

THE GLASS SCHOOL

RESEARCH BOOKLET

Robert Roohé

A
ACTORS

B
BUILDING

C
CRAFTING

D
DELFT

A
ACTORS

+

B
BUILDING

Introduction

In the Netherlands, a vocational school with a soul focus on the craftsmanship of glass does not exist. A quick search on the internet gives you results for multiple schools learning to become a glazier.¹ And at the moment six schools offer the trajectory of learning the craft of becoming a stained glass artist.² However, there is no education on learning the practice of the blowing glass. The closest thing we have in the Netherlands on learning how to blow glass is 'The Large Glass Department' of Gerrit Rietveld Academie in Amsterdam. The academy is more an art and design school than a vocational school. In this essay, I will not go in-depth to the similarities and differences between art or craft schools or the differences between art and craft. The terms artist and craftsman can sometimes be used interchangeably. It is a grey area and the translation between languages of the definitions obscure this even more. Plus sometimes there is may be no difference. However, I will explain in short the difference between an art school and a vocational school in the Netherlands in relation to the material of glass: The art school is more conceptual than the vocational schools and how you work with the material is a personal choice. This can be many ways like casting, painting, printing or blowing. You work with the materials or techniques that appeal to you. This is different from a vocational school where you have to master a certain set of skills.³ People in the Netherlands who want to learn this often look for possibilities outside of the country, for example, Belgium or Denmark.

After the first presentation of the graduation studio, there is a transition of the research done in the first ten weeks towards a design. I, therefore, wanted to know more about glass workshops and schools. It was difficult finding useful information about this online and in literature and I think this for three reasons: 'The craftsmanship of glass is a nice'. Working with glass is less accessible than for example wood, or earthenware. The material is expensive; you need very specific tools and machines; the material has a stigma of being difficult and brittle, and it takes a long time to master the skills. To become a skilful glassblower takes you, for example, five to six years.⁴ For this reason, there may be less information available. Second: 'The decline of the craftsmanship of glass in the Netherlands'. The decline can be explained by the rise of float glass and modern architecture, with a focus on light and openness, in the last century. Also, the popularity of the so-called *doorzonwoing* in the Netherlands favoured the large glass windows at the expense of smaller stained-glass windows.⁵ And final: The art of glass is very new. The use and creation of glass date back centuries but using glass as a medium for art is new. This way of using glass is called 'studio glass' and this started in the 1950s in the United States. So, instead of doing a literature study, I focused on conducting interviews and fieldwork. I wanted to know more about the workshops of the craftsman; the craftsman himself and how they work. Together with students from the graduation studio, we prepared interviews. It consisted of quantitative questions, the workshop, tools, machines and free-flowing qualitative questions about the workshop and craft in general. The group of interviewees consisted initially of twenty people. The interviewees consisted of beginning designers, glass artist, artists (who could not work with glass themselves), studios, teachers, a museum, a company, a researcher and an association. It was a group of people who were 'known in the glass world' and people who could not work with glass-like me. This gave me a range of completely different outcomes on similar questions. No distinction is made between glass blowers or artist who work with stained glass.

In the next chapter, there will be sections together with a small description of the persons. The sections are made from the different places I visited or analysed by drawings or pictures send by the interviewees. The text is an analysis of the interviews. Sometimes I used multiple interviews, for example, two artists, and combined it into one story. In the second chapter, I will explain how different actors connect to education and to the public.⁶ The last chapter is a conclusion of the essay and I will elaborate on how I can use this information in my design. In the period writing this essay, a press-report was released about the closing of Royal Leerdam Crystal. A Crystal factory that existed for over 140 years. To take a look into the 'glass world' can be important in this critical period in the history of glass in the Netherlands.

¹ A Glazier (Dutch: glaszetter) is a person who installs glass in windows frames and skylights.

² Stained glass or leadlight artist (Dutch: glazenier) is a person who masters the craft of making stained glass panels for restoration of contemporary purposes.

³ Maria, from the association, explained this in the interviews.

⁴ Mentioned in multiple interviews

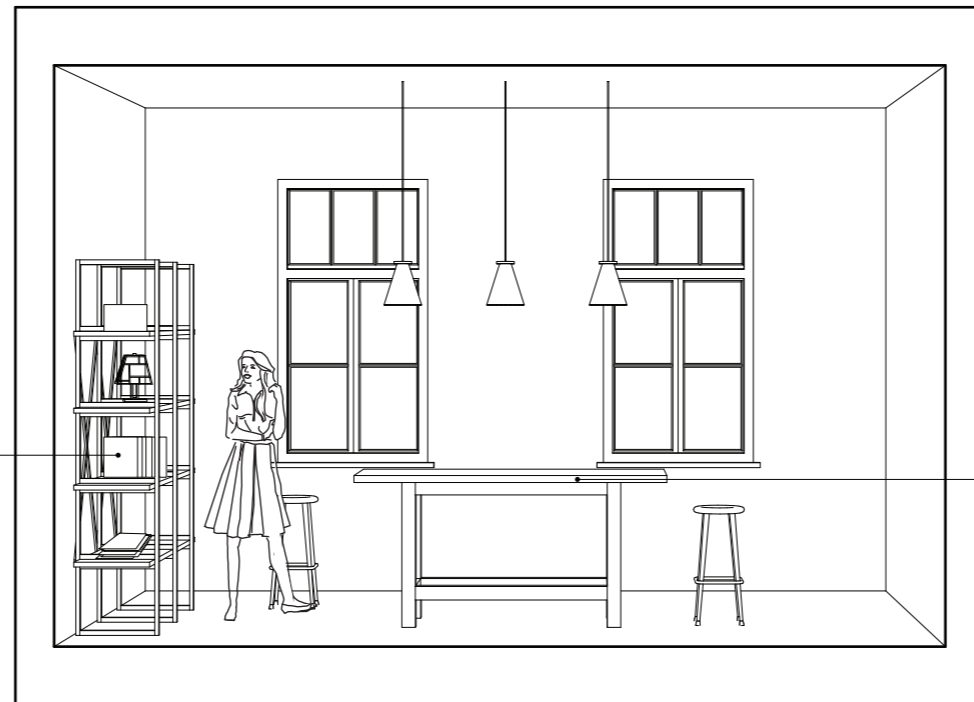
⁵ Mentioned by Mieke the teacher

⁶ The public in this essay is meant as the majority of people that cannot work with glass or do not work in relation to the material.

Fleur, The Beginning artist/designer

How close the beginning artist is in age to her education how far apart her workplace now seems to be. The beginning artist leaves their school but also leaves all the machines behind. Due to the limited amount of money she has she does not have her own atelier like older and established artists have. She works in her own home, a large table and some hand tools are sufficient for her to produce. With these tools she can test and experiment with the glass she has left. She mainly works with her waste material because it is free and within reach. Because she just started her own practice there is still a lot she doesn't know about how to work with glass. For each new project she looks for the right professional to collaborate with, to expand her knowledge and her network. At the moment exposure is a big issue for her. Most favourably she would have a small shop or gallery accompanying her studio in the city centre so many people can see her work. This could be shared with other designers or artists to make exhibitions and to share knowledge. She also works inside a vocational school where her knowledge is used to support students with their projects.

