Product Manager

24.1 General information

Developer of Product manager is IBM in the United States. Representation in Europe is done by an IBM division called Engineering Technical Solutions Europe (ETSE). ETSE is primarily responsible for software which also includes CAD/CAM/CAE. Important industry segments are aerospace, automotive, electronics and process industry. Another system in the PDM environment from IBM is CIM series 400. The functionality of this system is a subset of Product manager.

In the early seventies IBM started developing the forerunners of today's Product manager. This development was first initiated because of IBM's internal requirements. Eventually IBM had 70 implementations at 40 locations which were all linked. In consultation with 80 IBM clients in the United States, Europe and the Far East, the product was rewritten for general use. In 1987 this led to a system called Product Engineering Support. In 1991 the second generation was finished, which was called Product manager. 120 employees were involved with the development.

IBM offers a complete solution for the entire product lifecycle, either at a division level or at enterprise level. Other software includes Flowmark, a workflow product that is a foundation for other applications to build on. Also PDM bridge, a product that converts data to STEP format. A good example, of data exchange, is the coupling between Product manager and Sherpa. (see also section on Sherpa)
Integrations with MRP systems can be done according to client wishes, but is not a standard feature of Product manager.

Interesting feature of Product manager is the object oriented programming, which makes it simple to add functionalities and implement them fast. The programming code is also IBM hardware independent. Product manager is available for Sun Microsystems, Hewlett Packard and DOS/Windows. Also different database engines like ORACLE and INGRES are now supported.

24.2 Address information

Developer
IBM Corporation
1001 W.T. Harris Blva
Charlotte NC 28262
United States of America
tel. +1-704-5941000
fax. +1-

Supplier
IBM Industrial Systems Centre
Boerhaavelaan 11
2713 HA Zoetermeer
the Netherlands
tel. 079 - 223111
fax. 079 - 213989
### 24.3 System specifications

**ProductManager V2 R2** (3rd Quarter 1994)

<table>
<thead>
<tr>
<th>Platforms</th>
<th>server:</th>
<th>HP-9000</th>
<th>PowerPC</th>
<th>Sun SparcStation2</th>
</tr>
</thead>
<tbody>
<tr>
<td>client:</td>
<td>PC, Processor type 80286 or higher</td>
<td>HP-9000</td>
<td>PowerPC</td>
<td>Sun SparcStation2</td>
</tr>
<tr>
<td></td>
<td>IBM RS/6000</td>
<td>PowerPC</td>
<td>Sun SparcStation2</td>
<td></td>
</tr>
<tr>
<td>stand alone:</td>
<td>HP-9000</td>
<td>PowerPC</td>
<td>Sun SparcStation2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IBM RS/6000</td>
<td>PowerPC</td>
<td>Sun SparcStation2</td>
<td></td>
</tr>
</tbody>
</table>

| Memory | internal: | > 16 MB |
|        | external: | > 600 MB |

| Operating systems: | HP-UX | OS/2 (=client) |
|                   | MS-Windows 3.xx (=client) | Solaris |
|                   | MVS | AIX |

| Database engines: | DB2 |
|                  | Ingres |
|                  | ORACLE |

| Network systems: | Ethernet |
|                 | TCP/IP |

| CAD/CAM/CAE interface: | AutoCAD |
|                        | CADAM |
|                        | CATIA |

| MRP/PPS interface: | MARCAM |
|                   | AVALON |

| Base Modules: | ASM (Application Services Manager) |

| Extra Modules: | DCM-Document Control Manager |
|               | PSM-Product Structure Manager |
|               | PCM-Product Change Management |

### 24.4 Price indication

**Base licence 1st user:** Hfl. 37,400,-

**Full licence 1st user:** Hfl. 83,000,-

**extra user:** Starting licence includes 4 concurrent users
25. R/Solution

25.1 General information

R/Solution is a document management system, developed by Raveca BV in Veenendaal. Raveca is an Intergraph business partner with more than 10 years of experience in document management systems and more than 2 years of Intergraph history. Raveca felt that many PDM systems, currently available on the market, are too complex and too expensive for the majority of its customers. In 1993, Raveca started development of the PDM system R/Solution.

R/Solution is a simple and easy to use general purpose document management system for the PC and UNIX environment. It allows the user to add attributes to a document and store the document in a central archive. The user can easily search for documents in his catalog and make these documents available on his PC or workstation for viewing and editing. A few functionalities are user definable attributes, look-up tables, document plotting and user access control. In the future new functions will be added, like title block processing with CAD systems.

25.2 Address information

Developer information
Raveca B.V.
Vendelier 51b
P.O.Box 1065
3900 BB Veenendaal
The Netherlands
tel. 08385 - 55090
fax. 08385 - 52813

Supplier information
Raveca B.V.
Vendelier 51b
P.O. Box 1065
3900 BB Veenendaal
The Netherlands
tel. 08385 - 55090
fax. 08385 - 52813

Description PDM systems
25.3 System specifications | R/Solution V2 (1st Quarter 1995)

Platforms
- server: PC, processor type 80386 or higher
  - Clix-Unix
- client: PC, processor type 80386 or higher
- stand alone: PC, processor type 80386 or higher

Memory
- internal: =< 8 MB
- external: < 40 MB

Operating systems:
- MS-Windows 3.xx
- Unix ITT
- Windows NT

Database engines:
- DB2
- dBase IV
- Informix
- Ingress
- ORACLE
- RDB
- Sybase

Network systems:
- 3COM
- Banyan VINES
- Ethernet
- LANtastic
- LANmanager
- NFS
- Novell
- PCNFS
- TCP/IP

CAD/CAM/CAE interface:
- AutoCAD
- MicroStation

MRP/PPS interface:

Base Modules:
- R/Solution

Extra Modules:

25.4 Price indication

Base licence
- 1st user: Hfl. 1.500,-
- extra user: Hfl. 1.500,-

Full licence
- 1st user: Hfl. 1.500,-
- extra user: Hfl. 1.500,-
26. Sherpa/PIMS

26.1 General information

Sherpa corporation was founded in 1984 and has its headquarters in San Jose, California. European headquarters are in Bracknell, England with regional sales and customer support offices across the U.S. and Continental Europe with direct operations in France, Germany, Italy and Scandinavia.

The Sherpa mission is to maintain an industry leadership position through the provision of comprehensive Product Data Management (PDM) solutions to leading edge manufacturing organisations which improve their ability to compete.

The software products are complemented by a team of systems analysts and application engineers who are thoroughly familiar with the Sherpa products. This knowledge base is further backed by a broad range of implementation experiences within an evolving and diverse international client base.

Sherpa software products, services and personnel enable customers to effectively manage the complete product development process from engineering through to manufacturing and field support. The proliferation of data and files created by the increased adoption of powerful computer based tools is an acknowledged problem. The Sherpa PDM Product set is designed specifically to address these issues and provide total product life cycle management capability on an enterprise wide basis.

In contrast with CAD system file management or conventional data base management systems, Sherpa’s PIMS allows for the customer’s existing engineering logic and rules to be employed throughout the system to manage not only the data but also the procedures for operating on data. This results in an implementation that meets present system requirements in a form familiar to the user whilst facilitating future growth both in terms of scale and functionality.

Sherpa Corporation work very closely with their clients to install PDM solutions and is positioned to assist at whatever level is required to tailor the solution to meet specific needs. The baseline product can be implemented into Production status in minimal time to achieve immediate results and can be enhanced, cost effectively, to meet the full range of user requirements.

The Sherpa support profile is spearheaded by a core staff of engineers, analysts and programmers in San Jose, augmented by regional application engineering staff across the U.S. and Europe.

26.2 Address information

Developer
Sherpa Corporation
611 River Oaks Parkway
San Jose, CA 95134
United States of America
tel. 00-44-1344-867222
fax. 00-44-1344-868199

Supplier
Sherpa Corporation
Doncastlce house
Doncastlce Road
RJ128PD Bracknell Berkshire
United Kingdom
tel. 00-44-1344-867222
fax. 00-44-1344-868199

Description PDM systems
26.3 System specifications Sherpa/PIMS

Platforms server: Digital VAXstation, Digital DECstation, Digital Alpha AXP, HP-9000
client: PC, processor type 80386 or higher, Digital VAXstation, Digital DECstation, Digital Alpha AXP, HP-9000
stand alone: Digital VAXstation, Digital DECstation, Digital Alpha AXP

Memory internal: = < 16 MB
external: < 40 MB

Operating systems: HP-UX, OSF/1, Solaris, Ultrix, VMS, MS-Windows 3.xx

Database engines: Ingres, ORACLE

Network systems: 3Com, Banyan VINES, DECnet, Ethernet, NFS, 3Com, Banyan VINES, DECnet, Ethernet, NFS

CAD/CAM/CAE interface: AutoCAD, Bravo, CATIA, Euclid, I-DEAS, ME10/ME30, MicroStation, PRO/Engineer, Unigraphics

MRP/PPS interface: Oracle Manufacturing, SAP

Base Modules: Sherpa/PIMS

Extra Modules: Sherpa/View, Sherpa/ Integrator for PRO Engineer, PCS E/Change, PCS CITIS

26.4 Price indication

Base licence 1st user: Hfl. 210.600,- Site Licences are also available. extra 'concurrent' user: Hfl. 13.500,-

Full licence 1st user: Hfl. 361.580,-
extra 'concurrent' user: Hfl. 13.500,-

Sherpa has a user and company based pricing strategy. Its value is based on usage, modularity and implementation. Sherpa has standard site licence options. The above pricing is very indicative.
27. SoftSolutions

27.1 General information

For general information about the supplier of SoftSolutions, Cyco Automation, we refer to the section on AutoManager Workflow.

SoftSolutions was first called PerfectSolutions. After several takeovers, SoftSolutions is momentarily part of Novell's Workgroup Division.