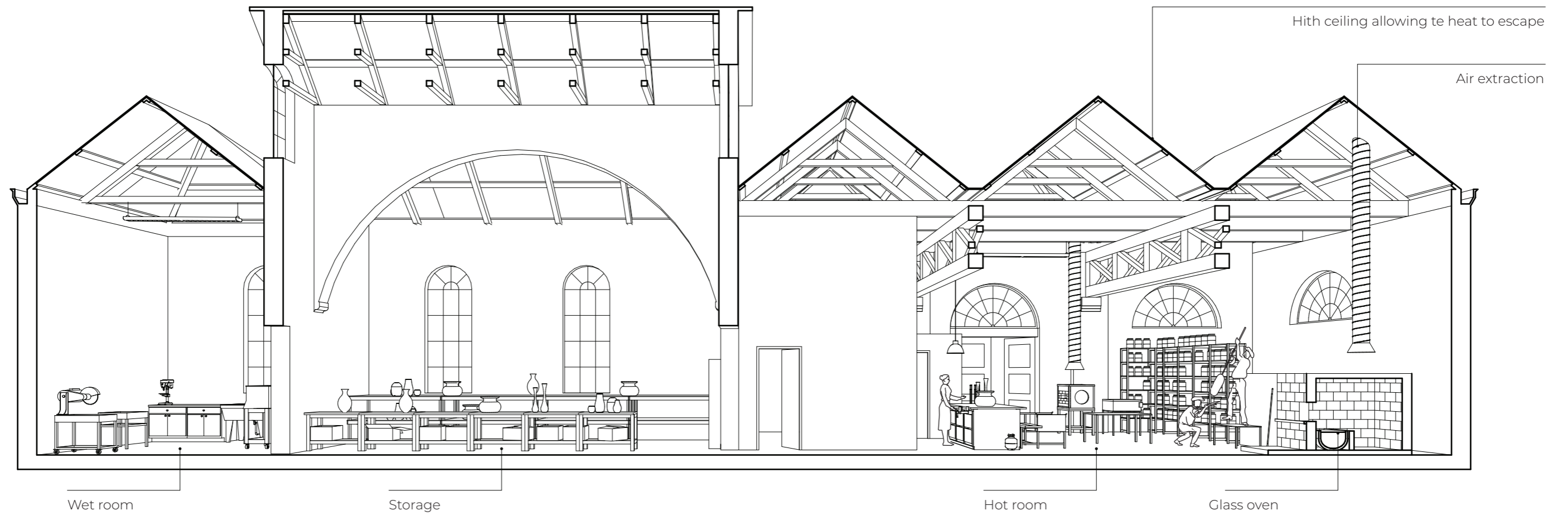
Spare glass



Large working table

Bernard, The glass artist

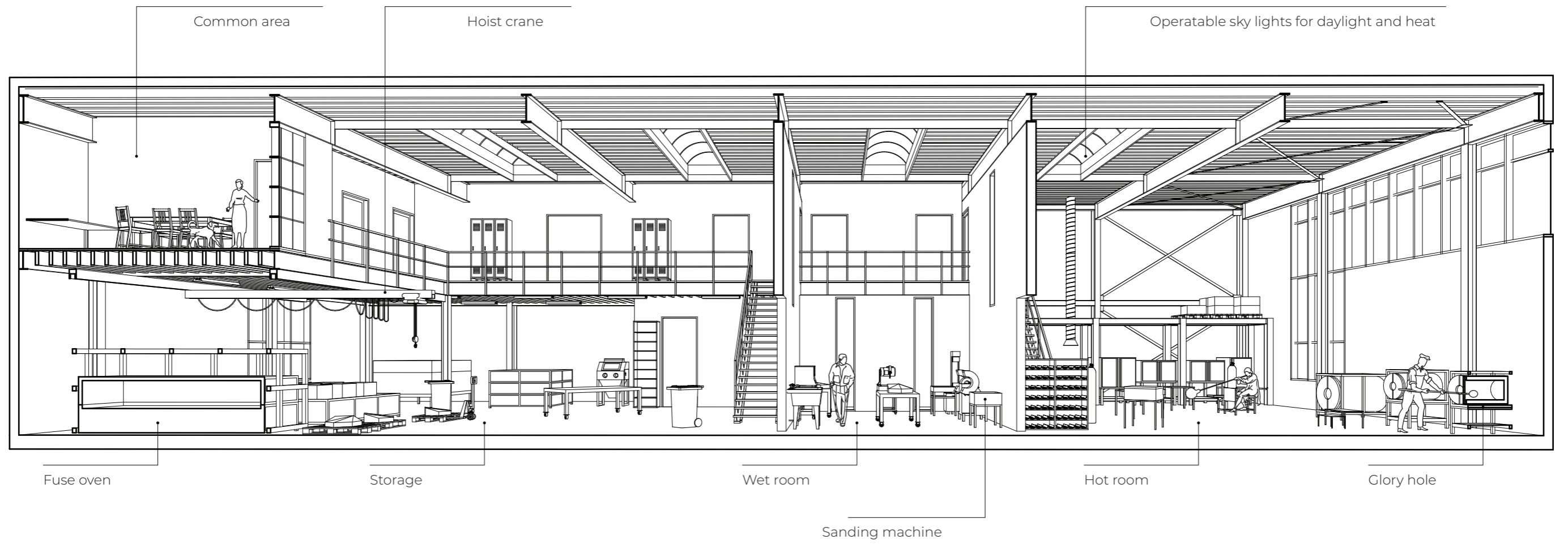
The tools, machines and the layout are generally the same inside a workshop. It is all different versions of one typology but the appearance can change a lot from one to the other. Every artist has their preferences and adjusts their workshop accordingly. Some are big, some small, some clean and some messy but every workshop is high. This is because the glass ovens are firing around 1100 °C day and night and the heat has to escape. A high ceiling and good ventilation are necessary because of this. The workshops of the glassblower or artist are often in remote buildings outside the city. This is different from the beginning artist, who likes to be more inside the city, and there are two reasons for this phenomenon. First, the buildings they use as workshops are often older buildings that housed a different function before it was a glass workshop. The older buildings have a high ceiling and no insulation and therefore are well suited to dispose of all the heat produced by the ovens. And secondly, they prefer to work in a quiet place where they can work on their own. Often, they are connected to a gallery and established a network throughout the years. Exposure is not a problem for them as it used to be. The workshop of the artist is smaller than the studio. One glassblower works most of the time with 1 or two assistants. The artist keeps their knowledge up to date through going to keep experimenting and to visit and collaborate with other artists. Many artists can not afford their own glass workshop and therefore turn to the glass studio to rent the space. Some have their own atelier in or around the city where they connect to other artists with different disciplines.



Caroline, The glass studio

The studio is similar to the workshop of the glassblower. The difference lays in the size, the age of the building and how clean and well maintained it is. The workshop inside has more and bigger machines than the workshop of the glass artist. Also, instead of only working with two to three people, the studio can house many people working at once. For these two reasons, the size is often bigger. The studio is housed in a modern warehouse. This is due to the size and the number of objects they have to store. The studio is located in an industrial area to be easily reached and allow for an easy in and outflow of products and raw materials. Also, a newer type of building is much easier to clean and maintain. The relationship with their client is different from the artist in the way that they receive commissions from artists and architects and the products they make have to be more precise to ensure the quality. A clean workshop reduces the number of influences on the end product.

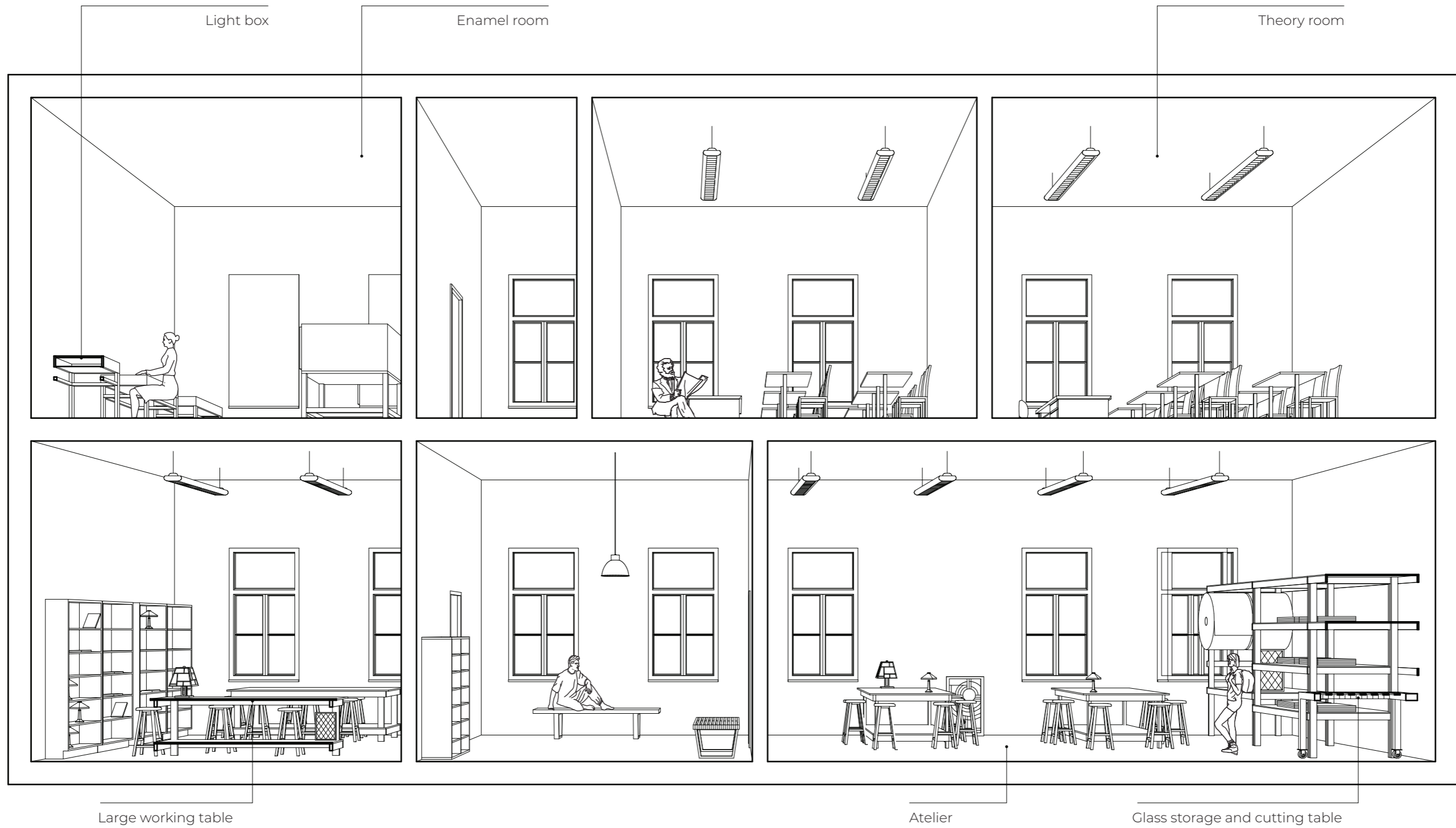
There are two types of studios; One has expert knowledge on the products they make and document their own knowledge. This gives them a unique position in the market. The studio educates its own people. First you can do an internship for six months and after these months there is a possibility of being hired. The second type is more open. Your studio is (partly) for hire and can be used by artists who do not own a glass workshop themselves. This studio can also be used as a centre for knowledge where beginning artists come to learn and talk to people with more experience.