A special feature of this product is the cost calculation, which can be done in three ways. First, from a certain date, the amount of documents per class can be counted automatically. Registration of time spent on documents for one project. Third, Registration of the number of keystrokes.

Since early 1994 Soft Solutions offers a 100% integration with Lotus Notes. ODBC, OLE/DDE and ODMA are supported, making it possible to recall pop-up menu’s from other databases.

27.2 Address information

Developer information
SoftSolutions Technology Corp.
Parkview plaza division of Novell
625 Southstate street
Orem, Utah 84058
United States of America
tel. 801 - 226 - 6000
fax. 801 - 224 - 0920

Supplier information
Cyco Automatisering
Adm. Banckertweg 2a
P.O. Box 9595
2300 RB Leiden
The Netherlands
tel. 071 - 222707
fax. 071 - 224979
27.3 System specifications SoftSolutions, 4.0 (1st Quarter 1994)

<table>
<thead>
<tr>
<th>Platforms</th>
<th>server:</th>
<th>PC, processor type 80386 or higher HP-9000 IBM RS/6000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>client:</td>
<td>PC, processor type 80286 or higher</td>
</tr>
<tr>
<td></td>
<td>stand alone:</td>
<td>.</td>
</tr>
<tr>
<td>Memory</td>
<td>internal:</td>
<td>&lt; 2 MB</td>
</tr>
<tr>
<td></td>
<td>external:</td>
<td>&lt; 40 MB</td>
</tr>
<tr>
<td>Operating systems:</td>
<td>HP-UX</td>
<td>MS-Dos</td>
</tr>
<tr>
<td></td>
<td>MS-Window 3.xx</td>
<td>System 5</td>
</tr>
<tr>
<td></td>
<td>Ultrix</td>
<td>VMS</td>
</tr>
<tr>
<td>Database engines:</td>
<td>Proprietary</td>
<td></td>
</tr>
<tr>
<td>Network systems:</td>
<td>3Com</td>
<td>LANmanager</td>
</tr>
<tr>
<td></td>
<td>Banyan VINES</td>
<td>NetBIOS</td>
</tr>
<tr>
<td></td>
<td>DECnet</td>
<td>Novell</td>
</tr>
<tr>
<td></td>
<td>Ethernet</td>
<td>PCSA/Path works</td>
</tr>
<tr>
<td></td>
<td>IBM-PCLAN</td>
<td>TCP/IP</td>
</tr>
<tr>
<td></td>
<td>LANtastic</td>
<td></td>
</tr>
<tr>
<td>CAD/CAM/CAE interface:</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>MRP/PPS interface:</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>Base Modules:</td>
<td>DMS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ALP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Imagemanager</td>
<td></td>
</tr>
<tr>
<td>Extra Modules:</td>
<td>Docum. Desktop</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Workflow</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intelligent search</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Client server NLM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Security NLM</td>
<td></td>
</tr>
</tbody>
</table>

27.4 Price indication

| Base licence 1st user: | Hfl. 1.450,- |
| 1st user: | Hfl. 1.700,- |
| extra user: | Hfl. 925,- |
| extra user: | Hfl. 825,- |

Description PDM systems

Appendix E-55
28. Trimco

28.1 General information

Octagon computing services B.V. is, for eight years now, the supplier of the PDM system Trimco. Octagon is a consultancy firm of 35 employees. They supply Trimco and also the entire scope from installation to staffing.

Trimco’s mission statement is as follows: "to provide our customers with quality solutions to increase their productivity and hence their profitability through application of technology to document management."

Octagon can utilize the investments of the customer and hook up to their existing software. However if required they can also supply new hardware and software.

Trimco was established when a group of engineers working on document image processing extended their activities to document management. Nowadays a strong feature of Trimco is T.I.E. It stands for Targeted Image Extraction and reduces the amount of network traffic and leads to fast extraction. The company Trimco, who does all development has approximately 70 employees working directly on development.

Packman product is a due to be released in early 1995. This is an enhancement of the product structure functionality. Another complementary product in the future could be a financial module.

28.2 Address information

**Developer information**
Trimco enterprise Ltd.
111 Uxbridge Road
South ealing London
United Kingdom
tel. +44 - 81-5798788
fax. +44 - 81-5662422

**Supplier information**
Octagon Computing Services B.V.
Trimco
Jan van Nassaustraat 87
2596 BR Den Haag
tel. 070 - 3283642
fax. 070 - 3540062
### 28.3 System specifications Trimco 1.4 (4th Quarter 1993)

<table>
<thead>
<tr>
<th>Platforms</th>
<th>Memory</th>
<th>Operating systems</th>
<th>Database engines</th>
<th>Network systems</th>
<th>CAD/CAM/CAE interface</th>
<th>MRP/PPS interface</th>
<th>Base Modules</th>
<th>Extra Modules</th>
<th>25% discount for more than 100 concurrent users</th>
</tr>
</thead>
<tbody>
<tr>
<td>server:</td>
<td>internal:</td>
<td>Apple-OS</td>
<td>Informix</td>
<td>3Com</td>
<td>AutoCAD</td>
<td>SAP</td>
<td>Win-Track</td>
<td>Torch</td>
<td>Hfl. 19.500,-</td>
</tr>
<tr>
<td></td>
<td>= &lt; 2 MB</td>
<td>HP-UX</td>
<td>Ingres</td>
<td>Banyan VINES</td>
<td>MicroStation</td>
<td></td>
<td></td>
<td>Tie main</td>
<td>Hfl. 4.500,-</td>
</tr>
<tr>
<td></td>
<td>external:</td>
<td>Windows 3.xx</td>
<td>Netware sql server</td>
<td>DECnet</td>
<td></td>
<td></td>
<td></td>
<td>Tie CAD</td>
<td>Hfl. 19.500,-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OSF/1</td>
<td></td>
<td>Ethernet</td>
<td></td>
<td></td>
<td></td>
<td>Tie Scan</td>
<td>Hfl. 4.500,-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HPnetwerk</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IBM-PCLAN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LANTastic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LANManager</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NetBIOS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NFS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Novell</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC NFS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PCSA/Pathworks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>TCP/IP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ORACLE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Paradox</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sybase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>client:</td>
<td></td>
<td>Solaris</td>
<td>ORACLE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>stand alone:</td>
<td></td>
<td>Unix ITT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ultrix</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Windows NT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 28.4 Price indication

<table>
<thead>
<tr>
<th>Base licence 1st user:</th>
<th>Hfl. 19.500,-</th>
</tr>
</thead>
<tbody>
<tr>
<td>extra user:</td>
<td>Hfl. 4.500,-</td>
</tr>
</tbody>
</table>

Description PDM systems Appendix E-57
29. AutoORG

29.1 Address information

Developer
CAD & LAN Computersysteme GmbH
0-8600 Bautzen
Dr-Ernst-Mucke-Straße 8
Germany
tel. +49 3591 - 3744-0
fax. +49 3591 - 3744-19

Supplier
CAD & LAN Computersysteme GmbH
0-8600 Bautzen
Dr-Ernst-Mucke-Straße 8
Germany
tel. +49 3591 - 3744-0
fax. +49 3591 - 3744-19

30. Centra 2000

30.1 Address information

Developer
Auto-trol Technology
12500 N. Washington Street
Denver, CO 80241-2400
USA
tel. +1 800 - 233 28 82
email: centra@auto-trol.com

Supplier
Auto-trol Technology
12500 N. Washington Street
Denver, CO 80241-2400
USA
tel. +1 800 - 233 28 82
email: centra@auto-trol.com

31. CIM Database

31.1 Address information

Developer
CONTACT Software GmbH
Wiener Straße 1-3
28539 Bremen
Germany
tel. +49 421 - 201 53 0
fax. +49 421 - 201 53 41

Supplier
CONTACT Software GmbH
Wiener Straße 1-3
28539 Bremen
Germany
tel. +49 421 - 201 53 0
fax. +49 421 - 201 53 41

32. CIM Series/400

32.1 Address information

Developer
IBM Deutschland GmbH
Program Product Development North
Information Development, Department 4490
Arndtstrasse 1
3000 Hannover 1
Germany
tel. +49 511-516 5340
fax. +49 511-516 5340

Supplier
IBM Industrial Systems Centre
Boerhaavelaan 11
2713 HA Zoetermeer
the Netherlands
tel. 079 - 223111
fax. 079 - 213989

Description PDM systems
Description PDM systems

33. CMstat

33.1 Address information

Developer
CMstat Corporation
5755 Oberlin Drive, Suite 100
San Diego, CA, 92121
USA
tel. +1 619 - 552 6660
fax. +1 619 - 546 1473

Supplier
CMstat Corporation
5755 Oberlin Drive, Suite 100
San Diego, CA, 92121
USA
tel. +1 619 - 552 6660
fax. +1 619 - 546 1473

34. EDB-CAD

34.1 Address information

Developer
TIB-Jena GmbH
Wildenbruchstraße 15
07745 Jena
Germany
tel. +49 3641 - 675370
fax. +49 3641 - 675379

Supplier
TIB-Jena GmbH
Wildenbruchstraße 15
07745 Jena
Germany
tel. +49 3641 - 675370
fax. +49 3641 - 675379

35. Engineering:EXPress

35.1 Address information

Developer
EXP Group Inc.
44063 Fremont Blvd.
Fremont, CA 94538-6045
USA
tel. +1 510 - 552 6660
fax. +1 510 - 546 1473

Supplier
EXP Group Inc.
44063 Fremont Blvd.
Fremont, CA 94538-6045
USA
tel. +1 510 - 552 6660
fax. +1 510 - 546 1473

36. Express

36.1 Address information

Developer
IRI Software
Waltham
Massachusets 02154
USA
tel. +1 617 890-1100
fax. +1 617 890-4660

Supplier
IRI software B.V.
Eglantierbaan 53-57
2908 LV Capelle a/d IJsel
The Netherlands
tel. 010 - 2586600
fax. 010 - 4420891
37. Linkage

37.1 Address information

Developer
CIMLINC Inc.
1222 Hamilton Parkway
Itasca, IL, 60143-1138
USA
tel. +1 708 250-0090
fax. +1 708 250-8513

Supplier
CIMLINK Ltd.
William Lee Buildings, Highfield Park
University Boulevard, Nottingham, NG7 2RQ
England
tel. +44 602 256255
fax. +44 602 252620

38. Mezzanine / CURO Document Management System

38.1 Address information

Developer
Frame Technology Corporation
333 West San Carlos Street
San Jose, California 95110
USA
tel. +1 408 975-6000
fax. +1 408 975-6799

Supplier
Curo Technology Europe B.V.
Bruistensingel 160
5232 AC 's-Hertogenbosch
The Netherlands
tel. 073 - 408884
fax. 073 - 408885

39. NovaManage

39.1 Address information

Developer
NovaSoft Systems, Inc.
129 Middlesex Turnpike
Burlington
MA 01803
USA
tel. +1 617 221-0300

Supplier
Source Information Technology
Koperstraat 35
P.O. Box 720
2700 AS Zoetermeer
The Netherlands
tel. 079 - 615511
fax. 079 - 615509

40. Open Data Manager

40.1 Address information

Developer
Digital Equipment Corporation
200 Forest Street MR01-3/C8
Marlboro
MA 01752
USA
tel. +1 508 467-5527
fax.

Supplier
Digital Equipment B.V.
Europalaan 44
P.O.Box 9064
3506 GB Utrecht
The Netherlands
tel. 03402 - 88674
fax. 03402 - 88550

Appendix E-60 Description PDM systems
41. Open ODMS

41.1 Address information

Developer
Odesta Systems Corporation
4084 Commercial Avenue
Northbrook, IL 60062
USA
tel. +1 708 498-5615
fax. +1 708 498-9917

Supplier
Odesta Systems Corporation
4084 Commercial Avenue
Northbrook, IL 60062
USA
tel. +1 708 498-5615
fax. +1 708 498-9917

42. PreView

42.1 Address information

Developer
Rosetta Technologies, Inc.
1225 NW Murray Road
Portland
OR 97229
USA
tel. +1 503 626-2288
fax. +1 503 643-6760

Supplier
Source Information Technology
Koperstraat 35
P.O. Box 720
2700 AS Zoetermeer
The Netherlands
tel. 079 - 615511
fax. 079 - 615509

43. Priamos

43.1 Address information

Developer
VW-GEDAS
Pascalstraße 11
D-10587 Berlin
Germany
tel. +49 30 - 39970-0
fax. +49 30 - 99970-999

Supplier
VW-GEDAS
Pascalstraße 11
D-10587 Berlin
Germany
tel. +49 30 - 39970-0
fax. +49 30 - 99970-999

44. Productivity Edge

44.1 Address information

Developer
PRC
12005 Sunrise Valley Drive
MSC2.02 Reston
USA
tel. +1 800 - 772 0028

Supplier
PRC
12005 Sunrise Valley Drive
MSC2.02 Reston
USA
tel. +1 800 - 772 0028
45. Pro*file

45.1 Address information

Developer
PROCAD GmbH & Co. KG
Vincenz-Priëßnitz-Str. 3
76131 Karlsruhe
Germany
tel. +49 721 - 96 56 5
fax. +49 721 - 96 56 650

46. Pro/PDM

46.1 Address information

Developer
Parametric Technology Corporation
128 Technology Drive
Waltham, MA 02154
USA
tel. +1 617 849-7111
fax. +1 617 819-1069

47. TDMS

47.1 Address information

Developer
Access Corporation
1011 Glendale-Milford Road
Cincinnati, OH 45215
USA
tel. +1 513 - 782 8300
fax. +1 513 - 782 8363

48. Win / Pro Cube

48.1 Address information

Developer
WIN Technology International
60, rue Etienne Dolet
92245 Malakoff
France
tel. +1 - 465 77373
fax. +1 - 465 77209
## Appendix F  PDM functions support

### Index

<table>
<thead>
<tr>
<th></th>
<th>PDM functions support</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Autodesk WorkCentre</td>
<td>F-2</td>
</tr>
<tr>
<td>2.</td>
<td>AutoEDMS</td>
<td>F-3</td>
</tr>
<tr>
<td>3.</td>
<td>AutoManager Organizer</td>
<td>F-4</td>
</tr>
<tr>
<td>4.</td>
<td>AutoManager WorkFlow</td>
<td>F-5</td>
</tr>
<tr>
<td>5.</td>
<td>BravoFrame</td>
<td>F-6</td>
</tr>
<tr>
<td>6.</td>
<td>CADIM/EDB</td>
<td>F-7</td>
</tr>
<tr>
<td>7.</td>
<td>D-Engine</td>
<td>F-8</td>
</tr>
<tr>
<td>8.</td>
<td>Document Manager</td>
<td>F-9</td>
</tr>
<tr>
<td>9.</td>
<td>Documentum</td>
<td>F-10</td>
</tr>
<tr>
<td>10.</td>
<td>DocuPlex</td>
<td>F-11</td>
</tr>
<tr>
<td>11.</td>
<td>EDM</td>
<td>F-12</td>
</tr>
<tr>
<td>12.</td>
<td>EuroEMS</td>
<td>F-13</td>
</tr>
<tr>
<td>13.</td>
<td>Formtek</td>
<td>F-14</td>
</tr>
<tr>
<td>14.</td>
<td>FYI</td>
<td>F-15</td>
</tr>
<tr>
<td>15.</td>
<td>HP PE/Workmanager</td>
<td>F-16</td>
</tr>
<tr>
<td>16.</td>
<td>Information Manager</td>
<td>F-17</td>
</tr>
<tr>
<td>17.</td>
<td>I/PDM</td>
<td>F-18</td>
</tr>
<tr>
<td>18.</td>
<td>Keyfile</td>
<td>F-19</td>
</tr>
<tr>
<td>19.</td>
<td>LT Manager</td>
<td>F-20</td>
</tr>
<tr>
<td>20.</td>
<td>Manta</td>
<td>F-21</td>
</tr>
<tr>
<td>21.</td>
<td>Metaphase PDM</td>
<td>F-22</td>
</tr>
<tr>
<td>22.</td>
<td>NOW24</td>
<td>F-23</td>
</tr>
<tr>
<td>23.</td>
<td>Papec Access</td>
<td>F-24</td>
</tr>
<tr>
<td>24.</td>
<td>ProductManager</td>
<td>F-25</td>
</tr>
<tr>
<td>25.</td>
<td>R/Solution</td>
<td>F-26</td>
</tr>
<tr>
<td>26.</td>
<td>Sherpa/PIMS</td>
<td>F-27</td>
</tr>
<tr>
<td>27.</td>
<td>SoftSolution</td>
<td>F-28</td>
</tr>
<tr>
<td>28.</td>
<td>Trimco</td>
<td>F-29</td>
</tr>
</tbody>
</table>
1. Autodesk WorkCentre

Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>[1] Autodesk Workcenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td>51.4 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td>95.0 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td>77.2 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td>0.0 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td>0.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td>69.5 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td>83.2 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td>88.4 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td>83.3 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td>82.6 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td>63.2 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td>72.7 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td>62.5 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td>38.8 %</td>
</tr>
</tbody>
</table>

Graph: Support of PDM functions

Appendix F-2 PDM functions support
## 2. AutoEDMS

### Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>[2]</th>
<th>PDM system</th>
<th>AutoEDMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td></td>
<td>69.1%</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td></td>
<td>95.0%</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td></td>
<td>79.8%</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td></td>
<td>84.7%</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td></td>
<td>72.0%</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td></td>
<td>93.3%</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td></td>
<td>88.6%</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td></td>
<td>93.7%</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td></td>
<td>95.0%</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td></td>
<td>99.0%</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td></td>
<td>86.8%</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td></td>
<td>82.2%</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td></td>
<td>88.7%</td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td></td>
<td>91.7%</td>
</tr>
</tbody>
</table>

### 6. Workflow Management

| 6.1 Document routing | 82.2% |
| 6.2 Process modeling | 0.0%  |
| 6.3 Process management | 67.9% |
| 6.4 Planning        | 44.4% |
| 6.5 Communication   | 41.5% |
| 7. Data Exchange    |       |
| 7.1 Data transportation | 83.8% |
| 7.2 Data translation | 23.7% |
| 8. User-interface   |       |
| 9.1 Operational features | 64.9% |
| 9.2 Presentational features | 70.0% |
| 9.3 Help           | 28.6% |
| 10. Customising     |       |
| 10.1 Customization  | 94.9% |
| 10.2 Tailoring      | 96.0% |
| 10.3 Reports        | 95.0% |
| 11. System architecture |    | |
| 11.5 Distributed databases | 0.0% |
| 11.6 Datadictionary | 79.3% |
| 11.7 Backup & Restore | 74.3% |

Graph: Support of PDM functions
3. AutoManager Organizer

Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>PDM system</th>
<th>[5] AutoManager Organizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td>45.5 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td>15.2 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td>19.0 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td>57.5 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td>22.9 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td>34.8 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td>14.0 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td>4.2 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td>0.0 %</td>
</tr>
</tbody>
</table>

6. Workflow Management

| 6.1 Document routing | 0.0 % |
| 6.2 Process modeling | 0.0 % |
| 6.3 Process management | 0.0 % |
| 6.4 Planning | 0.0 % |
| 6.5 Communication | 0.0 % |

7. Data Exchange

| 7.1 Data transportation | 43.2 % |
| 7.2 Data translation | 0.0 % |

9. User-interface

| 9.1 Operational features | 36.9 % |
| 9.2 Presentational features | 27.5 % |
| 9.3 Help | 71.4 % |