Mieke, The teacher

"You hear a lot that craft and innovation do not go well together but innovation is an important part of a craft school". Experimenting is an important part of the learning process and to really master the craftsmanship of glass, according to Mieke. Mieke has been a teacher for over 30 years and teaches glass techniques relating to float glass. The school focuses on maintaining the knowledge of working with glass and especially on renovation work. "It really is a vocational education and has a strong connection to the practice". The school enjoys a good reputation and students come from all over the country. However, traditional companies working with stained glass prefer that the school has more focus on learning the craft. They want the students to spend 5 days a week in the studio and not spending time on other courses like learning languages and math. The students work in groups of a maximum of 14 students. Each student has his own storage space but they share the ateliers and workbenches with students from different educational years. The location of the school is an important factor for Mieke. The students come from all over the country so connection to the public transport is crucial. Also a close connection to a city is welcome since the students need an inspiring surrounding and tend to go into the city while having a break

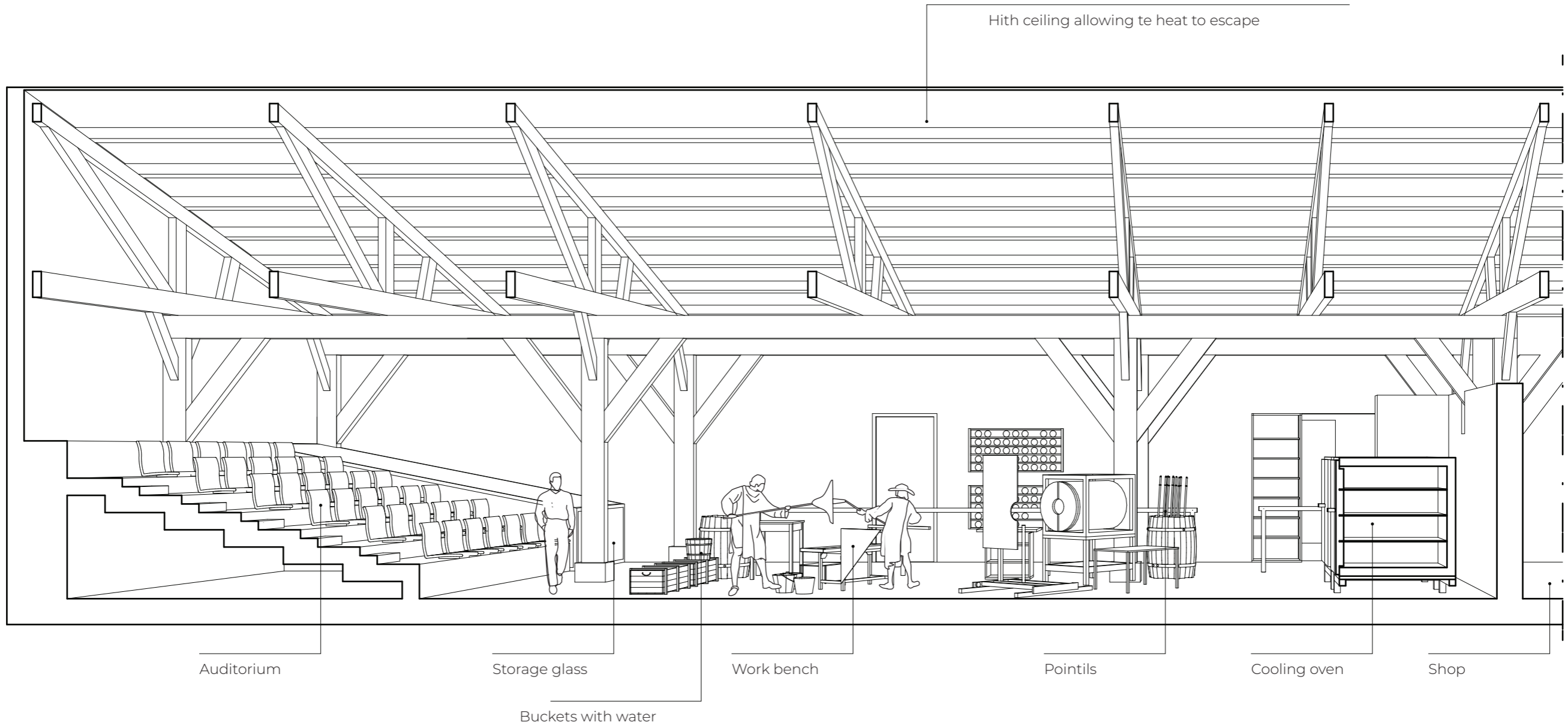
In the Netherlands there is no education that teaches you how to be a glassblower. There are workshops around the Netherlands and a three months period in Leerdam to get acquainted with the art of glassblowing but that does not teach you how to be a good glassblower. The process of becoming one will take you up to 5 to 6 years. A school that is the closest to teaching you how to become a glassblower is the 'Rietveld Academie' in Amsterdam. In the last decades there was an attempt on creating a new glass school/centre but this did not work out due to logistical problems of multiple locations and the actual time the students had to practice.



Gert, The museum

Gert started working with glass more than thirty years ago. He learned to work with glass in a studio in a way similar to the old guild system. He called it "Strict but fair". After working in another glass studio, he is now working as the head of the glassworks⁷ of 'Nationaal glasmuseum' (National Glass Museum). The museum has two locations, one is the museum with exhibition spaces and an archive, and the other is the glass workshop. At the workshop location there is a shop, a meeting room, catering and of course the glass workshop. The glassworks can work on his own but the museum and the workshop often collaborate to create exhibitions. The glass workshop mainly has three functions: working with artists and designers; 'the glaslab'; and public entertainment for the museum. 'The Glaslab' means that the Glassblowers can make whatever they want. The only requirement is that it is sellable. Public entertainment is the main function of the glassworks with the museum being open from Tuesday to Sunday with the Monday being used for workshops and to work with artists who do not want any public. In the glassworks there are three blowers and seven freelancers. Normally they also educate people but since they are now working on a new educational program (Leerdam Glass Academy) they have stopped education for a while.

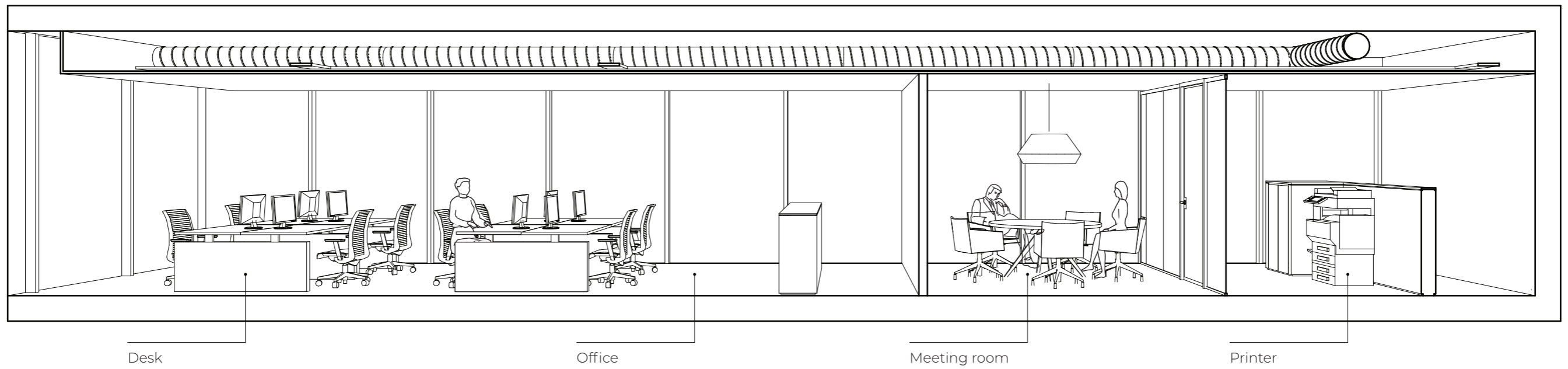
⁷Glassworks or hot shop (Dutch: glasblazerij) is workshop where you have all the tools and machines to blow and sculpt glass.



Pietro, The company

After working with glass for many years Pietro knows the basics of working with glass and knows how to educate people on how to produce the glass products of his company. He is the managing director and project director of a glass company that exists since 1998. The company focuses on a niche in the glass market. They do not focus on float glass but focus on other forms of glass. For a couple of years, they focus on one particular product. Their focus is on keeping the handmade feel but on a bigger scale. The company is reactive to clients coming to them but in the future they also want to exhibit their work. With more complicated projects they work together with researchers from universities but for a big part the company knows how to do everything themselves. The production, testing, research and installation on the construction site, is all a part of the company. However, they do not train people, only if they work with them on a basis. They do not want to train too many people because that will weaken their market position. In the workshop where the glass products are made, they can store between 5.000 and 6.000 objects. A workshop outside the city is therefore best suited. Pietro himself does not mainly work inside the glass workshop but he has an office there.

⁸The company and the studios have many similarities. They work in the private sector and have their own workplace. In this essay the difference is defined by that the company is not limited by the use of one workplace and have a product that can be produced in workplaces around the world. Also a big part of the company is focused on sales. This can be a specific product or multiple products.