10. Customising

| 10.1 Customization | 5.4 % |
| 10.2 Tailoring | 0.0 % |
| 10.3 Reports | 0.0 % |

11. System architecture

| 11.5 Distributed databases | 0.0 % |
| 11.6 Datadictionary | 34.1 % |
| 11.7 Backup & Restore | 18.4 % |

Graph: Support of PDM functions

Appendix F-4 PDM functions support
4. AutoManager Workflow

Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>PDM system</th>
<th>[4] AutoManager WorkFlow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td>$81.5 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td>48.9 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td>44.8 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td>70.5 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td>70.3 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td>61.1 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td>99.0 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td>68.4 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td>45.5 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td>54.2 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td>41.7 %</td>
</tr>
</tbody>
</table>

6. Workflow Management

<table>
<thead>
<tr>
<th>Function</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Document routing</td>
<td>8.9 %</td>
</tr>
<tr>
<td>6.2 Process modeling</td>
<td>0.0 %</td>
</tr>
<tr>
<td>6.3 Process management</td>
<td>57.1 %</td>
</tr>
<tr>
<td>6.4 Planning</td>
<td>0.0 %</td>
</tr>
<tr>
<td>6.5 Communication</td>
<td>18.5 %</td>
</tr>
<tr>
<td>7. Data Exchange</td>
<td></td>
</tr>
<tr>
<td>7.1 Data transportation</td>
<td>73.0 %</td>
</tr>
<tr>
<td>7.2 Data translation</td>
<td>0.0 %</td>
</tr>
<tr>
<td>9. User-interface</td>
<td></td>
</tr>
<tr>
<td>9.1 Operational features</td>
<td>62.2 %</td>
</tr>
<tr>
<td>9.2 Presentational features</td>
<td>65.0 %</td>
</tr>
<tr>
<td>9.3 Help</td>
<td>71.4 %</td>
</tr>
<tr>
<td>10. Customising</td>
<td></td>
</tr>
<tr>
<td>10.1 Customization</td>
<td>56.7 %</td>
</tr>
<tr>
<td>10.2 Tailoring</td>
<td>78.0 %</td>
</tr>
<tr>
<td>10.3 Reports</td>
<td>95.0 %</td>
</tr>
<tr>
<td>11. System architecture</td>
<td></td>
</tr>
<tr>
<td>11.5 Distributed databases</td>
<td>0.0 %</td>
</tr>
<tr>
<td>11.6 Datadictionary</td>
<td>63.2 %</td>
</tr>
<tr>
<td>11.7 Backup &amp; Restore</td>
<td>63.4 %</td>
</tr>
</tbody>
</table>

Graph: Support of PDM functions
5. **BravoFrame**

Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>[5]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDM system</td>
<td>BravoFrame</td>
</tr>
<tr>
<td>1. General</td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td>71.0 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td>70.6 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td>63.7 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td>50.0 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td>24.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td>64.8 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td>54.8 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td>82.3 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td>88.9 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td>82.6 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td>84.2 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td>72.7 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td>54.2 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td>64.0 %</td>
</tr>
</tbody>
</table>

6. **Workflow Management**

<table>
<thead>
<tr>
<th>Workflow Management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Document routing</td>
<td>60.0 %</td>
</tr>
<tr>
<td>6.2 Process modeling</td>
<td>33.3 %</td>
</tr>
<tr>
<td>6.3 Process management</td>
<td>99.0 %</td>
</tr>
<tr>
<td>6.4 Planning</td>
<td>0.0 %</td>
</tr>
<tr>
<td>6.5 Communication</td>
<td>64.6 %</td>
</tr>
</tbody>
</table>

7. **Data Exchange**

<table>
<thead>
<tr>
<th>Data Exchange</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1 Data transportation</td>
<td>78.4 %</td>
</tr>
<tr>
<td>7.2 Data translation</td>
<td>31.6 %</td>
</tr>
</tbody>
</table>

9. **User-Interface**

<table>
<thead>
<tr>
<th>User-Interface</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1 Operational features</td>
<td>79.3 %</td>
</tr>
<tr>
<td>9.2 Presentational features</td>
<td>70.0 %</td>
</tr>
<tr>
<td>9.3 Help</td>
<td>57.1 %</td>
</tr>
</tbody>
</table>

10. **Customising**

<table>
<thead>
<tr>
<th>Customising</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1 Customization</td>
<td>80.7 %</td>
</tr>
<tr>
<td>10.2 Tailoring</td>
<td>74.0 %</td>
</tr>
<tr>
<td>10.3 Reports</td>
<td>95.0 %</td>
</tr>
</tbody>
</table>

11. **System architecture**

<table>
<thead>
<tr>
<th>System architecture</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11.5 Distributed databases</td>
<td>99.0 %</td>
</tr>
<tr>
<td>11.6 Datadictionary</td>
<td>53.7 %</td>
</tr>
<tr>
<td>11.7 Backup &amp; Restore</td>
<td>76.5 %</td>
</tr>
</tbody>
</table>

Graph: Support of PDM functions
6. CADIM/EDB

Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>[6]</th>
<th>PDM system</th>
<th>CADIM/EDB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td></td>
<td>69.1 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td></td>
<td>99.0 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td></td>
<td>97.3 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td></td>
<td>97.2 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td></td>
<td>72.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td></td>
<td>62.9 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td></td>
<td>67.8 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td></td>
<td>96.8 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td></td>
<td>95.0 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td></td>
<td>82.6 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td></td>
<td>92.1 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td></td>
<td>54.5 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td></td>
<td>88.7 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td></td>
<td>94.0 %</td>
</tr>
</tbody>
</table>

6. Workflow Management

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>[6]</th>
<th>PDM system</th>
<th>CADIM/EDB</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Document routing</td>
<td></td>
<td></td>
<td>80.0 %</td>
</tr>
<tr>
<td>6.2 Process modeling</td>
<td></td>
<td></td>
<td>78.8 %</td>
</tr>
<tr>
<td>6.3 Process management</td>
<td></td>
<td></td>
<td>78.6 %</td>
</tr>
<tr>
<td>6.4 Planning</td>
<td></td>
<td></td>
<td>66.7 %</td>
</tr>
<tr>
<td>6.5 Communication</td>
<td></td>
<td></td>
<td>78.5 %</td>
</tr>
<tr>
<td>7. Data Exchange</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.1 Data transportation</td>
<td></td>
<td></td>
<td>83.8 %</td>
</tr>
<tr>
<td>7.2 Data translation</td>
<td></td>
<td></td>
<td>57.9 %</td>
</tr>
<tr>
<td>9. User-interface</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.1 Operational features</td>
<td></td>
<td></td>
<td>82.0 %</td>
</tr>
<tr>
<td>9.2 Presentational features</td>
<td></td>
<td></td>
<td>92.5 %</td>
</tr>
<tr>
<td>9.3 Help</td>
<td></td>
<td></td>
<td>57.1 %</td>
</tr>
<tr>
<td>10. Customising</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.1 Customization</td>
<td></td>
<td></td>
<td>58.2 %</td>
</tr>
<tr>
<td>10.2 Tailoring</td>
<td></td>
<td></td>
<td>99.0 %</td>
</tr>
<tr>
<td>10.3 Reports</td>
<td></td>
<td></td>
<td>95.0 %</td>
</tr>
<tr>
<td>11. System architecture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.5 Distributed databases</td>
<td></td>
<td></td>
<td>99.0 %</td>
</tr>
<tr>
<td>11.6 Datadictionary</td>
<td></td>
<td></td>
<td>82.9 %</td>
</tr>
<tr>
<td>11.7 Backup &amp; Restore</td>
<td></td>
<td></td>
<td>66.9 %</td>
</tr>
</tbody>
</table>

Graph: Support of PDM functions

PDM functions support

Appendix F-7
## 7. D-Engine

### Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>PDM system</th>
<th>D-Engine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td>61.4 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td>17.6 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td>24.5 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td>23.6 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td>24.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td>53.3 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td>23.6 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td>58.1 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td>38.9 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td>14.0 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td>12.5 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td>13.7 %</td>
</tr>
<tr>
<td>6. Workflow Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1 Document routing</td>
<td></td>
<td>8.9 %</td>
</tr>
<tr>
<td>6.2 Process modeling</td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>6.3 Process management</td>
<td></td>
<td>28.6 %</td>
</tr>
<tr>
<td>6.4 Planning</td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>6.5 Communication</td>
<td></td>
<td>49.2 %</td>
</tr>
<tr>
<td>7. Data Exchange</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.1 Data transportation</td>
<td></td>
<td>67.6 %</td>
</tr>
<tr>
<td>7.2 Data translation</td>
<td></td>
<td>23.7 %</td>
</tr>
<tr>
<td>9. User-interface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.1 Operational features</td>
<td></td>
<td>73.0 %</td>
</tr>
<tr>
<td>9.2 Presentational features</td>
<td></td>
<td>35.0 %</td>
</tr>
<tr>
<td>9.3 Help</td>
<td></td>
<td>14.3 %</td>
</tr>
<tr>
<td>10. Customising</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.1 Customization</td>
<td></td>
<td>40.4 %</td>
</tr>
<tr>
<td>10.2 Tailoring</td>
<td></td>
<td>14.0 %</td>
</tr>
<tr>
<td>10.3 Reports</td>
<td></td>
<td>90.0 %</td>
</tr>
<tr>
<td>11. System architecture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.5 Distributed databases</td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>11.6 Data dictionary</td>
<td></td>
<td>35.4 %</td>
</tr>
<tr>
<td>11.7 Backup &amp; Restore</td>
<td></td>
<td>11.8 %</td>
</tr>
</tbody>
</table>

### Graph: Support of PDM functions

![Graph: Support of PDM functions](image-url)