Desk

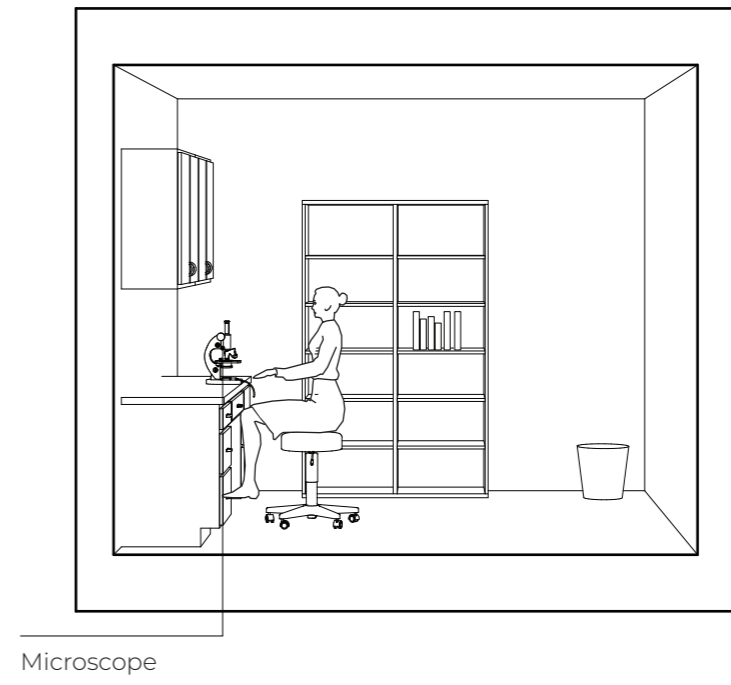
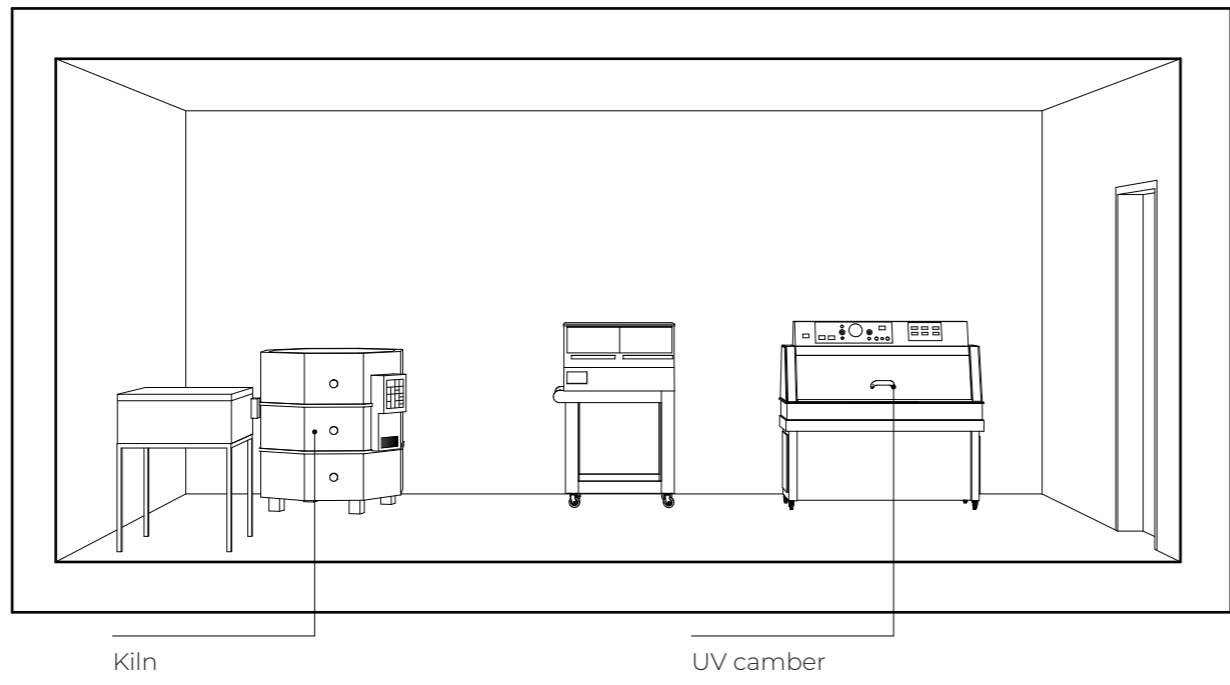
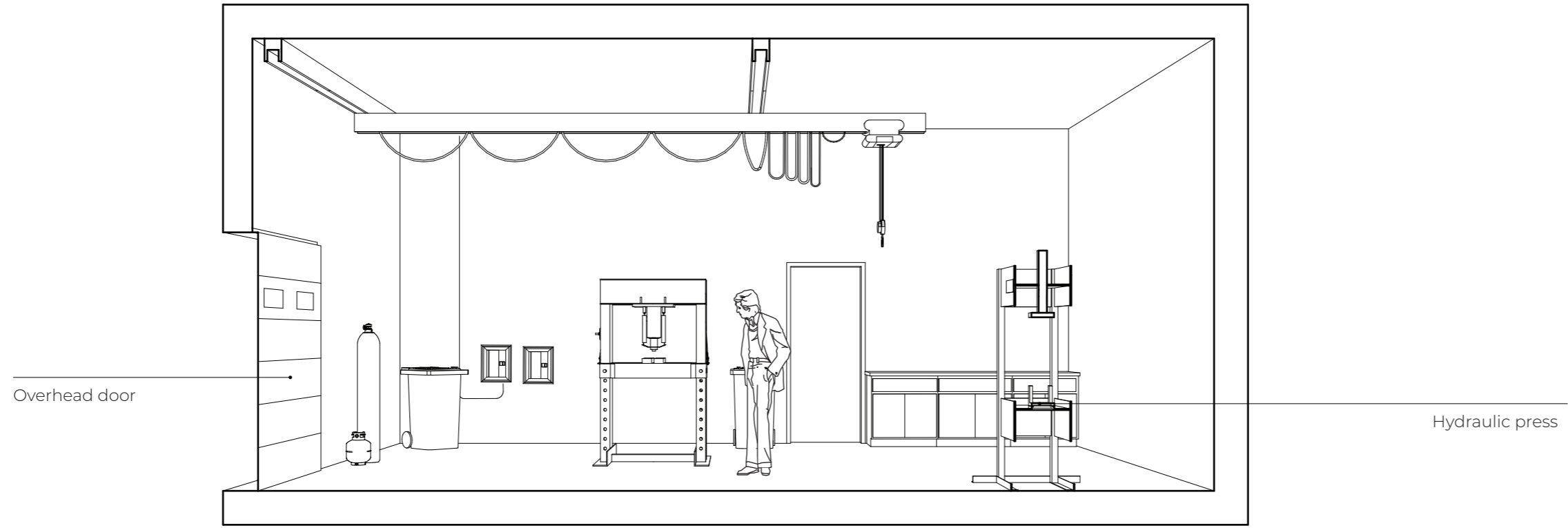
Office

Meeting room

Printer

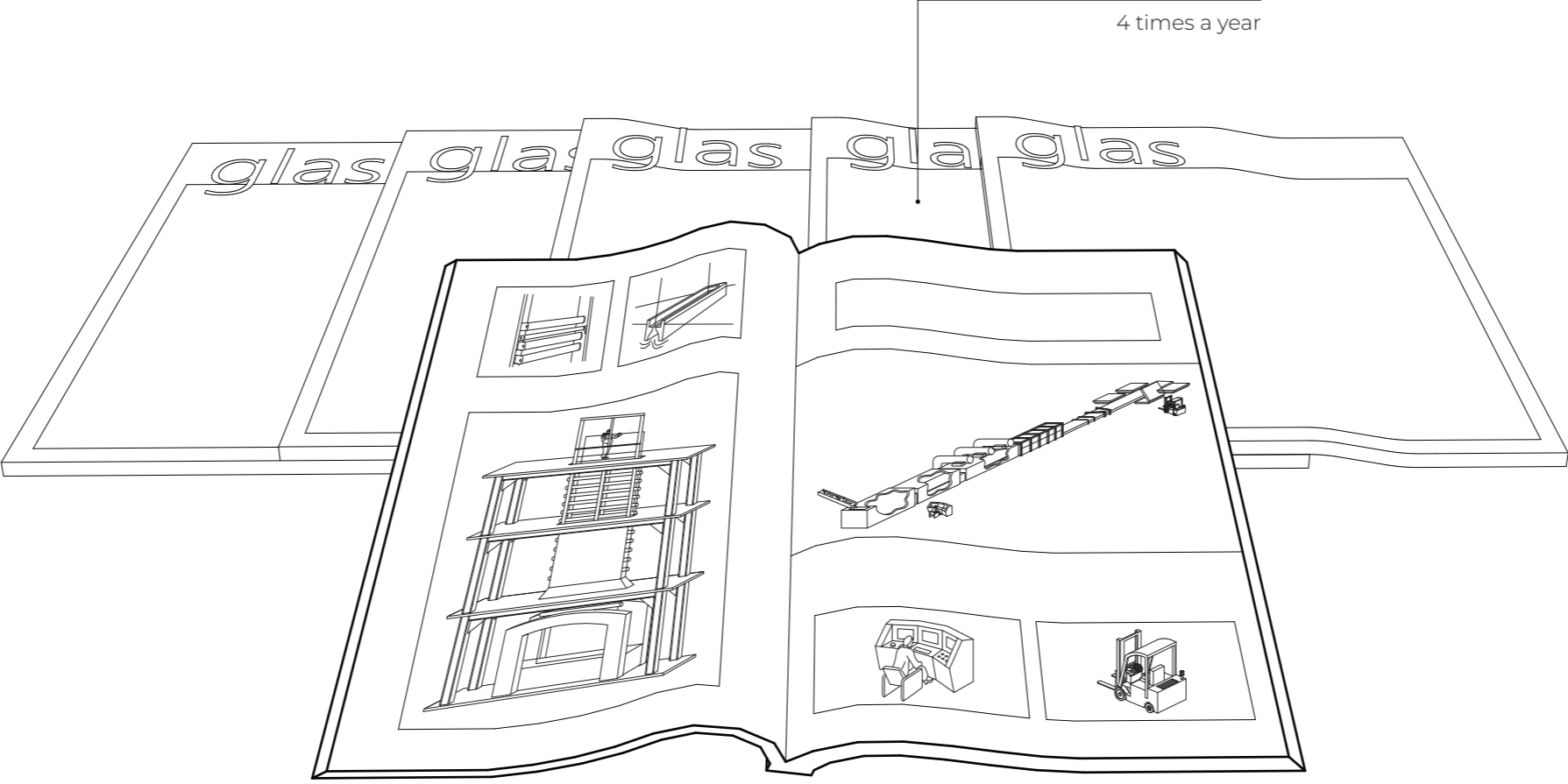
Faidra, The researcher

The craftsmanship and the research of glass are so seen as two different things that are far away from each other on the spectrum of glass. But according to Faidra, the two need to be more connected and can really benefit from each other. Casted glass is not something that can only be used for artistic purposes but also for constructional purposes and the research of the structural properties have taken a flight in the last decades. A problem for researchers is that they cannot work with glass themselves. Faidra knows the basics of working with glass but does not master the skills. The researcher therefore cannot make prototypes themselves and have to rely on other glass studios. This restricts the freedom to play with prototypes if you have to rely on someone else. Also, in the production of architectural glass components you have to rely on tiny studios or a complete factory, there is nothing in-between. The relation to a university is of much bigger importance than the connection to the city. The researchers need specific equipment and that is often dispersed around different faculties. To research glass you need one big room with two machines, one for compression and one for bending plus a large crane to transfer heavy objects. One room for aging test and small ovens for heat-shock testing and a dark room with a microscope to investigate the fractured glass.