Appendix F-8
8. Document Manager

Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>[8] Document Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td>53.7 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td>64.7 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td>73.1 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td>50.0 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td>0.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td>83.8 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td>74.4 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td>70.0 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td>61.1 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td>99.0 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td>56.1 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td>72.7 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td>41.7 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td>91.7 %</td>
</tr>
</tbody>
</table>

| 6. Workflow Management        |                      |
| 6.1 Document routing          | 64.4 %               |
| 6.2 Process modeling          | 69.7 %               |
| 6.3 Process management        | 64.3 %               |
| 6.4 Planning                  | 58.3 %               |
| 6.5 Communication             | 33.8 %               |

7. Data Exchange

7.1 Data transportation        | 78.4 %               |
7.2 Data translation           | 47.4 %               |

9. User-interface

9.1 Operational features       | 46.8 %               |
9.2 Presentational features    | 75.0 %               |
9.3 Help                       | 14.3 %               |

10. Customising

10.1 Customization             | 53.6 %               |
10.2 Tailoring                 | 60.0 %               |
10.3 Reports                   | 10.6 %               |

11. System architecture

11.5 Distributed databases     | 69.2 %               |
11.6 Datadictionary            | 76.8 %               |
11.7 Backup & Restore          | 36.0 %               |

Graph: Support of PDM functions
9. Documentum

Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>[9]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDM system</td>
<td>Documentum</td>
</tr>
<tr>
<td>1. General Support</td>
<td>61.4 %</td>
</tr>
<tr>
<td>1.9 Support</td>
<td>61.4 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td>99.0 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td>77.7 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td>62.5 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td>99.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td>81.9 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td>36.6 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td>75.8 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td>83.3 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td>99.0 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td>84.2 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td>54.5 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td>79.2 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td>83.5 %</td>
</tr>
</tbody>
</table>

| 6. Workflow Management        |      |
| 6.1 Document routing          | 95.6 % |
| 6.2 Process modeling          | 0.0 %  |
| 6.3 Process management        | 67.9 % |
| 6.4 Planning                  | 0.0 %  |
| 6.5 Communication             | 49.2 % |
| 7. Data Exchange              |      |
| 7.1 Data transportation       | 0.0 %  |
| 7.2 Data translation          | 42.1 % |
| 9. User-Interface             |      |
| 9.1 Operational features      | 73.9 % |
| 9.2 Presentational features   | 90.0 % |
| 9.3 Help                      | 57.1 % |
| 10. Customising               |      |
| 10.1 Customization            | 66.1 % |
| 10.2 Tailoring                | 60.0 % |
| 10.3 Reports                  | 95.0 % |
| 11. System architecture       |      |
| 11.5 Distributed databases    | 99.0 % |
| 11.6 Datadictionary           | 72.0 % |
| 11.7 Backup & Restore         | 74.3 % |

Graph: Support of PDM functions

Appendix F-10

PDM functions support
10. DocuPlex

Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>PDM system</th>
<th>[10]</th>
<th>DocuPlex</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td>59.1%</td>
<td></td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td>99.0%</td>
<td></td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td>72.3%</td>
<td></td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td>38.9%</td>
<td></td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td>72.0%</td>
<td></td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td>54.3%</td>
<td></td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td>70.9%</td>
<td></td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td>63.5%</td>
<td></td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td>34.8%</td>
<td></td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td>73.7%</td>
<td></td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td>72.7%</td>
<td></td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td>20.8%</td>
<td></td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td>0.0%</td>
<td></td>
</tr>
</tbody>
</table>

6. Workflow Management

| 6.1 Document routing | 44.4% |
| 6.2 Process modeling | 51.5% |
| 6.3 Process management | 42.9% |
| 6.4 Planning         | 0.0%  |
| 6.5 Communication    | 38.5% |

7. Data Exchange

| 7.1 Data transportation | 56.8% |
| 7.2 Data translation    | 47.4% |

9. User-interface

| 9.1 Operational features | 67.6% |
| 9.2 Presentational features | 82.5% |
| 9.3 Help                | 28.6% |

10. Customising

| 10.1 Customisation      | 43.3% |
| 10.2 Tailoring          | 60.0% |
| 10.3 Reports            | 95.0% |

11. System architecture

| 11.5 Distributed databases | 61.5% |
| 11.6 Datadictionary       | 68.3% |
| 11.7 Backup & Restore     | 52.2% |

Graph: Support of PDM functions

PDM functions support

Appendix F-11
## 11. EDM

### Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>[11]</th>
<th>PDM system</th>
<th>EDM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td></td>
<td>71.5 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td></td>
<td>52.9 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td></td>
<td>86.6 %</td>
</tr>
<tr>
<td>2.3 Product structure</td>
<td></td>
<td></td>
<td>68.1 %</td>
</tr>
<tr>
<td>2.4 Configuration</td>
<td></td>
<td></td>
<td>40.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td></td>
<td>47.6 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td></td>
<td>68.7 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td></td>
<td>77.8 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td></td>
<td>82.6 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td></td>
<td>44.7 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td></td>
<td>54.2 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td></td>
<td>36.3 %</td>
</tr>
</tbody>
</table>

### Graph: Support of PDM functions

![Graph: Support of PDM functions](image)

Appendix F-12
## 12. EuroEMS

### Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>[12]</th>
<th>PDM system</th>
<th>EuroEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td></td>
<td>63.4 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td></td>
<td>88.2 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td></td>
<td>50.3 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td></td>
<td>68.1 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td></td>
<td>72.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td></td>
<td>86.7 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td></td>
<td>75.3 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td></td>
<td>62.3 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td></td>
<td>95.0 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td></td>
<td>65.2 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td></td>
<td>59.9 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td></td>
<td>45.5 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td></td>
<td>75.0 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td></td>
<td>83.5 %</td>
</tr>
</tbody>
</table>

### 6. Workflow Management

| 6.1 Document routing                  | 0.0 % |
| 6.2 Process modeling                  | 0.0 % |
| 6.3 Process management                | 0.0 % |
| 6.4 Planning                          | 0.0 % |
| 6.5 Communication                     | 0.0 % |

### 7. Data Exchange

| 7.1 Data transportation               | 73.0 % |
| 7.2 Data translation                  | 42.1 % |

### 9. User-interface

| 9.1 Operational features              | 45.9 % |
| 9.2 Presentational features           | 72.5 % |
| 9.3 Help                               | 57.1 % |

### 10. Customising

| 10.1 Customization                    | 68.0 % |
| 10.2 Tailoring                        | 68.0 % |
| 10.3 Reports                          | 95.0 % |

### 11. System architecture

| 11.5 Distributed databases            | 38.5 % |
| 11.6 Dictionaries                     | 45.1 % |
| 11.7 Backup & Restore                 | 58.1 % |

### Graph: Support of PDM functions

![Graph of PDM functions support](image)
### 13. Formtek

**Table: Support of PDM functions**

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>[13]</th>
<th>Formtek</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. General</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td>59.1 %</td>
</tr>
<tr>
<td><strong>2. Structure Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td>88.2 %</td>
<td></td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td>98.7 %</td>
<td></td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td>81.9 %</td>
<td></td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td>99.0 %</td>
<td></td>
</tr>
<tr>
<td><strong>3. Retrieval Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td>52.4 %</td>
<td></td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td>89.7 %</td>
<td></td>
</tr>
<tr>
<td><strong>4. Release Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td>76.1 %</td>
<td></td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td>95.0 %</td>
<td></td>
</tr>
<tr>
<td>4.3 Status control</td>
<td>82.6 %</td>
<td></td>
</tr>
<tr>
<td><strong>5. Change Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td>88.7 %</td>
<td></td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td>82.2 %</td>
<td></td>
</tr>
<tr>
<td>5.3 Version control</td>
<td>62.5 %</td>
<td></td>
</tr>
<tr>
<td>5.4 History management</td>
<td>88.8 %</td>
<td></td>
</tr>
</tbody>
</table>

**6. Workflow Management**

| 6.1 Document routing | 99.0 % |
| 6.2 Process modeling | 69.7 % |
| 6.3 Process management | 78.6 % |
| 6.4 Planning         | 91.7 % |
| 6.5 Communication    | 92.3 % |

**7. Data Exchange**

| 7.1 Data transportation | 75.7 % |
| 7.2 Data translation    | 42.1 % |

**9. User Interface**

| 9.1 Operational features | 93.7 % |
| 9.2 Presentational features | 95.0 % |
| 9.3 Help                  | 28.6 % |

**10. Customising**

| 10.1 Customization       | 77.6 % |
| 10.2 Tailoring           | 68.0 % |
| 10.3 Reports             | 95.0 % |

**11. System Architecture**

| 11.5 Distributed databases | 99.0 % |
| 11.6 Datadictionary       | 79.3 % |
| 11.7 Backup & Restore     | 76.5 % |

**Graph: Support of PDM functions**

![Graph: Support of PDM functions](image)
14. FYI

Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>PDM system</th>
<th>FYI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td>59.1 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td>35.3 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td>89.2 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td>23.6 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td>24.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td>79.0 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td>75.6 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td>78.7 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td>83.3 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td>82.6 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td>50.9 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td>72.7 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td>50.0 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td>88.8 %</td>
</tr>
</tbody>
</table>