Maria, the association

Maria is since a few years member of the board of a glass association. The association was founded in 1986 and focuses on 'studio glass'. 'Studio glass' is a definition that is used for glass objects produced by artists. Artists began working with glass since the 1950's in America and from there moved to Europe. The goal of the associations is to increase the interest of contemporary glass and to stimulate the development of glass as an art form. The association has 900 members and at the moment and 140 of these members are signed in as artists. The other members are collectors, gallery holders, museums and just people interested in glass. Studio visits are organized and there is a magazine that is published 4 times a year. In the magazine, there is information about exhibitions, the studios they visit, art and architecture. The association does not have a location but through the magazine and studio visits, it is constantly sharing knowledge between people who are in some way connected through glass. It is strongly connected to the practice, schools and has strong ties to multiple museums. The association is part of the lifelong learning process of the craftsman and people interested in the material.

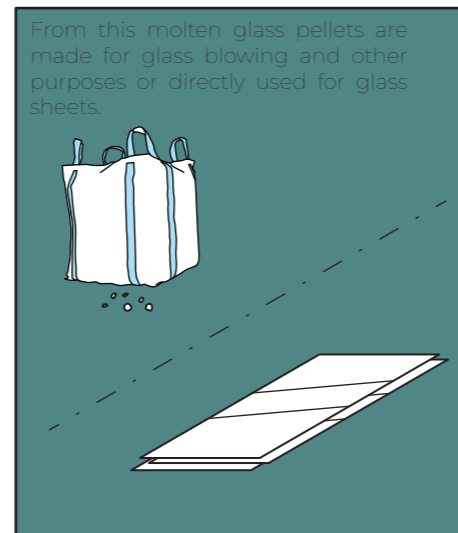
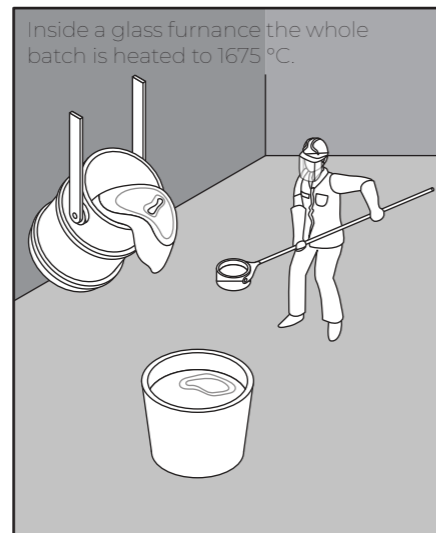
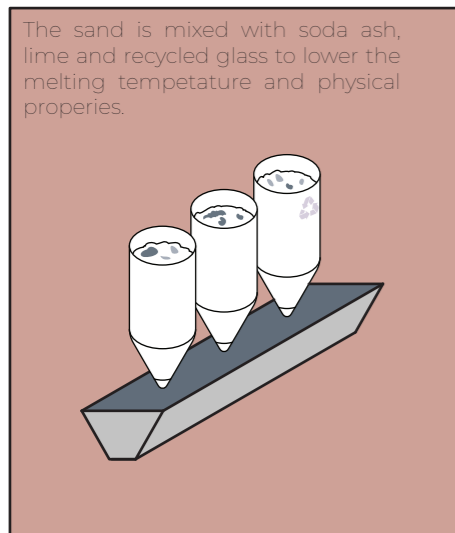
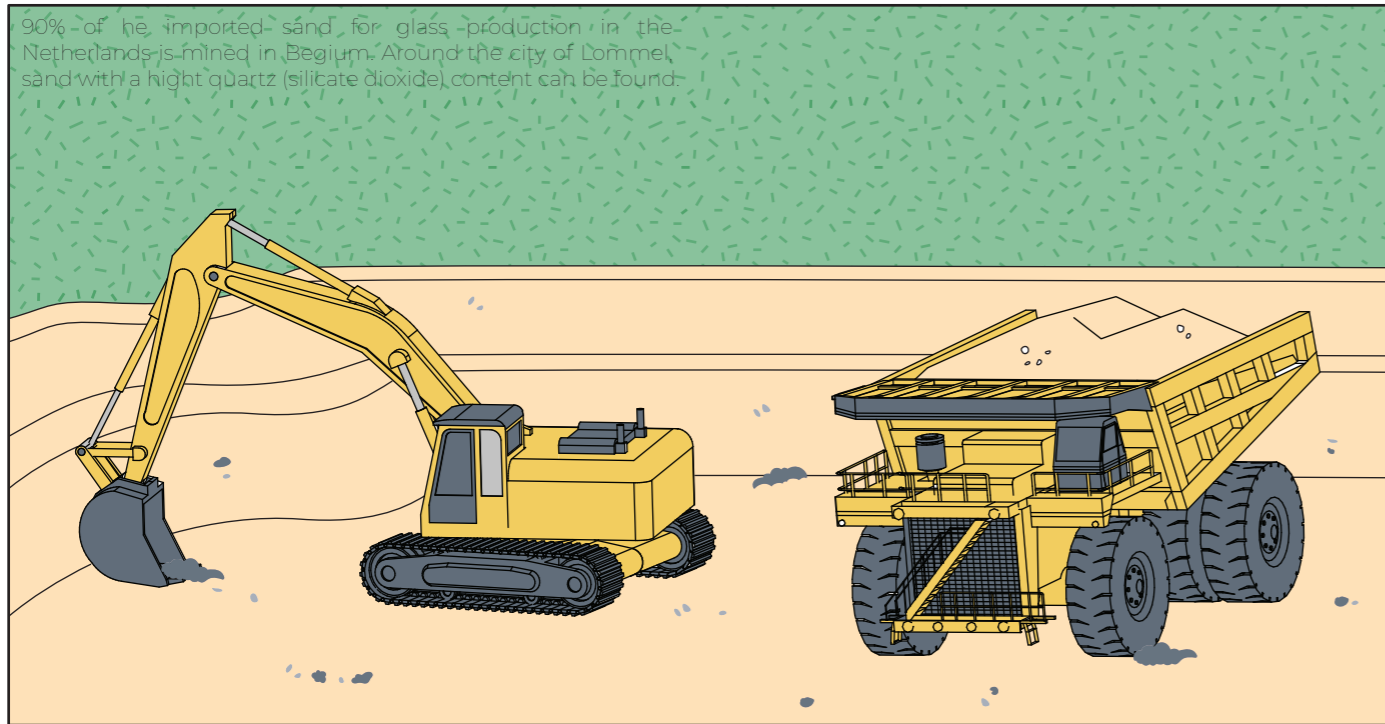




CRAFTING

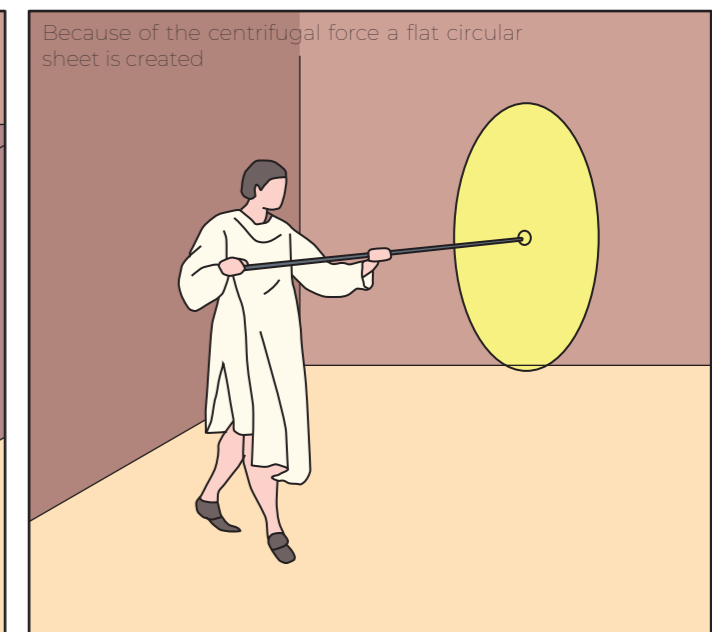
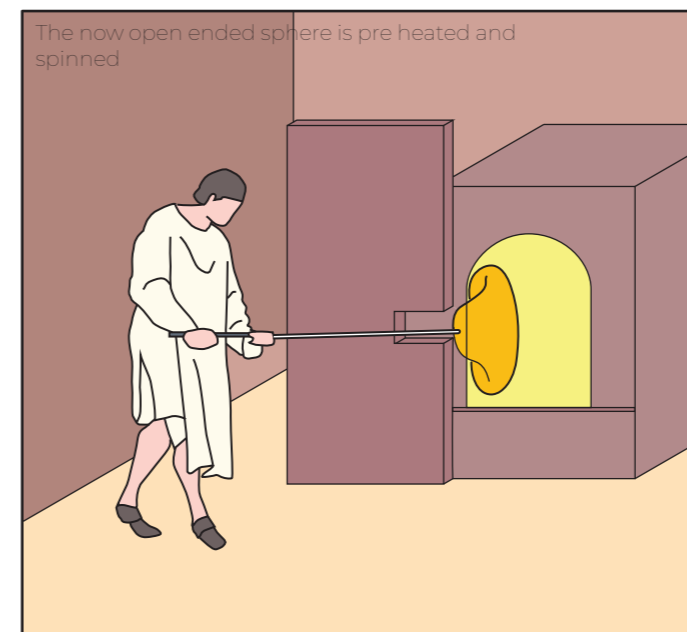
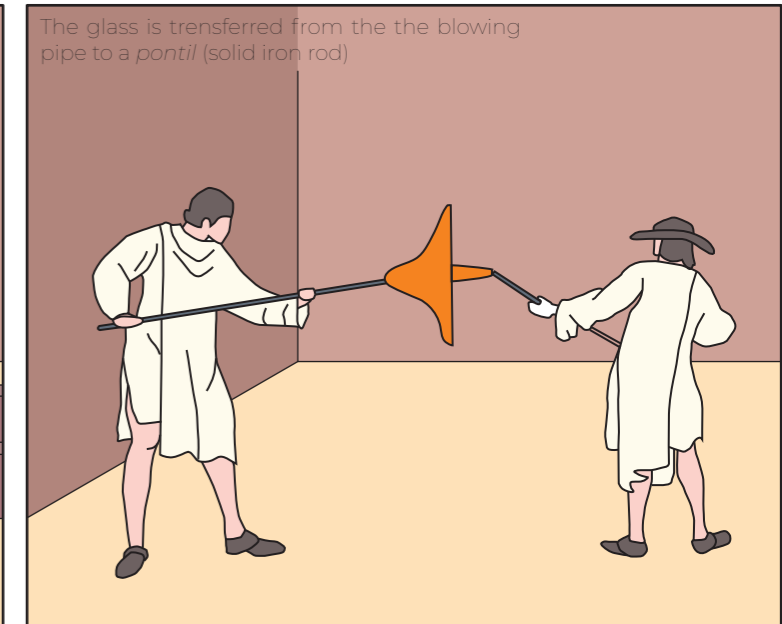
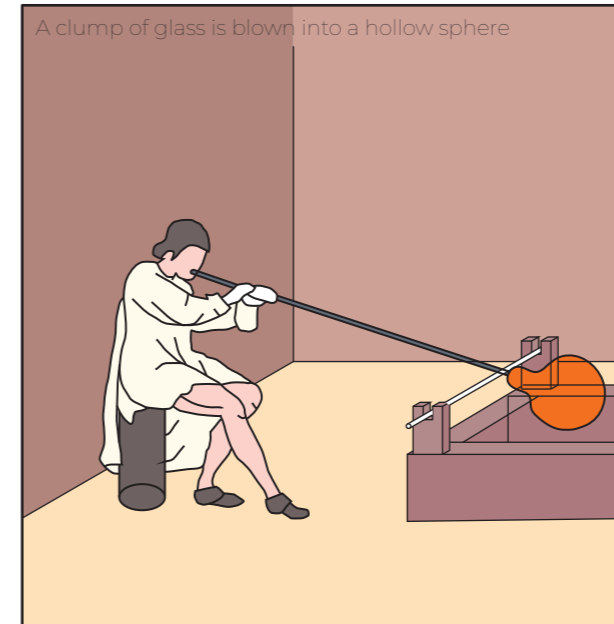
Delving

The raw material for the production of glass barely changed over the centuries. The main component is sand (silicate) together with some additives to lower the melting temperature and change the physical properties. The melting of materials and the creation of glass is an energy intensive process that changed in time.



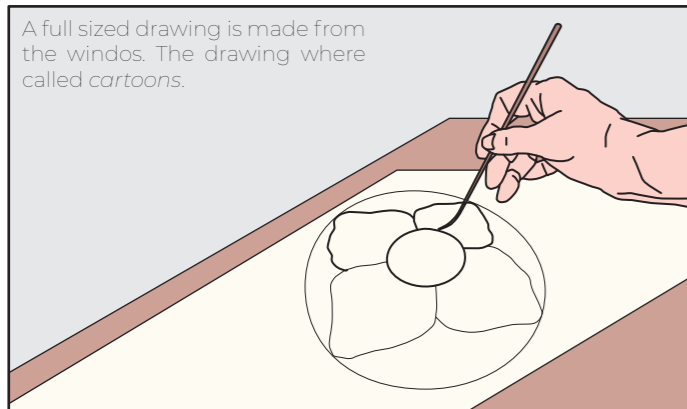
1000 BC.

The blowing pipe was discovered 1000 BC in what we know as Lebanon. With this discovery the creation of transparent glass was feasible. The Romans began to use glass for windows in the beginning of the era. The crown glass method is one way of producing sheets of glass. This method was mainly used until the 19th century.

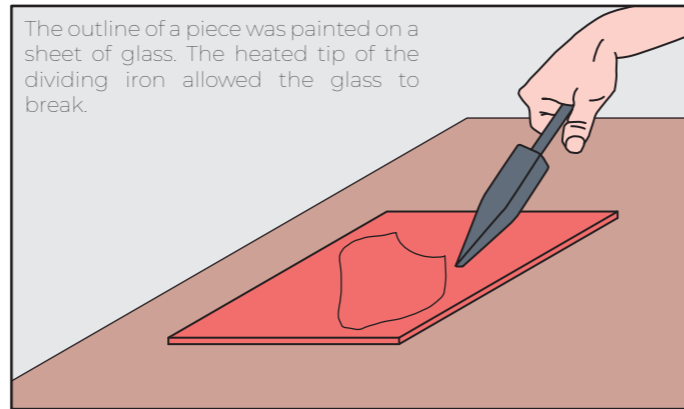


950

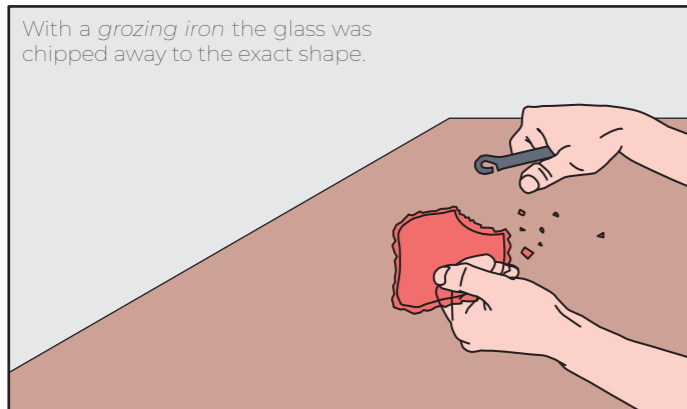
First the sheet of glass was cut in smaller pieces and placed in a wooden frame but when people learned how to use lead larger window frames that also protects for weather was possible. In the early gothic period this type of windows took flight.



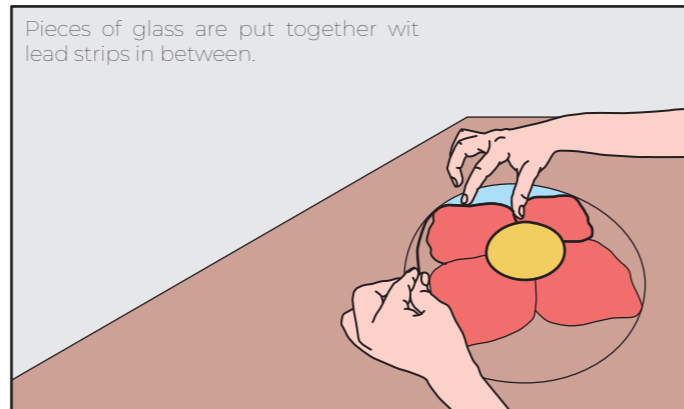
A full sized drawing is made from the window. The drawing where called *cartoons*.



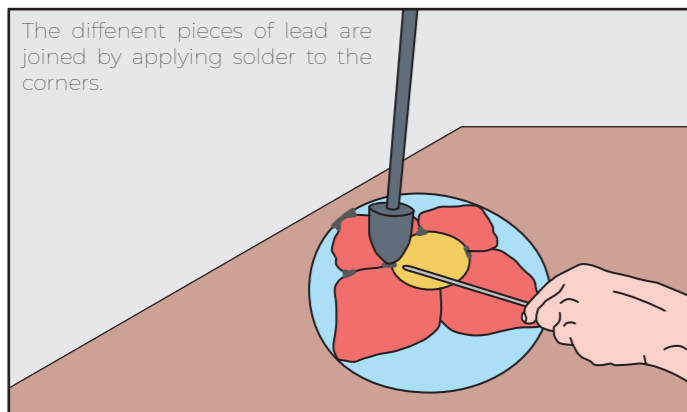
The outline of a piece was painted on a sheet of glass. The heated tip of the dividing iron allowed the glass to break.