Graph: Support of PDM functions

<table>
<thead>
<tr>
<th>6. Workflow Management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Document routing</td>
<td>99.0 %</td>
</tr>
<tr>
<td>6.2 Process modeling</td>
<td>97.0 %</td>
</tr>
<tr>
<td>6.3 Process management</td>
<td>89.3 %</td>
</tr>
<tr>
<td>6.4 Planning</td>
<td>91.7 %</td>
</tr>
<tr>
<td>6.5 Communication</td>
<td>64.6 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7. Data Exchange</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1 Data transportation</td>
<td>75.7 %</td>
</tr>
<tr>
<td>7.2 Data translation</td>
<td>26.3 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9. User-interface</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1 Operational features</td>
<td>80.2 %</td>
</tr>
<tr>
<td>9.2 Presentational features</td>
<td>67.5 %</td>
</tr>
<tr>
<td>9.3 Help</td>
<td>71.4 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10. Customising</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1 Customization</td>
<td>53.6 %</td>
</tr>
<tr>
<td>10.2 Tailoring</td>
<td>60.0 %</td>
</tr>
<tr>
<td>10.3 Reports</td>
<td>90.0 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11. System architecture</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11.5 Distributed databases</td>
<td>90.0 %</td>
</tr>
<tr>
<td>11.6 Datadictionary</td>
<td>78.0 %</td>
</tr>
<tr>
<td>11.7 Backup &amp; Restore</td>
<td>48.5 %</td>
</tr>
</tbody>
</table>

PDM functions support Appendix F-15
15. HP PE/Workmanager

Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>HP PE/WorkManager</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PDM system</strong></td>
<td></td>
</tr>
<tr>
<td><strong>PDM function support</strong></td>
<td>[15]</td>
</tr>
<tr>
<td>1. General</td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td>72.7 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td>82.4 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td>46.2 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td>90.3 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td>72.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td>64.8 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td>24.2 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td>96.8 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td>95.0 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td>99.0 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td>57.9 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td>0.0 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td>70.8 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td>92.4 %</td>
</tr>
</tbody>
</table>

Graph: Support of PDM functions

Appendix F-16

PDM functions support
16. Information Manager

Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>[16] Information Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td>61.9 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td>99.0 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td>90.6 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td>90.3 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td>72.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td>58.1 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td>41.2 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td>90.6 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td>95.0 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td>82.6 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td>88.7 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td>82.2 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td>80.8 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td>92.4 %</td>
</tr>
<tr>
<td>6. Workflow Management</td>
<td></td>
</tr>
<tr>
<td>6.1 Document routing</td>
<td>88.9 %</td>
</tr>
<tr>
<td>6.2 Process modeling</td>
<td>69.7 %</td>
</tr>
<tr>
<td>6.3 Process management</td>
<td>78.6 %</td>
</tr>
<tr>
<td>6.4 Planning</td>
<td>66.7 %</td>
</tr>
<tr>
<td>6.5 Communication</td>
<td>70.8 %</td>
</tr>
<tr>
<td>7. Data Exchange</td>
<td></td>
</tr>
<tr>
<td>7.1 Data transportation</td>
<td>78.4 %</td>
</tr>
<tr>
<td>7.2 Data translation</td>
<td>68.4 %</td>
</tr>
<tr>
<td>9. User-interface</td>
<td></td>
</tr>
<tr>
<td>9.1 Operational features</td>
<td>86.5 %</td>
</tr>
<tr>
<td>9.2 Presentational features</td>
<td>90.0 %</td>
</tr>
<tr>
<td>9.3 Help</td>
<td>91.0 %</td>
</tr>
<tr>
<td>10. Customising</td>
<td></td>
</tr>
<tr>
<td>10.1 Customization</td>
<td>98.6 %</td>
</tr>
<tr>
<td>10.2 Tailoring</td>
<td>84.0 %</td>
</tr>
<tr>
<td>10.3 Reports</td>
<td>95.0 %</td>
</tr>
<tr>
<td>11. System architecture</td>
<td></td>
</tr>
<tr>
<td>11.5 Distributed databases</td>
<td>69.2 %</td>
</tr>
<tr>
<td>11.6 Datadictionary</td>
<td>63.4 %</td>
</tr>
<tr>
<td>11.7 Backup &amp; Restore</td>
<td>74.3 %</td>
</tr>
</tbody>
</table>

Graph: Support of PDM functions
Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>PDM system</th>
<th>I/PDM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td>85.8%</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td>64.7%</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td>66.4%</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td>56.9%</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td>72.0%</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td>70.5%</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td>90.5%</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td>93.5%</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td>95.0%</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td>65.2%</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td>78.1%</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td>82.2%</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td>66.7%</td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td>91.7%</td>
</tr>
<tr>
<td>6. Workflow Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1 Document routing</td>
<td></td>
<td>20.0%</td>
</tr>
<tr>
<td>6.2 Process modeling</td>
<td></td>
<td>0.0%</td>
</tr>
<tr>
<td>6.3 Process management</td>
<td></td>
<td>0.0%</td>
</tr>
<tr>
<td>6.4 Planning</td>
<td></td>
<td>0.0%</td>
</tr>
<tr>
<td>6.5 Communication</td>
<td></td>
<td>30.8%</td>
</tr>
<tr>
<td>7. Data Exchange</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.1 Data transportation</td>
<td></td>
<td>45.9%</td>
</tr>
<tr>
<td>7.2 Data translation</td>
<td></td>
<td>55.3%</td>
</tr>
<tr>
<td>9. User-Interface</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.1 Operational features</td>
<td></td>
<td>75.7%</td>
</tr>
<tr>
<td>9.2 Presentational features</td>
<td></td>
<td>62.5%</td>
</tr>
<tr>
<td>9.3 Help</td>
<td></td>
<td>93.4%</td>
</tr>
<tr>
<td>10. Customising</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.1 Customization</td>
<td></td>
<td>77.6%</td>
</tr>
<tr>
<td>10.2 Tailoring</td>
<td></td>
<td>66.0%</td>
</tr>
<tr>
<td>10.3 Reports</td>
<td></td>
<td>95.0%</td>
</tr>
<tr>
<td>11. System architecture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.5 Distributed databases</td>
<td></td>
<td>99.0%</td>
</tr>
<tr>
<td>11.6 Datadictionary</td>
<td></td>
<td>63.4%</td>
</tr>
<tr>
<td>11.7 Backup &amp; Restore</td>
<td></td>
<td>44.1%</td>
</tr>
</tbody>
</table>

Graph: Support of PDM functions
18. Keyfile

Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>PDM system</th>
<th>Keyfile</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td>78.5 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td>88.2 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td>79.8 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td>30.6 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td>62.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td>51.4 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td>81.5 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td>93.1 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td>95.0 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td>99.0 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td>57.9 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td>82.2 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td>41.7 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td>16.5 %</td>
</tr>
</tbody>
</table>

6. Workflow Management

<table>
<thead>
<tr>
<th>PDM function</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Document routing</td>
<td>95.6 %</td>
</tr>
<tr>
<td>6.2 Process modeling</td>
<td>78.8 %</td>
</tr>
<tr>
<td>6.3 Process management</td>
<td>89.3 %</td>
</tr>
<tr>
<td>6.4 Planning</td>
<td>0.0 %</td>
</tr>
<tr>
<td>6.5 Communication</td>
<td>52.3 %</td>
</tr>
</tbody>
</table>

7. Data Exchange

<table>
<thead>
<tr>
<th>PDM function</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1 Data transportation</td>
<td>78.4 %</td>
</tr>
<tr>
<td>7.2 Data translation</td>
<td>68.4 %</td>
</tr>
</tbody>
</table>

9. User-Interface

<table>
<thead>
<tr>
<th>PDM function</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1 Operational features</td>
<td>58.6 %</td>
</tr>
<tr>
<td>9.2 Presentational features</td>
<td>75.0 %</td>
</tr>
<tr>
<td>9.3 Help</td>
<td>93.4 %</td>
</tr>
</tbody>
</table>

10. Customising

<table>
<thead>
<tr>
<th>PDM function</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1 Customization</td>
<td>42.7 %</td>
</tr>
<tr>
<td>10.2 Tailoring</td>
<td>72.0 %</td>
</tr>
<tr>
<td>10.3 Reports</td>
<td>51.2 %</td>
</tr>
</tbody>
</table>

11. System architecture

<table>
<thead>
<tr>
<th>PDM function</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.5 Distributed databases</td>
<td>0.0 %</td>
</tr>
<tr>
<td>11.6 Datadictionary</td>
<td>58.5 %</td>
</tr>
<tr>
<td>11.7 Backup &amp; Restore</td>
<td>74.3 %</td>
</tr>
</tbody>
</table>

Graph: Support of PDM functions
19. LT Manager

Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>PDM system</th>
<th>LT Manager</th>
<th>[19]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td></td>
<td>26.7 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td></td>
<td>10.6 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td></td>
<td>31.2 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td></td>
<td>30.4 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td></td>
<td>0.0 %</td>
</tr>
</tbody>
</table>

Graph: Support of PDM functions

Appendix F-20
# Manta

Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>PDM system</th>
<th>[20]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td>Manta</td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td>58.3%</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td>88.2%</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td>86.3%</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td>83.3%</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td>72.7%</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td>45.7%</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td>63.2%</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td>83.2%</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td>66.7%</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td>73.9%</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td>68.4%</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td>72.7%</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td>54.2%</td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td>92.3%</td>
</tr>
</tbody>
</table>

## Workflow Management

<table>
<thead>
<tr>
<th>6. Workflow Management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Document routing</td>
<td>64.4%</td>
</tr>
<tr>
<td>6.2 Process modeling</td>
<td>0.0%</td>
</tr>
<tr>
<td>6.3 Process management</td>
<td>53.6%</td>
</tr>
<tr>
<td>6.4 Planning</td>
<td>0.0%</td>
</tr>
<tr>
<td>6.5 Communication</td>
<td>63.1%</td>
</tr>
</tbody>
</table>

## Data Exchange

<table>
<thead>
<tr>
<th>7. Data Exchange</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1 Data transportation</td>
<td>75.7%</td>
</tr>
<tr>
<td>7.2 Data translation</td>
<td>34.2%</td>
</tr>
</tbody>
</table>

## User-interface

<table>
<thead>
<tr>
<th>9. User-interface</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1 Operational features</td>
<td>55.0%</td>
</tr>
<tr>
<td>9.2 Presentational features</td>
<td>0.0%</td>
</tr>
<tr>
<td>9.3 Help</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