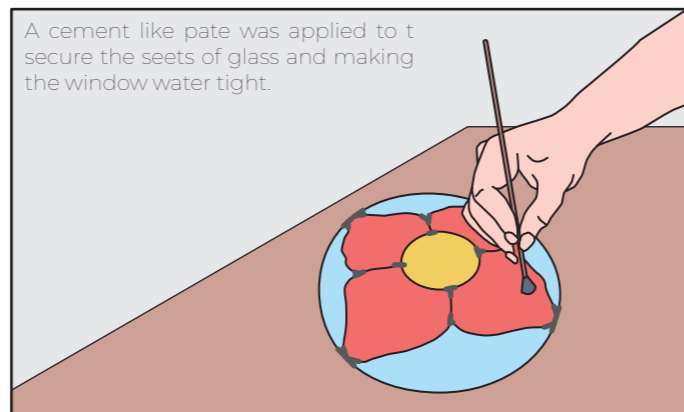
With a *grozing iron* the glass was chipped away to the exact shape.



Pieces of glass are put together with lead strips in between.



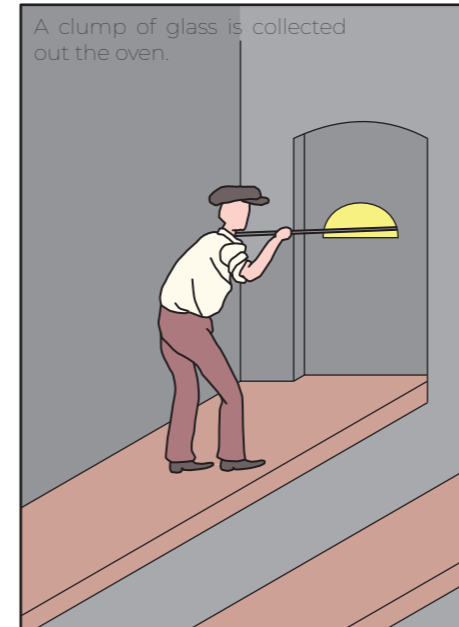
The different pieces of lead are joined by applying solder to the corners.



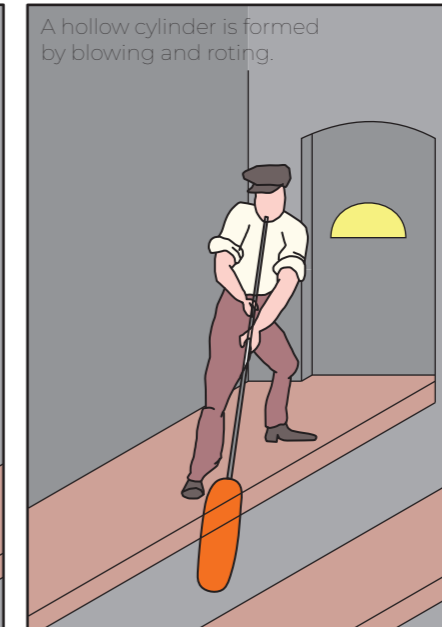
A cement like paste was applied to secure the sheets of glass and making the window water tight.

1850

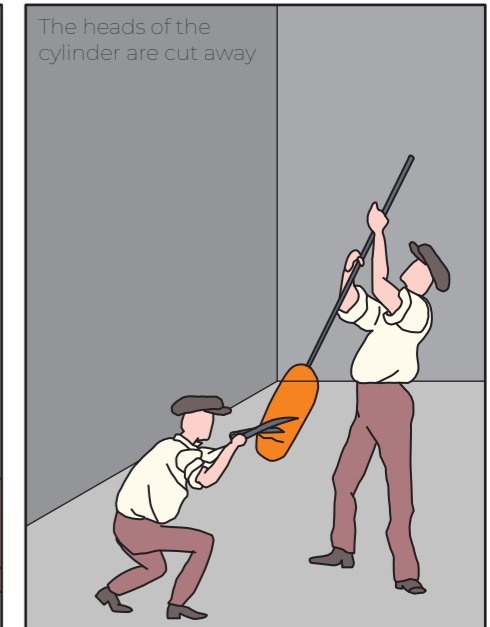
The second method of producing sheet glass was the cylinder method. This method already existed since the invention of the blowing pipe. This method allows for bigger sheets of glass but the production is difficult. The Chance Brothers improved the process which allowed to produce 270,000 glass sheets for the Crystal Palace.



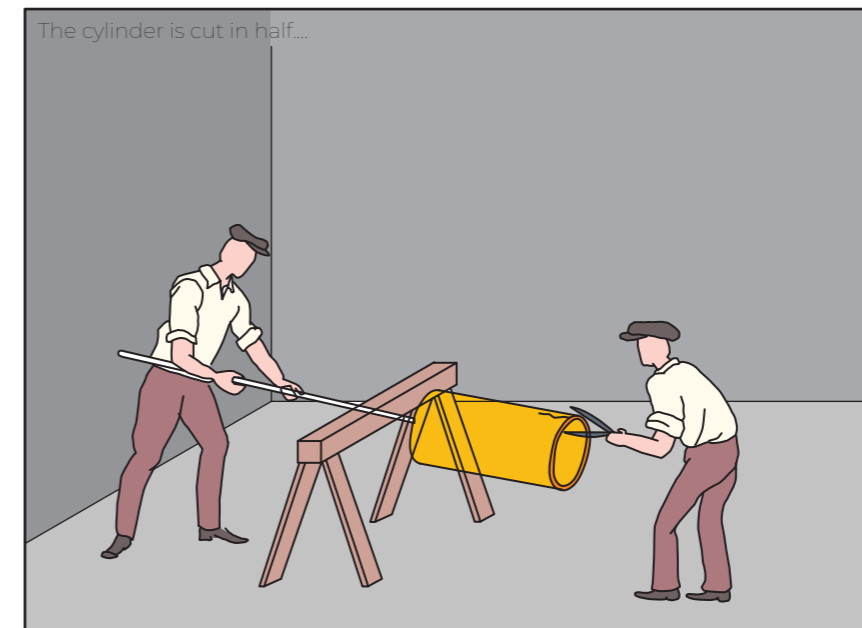
A clump of glass is collected out the oven.



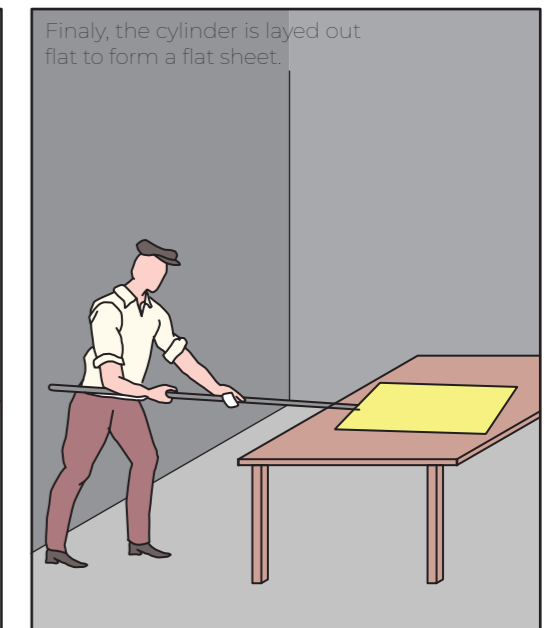
A hollow cylinder is formed by blowing and rotating.