## Customising

<table>
<thead>
<tr>
<th>10. Customising</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1 Customization</td>
<td>24.1%</td>
</tr>
<tr>
<td>10.2 Tailoring</td>
<td>42.0%</td>
</tr>
<tr>
<td>10.3 Reports</td>
<td>90.0%</td>
</tr>
</tbody>
</table>

## System architecture

<table>
<thead>
<tr>
<th>11. System architecture</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11.5 Distributed databases</td>
<td>99.0%</td>
</tr>
<tr>
<td>11.6 Datadictionary</td>
<td>81.7%</td>
</tr>
<tr>
<td>11.7 Backup &amp; Restore</td>
<td>62.5%</td>
</tr>
</tbody>
</table>

Graph: Support of PDM functions

PDM functions support

Appendix F-21
## 21. Metaphase PDM

### Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>PDM system</th>
<th>Metaphase PDM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. General</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td>81.6 %</td>
</tr>
<tr>
<td><strong>2. Structure Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td>99.0 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td>98.7 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td>88.9 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td>99.0 %</td>
</tr>
<tr>
<td><strong>3. Retrieval Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td>53.3 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td>75.6 %</td>
</tr>
<tr>
<td><strong>4. Release Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td>93.5 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td>95.0 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td>82.6 %</td>
</tr>
<tr>
<td><strong>5. Change Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td>84.2 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td>72.7 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td>62.5 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td>84.9 %</td>
</tr>
</tbody>
</table>

| 6. Workflow Management | | 82.2 % |
| 6.1 Document routing   | | 57.6 % |
| 6.2 Process modeling   | | 78.6 % |
| 6.3 Process management | | 16.7 % |
| 6.4 Planning           | | 80.0 % |
| 6.5 Communication      | | 78.4 % |
| 7. Data Exchange       | | 57.9 % |
| 7.1 Data transportation| | 82.9 % |
| 7.2 Data translation   | | 85.0 % |
| 9. User-interface      | | 93.4 % |
| 9.1 Operational features| | 97.0 % |
| 9.2 Presentational features | | 96.0 % |
| 9.3 Help               | | 95.0 % |
| 10. Customising        | | 99.0 % |
| 10.1 Customization     | | 99.0 % |
| 10.2 Tailoring         | | 78.0 % |
| 10.3 Reports           | | 76.5 % |
| 11. System architecture| | |
| 11.5 Distributed databases | | 99.0 % |
| 11.6 Datadictionary    | | 78.0 % |
| 11.7 Backup & Restore  | | 76.5 % |

Graph: Support of PDM functions

---

Appendix F-22
Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>[22]</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDM system</td>
<td>NOW24</td>
</tr>
<tr>
<td>1. General</td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td>52.2 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td>47.1 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td>72.8 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td>43.1 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td>40.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td>40.0 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td>46.9 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td>68.4 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td>44.4 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td>82.6 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td>54.4 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td>54.5 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td>54.2 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td>63.7 %</td>
</tr>
</tbody>
</table>

Graph: Support of PDM functions

6. Workflow Management

| 6.1 Document routing | 46.7 %|
| 6.2 Process modeling | 36.4 %|
| 6.3 Process management | 78.6 %|
| 6.4 Planning        | 41.7 %|
| 6.5 Communication   | 33.8 %|

7. Data Exchange

| 7.1 Data transportation | 0.0 %|
| 7.2 Data translation    | 0.0 %|

9. User-interface

| 9.1 Operational features | 68.5 %|
| 9.2 Presentational features | 65.0 %|
| 9.3 Help                | 71.4 %|

10. Customising

| 10.1 Customization     | 67.9 %|
| 10.2 Tailoring         | 28.0 %|
| 10.3 Reports           | 90.0 %|

11. System architecture

| 11.5 Distributed databases | 99.0 %|
| 11.6 Datadictionary       | 50.0 %|
| 11.7 Backup & Restore     | 45.6 %|

PDM functions support

Appendix F-23
## 23. Pafec Access

### Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>PDM system</th>
<th>[23] Pafec Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Graph: Support of PDM functions

![Graph: Support of PDM functions](image)

### Appendix F-24

PDM functions support
24. **ProductManager**

Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>PDM system</th>
<th>[24] Product-Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>General</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td>75.0 %</td>
</tr>
<tr>
<td>2. <strong>Structure Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td>64.7 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td>82.5 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. <strong>Retrieval Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td>32.4 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td>73.6 %</td>
</tr>
<tr>
<td>4. <strong>Release Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td>91.9 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td>83.3 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td>82.6 %</td>
</tr>
<tr>
<td>5. <strong>Change Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td>80.7 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td>72.7 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td>62.5 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td>71.9 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. <strong>Workflow Management</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Document routing</td>
<td>88.9 %</td>
</tr>
<tr>
<td>6.2 Process modeling</td>
<td>57.6 %</td>
</tr>
<tr>
<td>6.3 Process management</td>
<td>78.6 %</td>
</tr>
<tr>
<td>6.4 Planning</td>
<td>56.9 %</td>
</tr>
<tr>
<td>6.5 Communication</td>
<td>52.3 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7. <strong>Data Exchange</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1 Data transportation</td>
<td>78.4 %</td>
</tr>
<tr>
<td>7.2 Data translation</td>
<td>44.7 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9. <strong>User-interface</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1 Operational features</td>
<td>89.2 %</td>
</tr>
<tr>
<td>9.2 Presentational features</td>
<td>72.5 %</td>
</tr>
<tr>
<td>9.3 Help</td>
<td>91.0 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10. <strong>Customising</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1 Customization</td>
<td>73.0 %</td>
</tr>
<tr>
<td>10.2 Tailoring</td>
<td>68.0 %</td>
</tr>
<tr>
<td>10.3 Reports</td>
<td>90.0 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11. <strong>System architecture</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11.5 Distributed databases</td>
<td>99.0 %</td>
</tr>
<tr>
<td>11.6 Datadictionary</td>
<td>80.5 %</td>
</tr>
<tr>
<td>11.7 Backup &amp; Restore</td>
<td>35.3 %</td>
</tr>
</tbody>
</table>

Graph: Support of PDM functions
### Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>PDM system</th>
<th>R/Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td>68.1 %</td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td>82.4 %</td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td>50.3 %</td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td>2.8 %</td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td>0.0 %</td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td>38.1 %</td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td>83.7 %</td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td>70.3 %</td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td>44.4 %</td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td>47.8 %</td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td>33.3 %</td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td>45.5 %</td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td>4.2 %</td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td>33.1 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. Workflow Management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Document routing</td>
<td>0.0 %</td>
</tr>
<tr>
<td>6.2 Process modeling</td>
<td>0.0 %</td>
</tr>
<tr>
<td>6.3 Process management</td>
<td>0.0 %</td>
</tr>
<tr>
<td>6.4 Planning</td>
<td>0.0 %</td>
</tr>
<tr>
<td>6.5 Communication</td>
<td>0.0 %</td>
</tr>
<tr>
<td>7. Data Exchange</td>
<td></td>
</tr>
<tr>
<td>7.1 Data transportation</td>
<td>0.0 %</td>
</tr>
<tr>
<td>7.2 Data translation</td>
<td>0.0 %</td>
</tr>
<tr>
<td>9. User-interface</td>
<td></td>
</tr>
<tr>
<td>9.1 Operational features</td>
<td>55.0 %</td>
</tr>
<tr>
<td>9.2 Presentational features</td>
<td>45.0 %</td>
</tr>
<tr>
<td>9.3 Help</td>
<td>91.0 %</td>
</tr>
<tr>
<td>10. Customising</td>
<td></td>
</tr>
<tr>
<td>10.1 Customization</td>
<td>25.6 %</td>
</tr>
<tr>
<td>10.2 Tailoring</td>
<td>14.0 %</td>
</tr>
<tr>
<td>10.3 Reports</td>
<td>90.0 %</td>
</tr>
<tr>
<td>11. System architecture</td>
<td></td>
</tr>
<tr>
<td>11.5 Distributed databases</td>
<td>69.2 %</td>
</tr>
<tr>
<td>11.6 Datadictionary</td>
<td>64.6 %</td>
</tr>
<tr>
<td>11.7 Backup &amp; Restore</td>
<td>52.2 %</td>
</tr>
</tbody>
</table>

Graph: Support of PDM functions
## 26. Sherpa/PIMS

### Table: Support of PDM functions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PDM system</td>
<td>Sherpa</td>
<td>PIMS</td>
<td>6.1 Document routing</td>
<td>64.4 %</td>
<td>6.2 Process modeling</td>
<td>60.6 %</td>
<td>6.3 Process management</td>
<td>78.6 %</td>
<td>6.4 Planning</td>
<td>52.8 %</td>
<td>6.5 Communication</td>
<td>74.7 %</td>
<td>7.1 Data transportation</td>
<td>83.8 %</td>
<td>7.2 Data translation</td>
<td>57.9 %</td>
<td>9.1 Operational features</td>
<td>92.8 %</td>
<td>9.2 Presentational features</td>
<td>87.5 %</td>
<td>9.3 Help</td>
<td>93.4 %</td>
<td>10.1 Customization</td>
<td>83.9 %</td>
<td>10.2 Tailoring</td>
<td>84.0 %</td>
<td>10.3 Reports</td>
<td>95.0 %</td>
<td>11.5 Distributed databases</td>
<td>99.0 %</td>
<td>11.6 Datadictionary</td>
<td>84.1 %</td>
</tr>
</tbody>
</table>

### Graph: Support of PDM functions

![Graph: Support of PDM functions](image-url)
# SoftSolution

## Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>[27]</th>
<th>SoftSolution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PDM system</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1. General</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. Structure Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td>88.2</td>
<td></td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td>76.4</td>
<td></td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td><strong>3. Retrieval Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td>64.8</td>
<td></td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td>65.2</td>
<td></td>
</tr>
<tr>
<td><strong>4. Release Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td>65.2</td>
<td></td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>4.3 Status control</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td><strong>5. Change Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>5.3 Version control</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>5.4 History management</td>
<td>68.3</td>
<td></td>
</tr>
</tbody>
</table>

## Graph: Support of PDM functions

![Graph: Support of PDM functions](image-url)
## 28. Trimco

### Table: Support of PDM functions

<table>
<thead>
<tr>
<th>PDM function support</th>
<th>PDM system</th>
<th>[28]</th>
<th>Trimpco</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.9 Support</td>
<td></td>
<td>64.7%</td>
<td></td>
</tr>
<tr>
<td>2. Structure Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Classification</td>
<td></td>
<td>35.3%</td>
<td></td>
</tr>
<tr>
<td>2.2 Document structure</td>
<td></td>
<td>82.5%</td>
<td></td>
</tr>
<tr>
<td>2.3 Product structure management</td>
<td></td>
<td>9.7%</td>
<td></td>
</tr>
<tr>
<td>2.4 Configuration management</td>
<td></td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>3. Retrieval Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 Searching</td>
<td></td>
<td>66.7%</td>
<td></td>
</tr>
<tr>
<td>3.2 Viewing</td>
<td></td>
<td>87.2%</td>
<td></td>
</tr>
<tr>
<td>4. Release Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 Authorization</td>
<td></td>
<td>74.5%</td>
<td></td>
</tr>
<tr>
<td>4.2 Sign-off</td>
<td></td>
<td>77.8%</td>
<td></td>
</tr>
<tr>
<td>4.3 Status control</td>
<td></td>
<td>99.0%</td>
<td></td>
</tr>
<tr>
<td>5. Change Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1 Change process</td>
<td></td>
<td>57.9%</td>
<td></td>
</tr>
<tr>
<td>5.2 Mark-up &amp; Redlining</td>
<td></td>
<td>82.2%</td>
<td></td>
</tr>
<tr>
<td>5.3 Version control</td>
<td></td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td>5.4 History management</td>
<td></td>
<td>92.4%</td>
<td></td>
</tr>
</tbody>
</table>

### Graph: Support of PDM functions

![Graph: Support of PDM functions](image-url)**Appendix F-29**
Appendix G  PDM Selection tool

Introduction to the PDM Selection tool

The PDM Selection tool is a computerised tool to support the PDM selection method described in this book. The PDM Selection tool supports all steps in the selection process. The selection process requires many calculations. The PDM System questionnaires result in almost 1000 support percentages that need to be compared to 56 questions rated with 5 different ratings in up to 6 PDM Business questionnaires. The results of these comparisons need to be compared and sorted to functional support. Also the results of the cost comparisons and over 300 items of limiting conditions need to be calculated. The PDM Selection tool has been developed to lead the user through the selection process in the best possible way in order to obtain an overview of best fitting PDM software for the specific company situation.

All results can be shown in table, graph and print-preview or print format.

Results of the PDM Selection tool are:
- Filled out PDM Business questionnaires for functional requirements
- Filled out PDM Business questionnaires for limiting conditions
- Matrix with totals of functional requirements with graphs
- Matrix with totals of limiting conditions with graphs
- Short list on functional requirements of PDM systems with graphs
- Knock-out list on cost of PDM systems with graphs
- Strike-out list on limiting conditions of PDM systems with graphs
- Graphical overviews of PDM systems

The selection method is based on the comparison of questionnaires resulting in matrix tables with totals. Therefore a spreadsheet (Lotus) has been selected for the development of the computerised tool. The spreadsheet is fully menu driven and can be operated without any further knowledge of spreadsheets or Lotus 123. The only thing that needs to be filled in are the business questionnaires. The calculation of results are performed by the tool.

Getting started

On the floppy disk a README file is included which contains the information to load and start the PDM Selection tool. The README file that can be read (in DOS) by: TYPE A:README.

The PDM selection tool consists of two files; 1 working file (.WK3) and 1 WYSIWYG format file (.FM3). These files are on the floppy disk:
- PDM-TOOL.WK3  Lotus 123 working file
- PDM-TOOL.FM3;  WYSIWYG presentation format file

Copy both the PDM-TOOL.WK3 and PDM-TOOL.FM3 to the correct working directory of your Lotus installation. This directory is shown in Lotus by the command; / File Retrieve. (Remark: the slash / activates the Lotus menu, <Alt> <F7> activates the WYSIWYG menu). On the first line Lotus now shows the path of your its working directory. After having copied (in DOS) the tool files to the working directory the PDM selection tool can be started by retrieving the PDM-TOOL workfile with: / File Retrieve PDM-TOOL <Enter>. When the tool files are not both in this working directory the tool will not not operate correctly (Lotus may find the working file but the WYSIWYG format file will not be found).

The starting screen should now be visible, on a colour screen in Magenta and Yellow, with on top the Main menu already active. The menu is not always active. The main menu can always be activated by pressing <Alt>M.
Menus of PDM selection tool

The tool has its own menus. No Lotus or WYSIWYG menu calls need to be made. The tool menus are not always active; the main menu can be activated by pressing <Alt> M. The menu can be cancelled by pressing <Esc>. The menu choices always appear on the first line. The second line gives an explanation of the menu choice currently addressed by the cursor.

The Main menu has the following options:
- PDM Business questionnaire
  This option leads to the forms for PDM Business questionnaire for functional requirements and limiting conditions (cost and system requirements).
- Matrix
  This option leads to the matrices for functional requirements and limiting conditions with the totals of the filled out PDM Business questionnaires. The results are also presented in circle diagrams and bar charts (the total requirement is set to 100%).
- Selection
  By this option the short list, knock-out list or strike-out list selection of PDM systems can be calculated and presented.
- Print
  With this option all results can be previewed and printed
- Info
  This option provides information concerning the PDM Selection tool
- End
  By option the session can be stopped with or without the saving of all changes.

Sub-menus are not detailed in this section. It is not possible to 'climb' to a 'higher level' menu from a sub-menu by pressing <Esc> (as it can be done with standard Lotus). For this reason the option Back is included in all menus, which will lead to the above menu. Graphs or Print previews can be walked through by pressing <Enter> or cancelled by pressing <Esc>.

Tool requirements

The PDM selection tool is an application to be run with Lotus 123. The tool requires also the WYSIWYG (What You See is What You Get) software presentation module of Lotus 123. The WYSIWYG add-in software is standard included and provided with the software from Lotus version 3.1.

The PDM selection tool will operate only with the English version of Lotus 123 software for PC from version 3.1 or higher including the WYSIWYG add-in software. Because other language versions (dutch) of Lotus have a different menu tree and command naming, the tool will not operate on a non-english version of Lotus 123. Other (older) versions of Lotus are not or not completely supported and will not lead to the desired result.

The correct availability of the WYSIWYG software in Lotus can be checked by the following command; Press <Alt> <F10> and than choose Load from the menu. On the second line - which may be a walkthrough line - the word WYSIWYG.PLC must appear. If not, the path setting for the /ADDINS directory might be wrong or the WYSIWYG software might not be installed at all. When starting the tool, it will automatically remove a possibly already loaded WYSIWYG application, and then again load WYSIWYG under key 1 (assignment to APP1 or <Alt> <F7>). It may be possible to correct this procedure by hand if the starting is not successful. The lack of ability to load the WYSIWYG add-in application (under APP1 or <Alt> <F7>) will result in errors in using the tool.

The Lotus 123 and WYSIWYG software need to be completely and correctly installed. For a proper performance of the software a minimum of 8MB internal memory on the PC. A 'strong' PC is required; a 486 or pentium is strongly advised as well as a colour monitor. The tool might operate on a 386 with enough internal memory but will be very slow in calculating the selections.
How to work with the tool

A PDM Business questionnaire

B Matrices and graphs
The total results of the calculations of functional requirements and limiting conditions of the filled out PDM Business questionnaires can be seen in matrix format by choosing Matrix and than Functional requirements or limiting conditions. Also than Graphs can be viewed (by <enter> one returns to the menu.

C Selection
Choose the Selection option in the Main menu. The actual selections or comparison find place on the level of sub-function (not main function). By the Shortlist option the tool calculates the shortlist of PDM systems that are best fit only from a functional requirements point of view. The Knock-out list option calculates the functional best PDM systems that meet the maximum cost/budget for the total PDM system software. The Strike-out list option calculates the PDM systems that meet the limiting conditions best. All selections can are shown in table format and with graphs (function-price diagram). The match of all requirements for all PDM systems (overview) can also graphically be shown.

D Print
By this option print/preview and prints to the printer can be generated of all results. The result that can be printed are mentioned in the introduction paragraph. For failures see also the printer settings paragraph.

Printer setting
The tool uses the standard Lotus settings for the printer. The tool worksheet setting is by default a Postscript printer on LPT1. This should lead to normal operation in most situations. Should the printer setting need to be changed than this can be done in WYSIWYG by; Alt F7, Printer, Config, Printer and Interface, or in Lotus by; / Print Printer Options Advanced Device Name and Interface. The workfile now needs to be saved to keep the printer setting.

Licence agreement
The PDM selection tool is distributed on a 'AS-IS' basis. This means that the tool will have to be accepted in the way it is delivered, without any rights for support in case of malfunctioning. The results of working with the tool will have to be accepted in the way they are. The developer is not responsible for any damage to software or any other product as a result of the use of the tool.

The PDM selection tool is a development of TNO CAD Centre, The Netherlands. Correspondance about the PDM selection can be directed to;
TNO CAD Centre, P.O.box 5073, 2600 GB, Delft, The Netherlands; or
MIS Organisatie-ingenieurs, P.O.box 563, 2130 AN, Hoofddorp, The Netherlands.