The heads of the cylinder are cut away



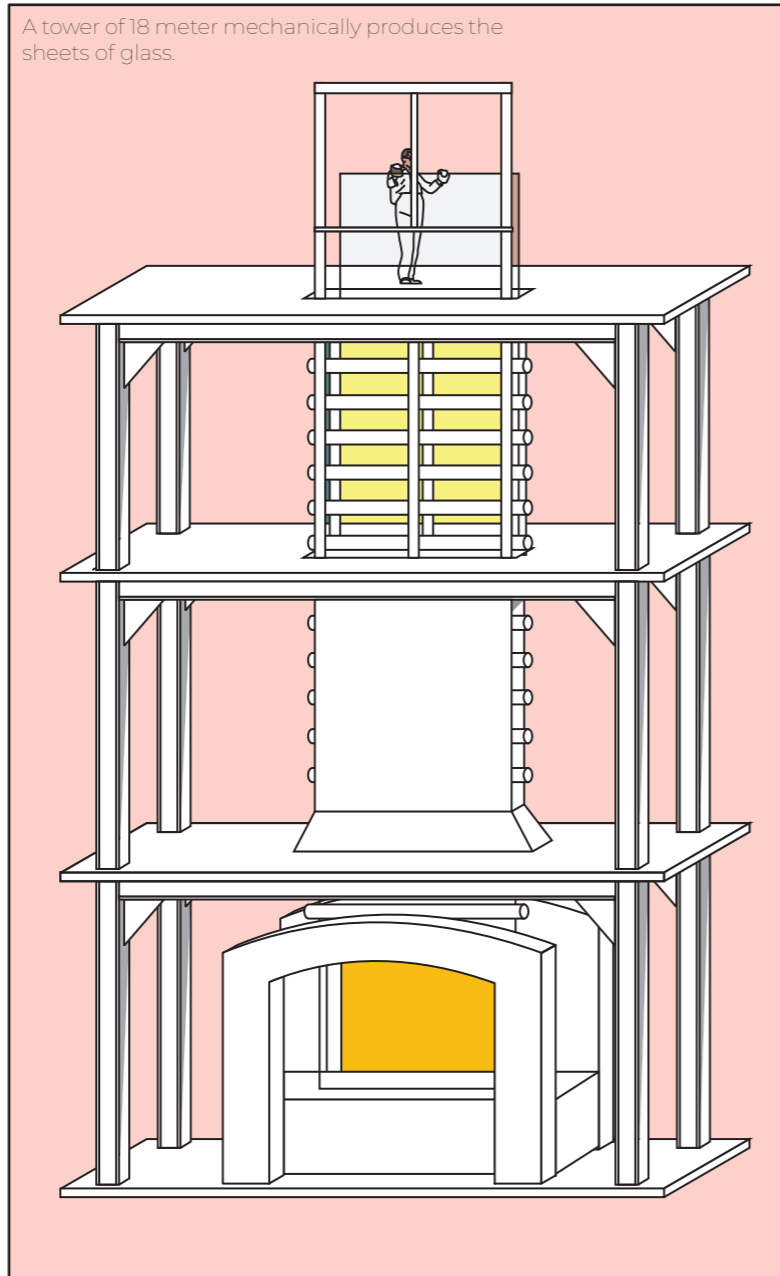
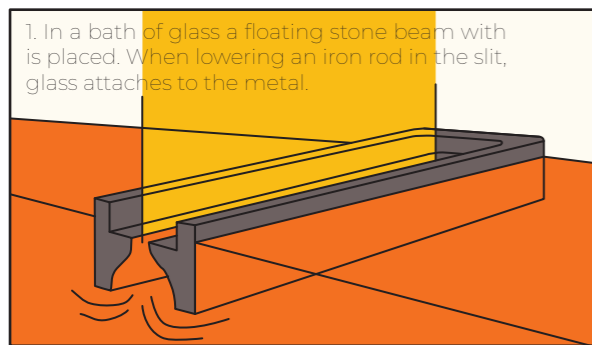
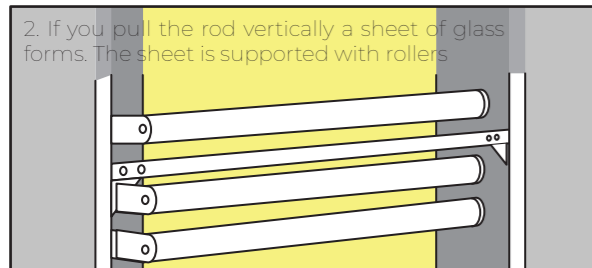
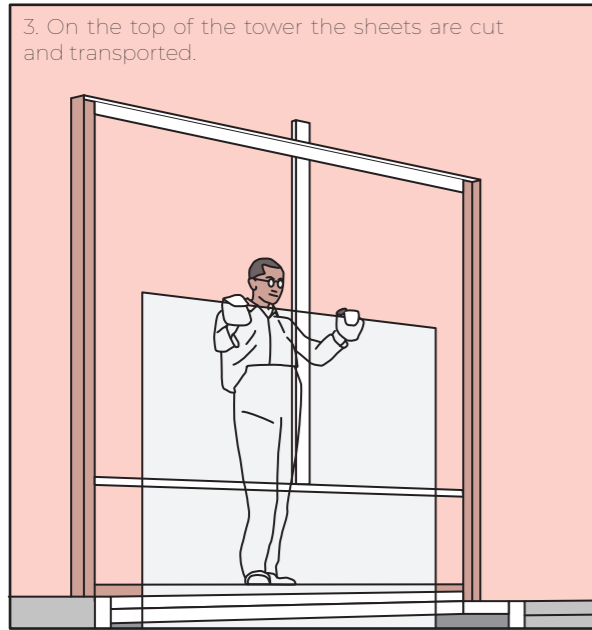
The cylinder is cut in half...



Finally, the cylinder is layed out flat to form a flat sheet.

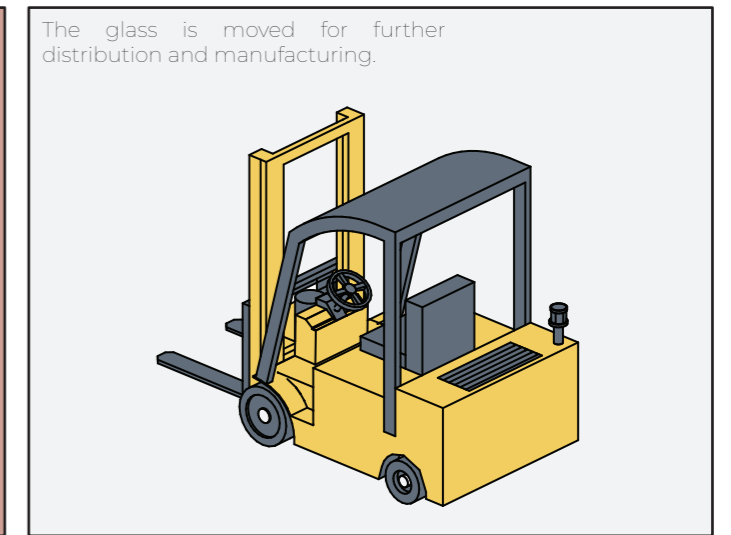
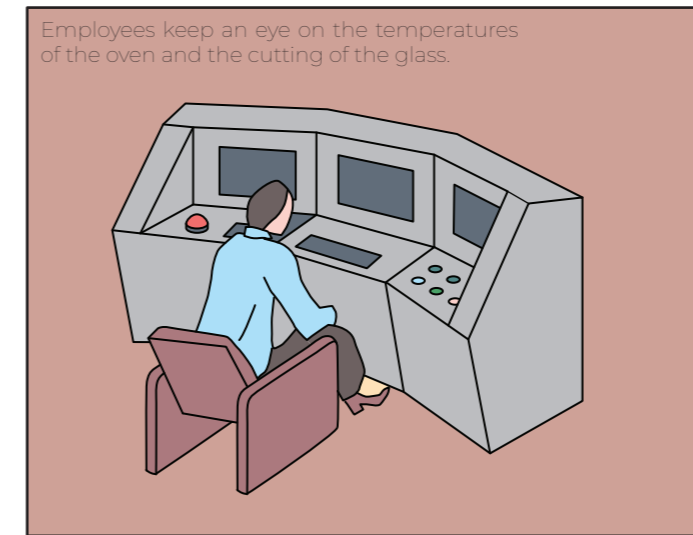
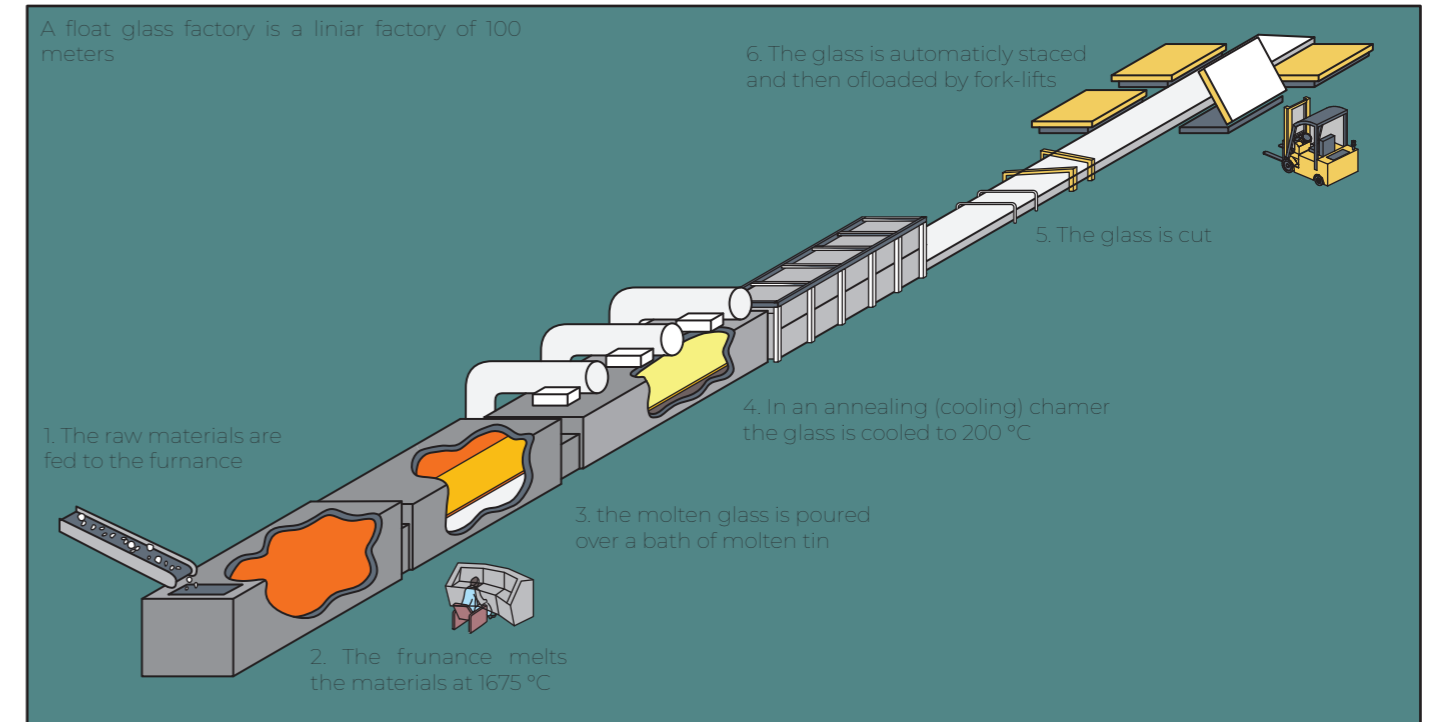
1925

in the world Through the glass drawing or Fourcault method It was possible to create flat sheets of glass in a mechanical process. Emile Fourcault build the first glass factory in Belgium that only fabricated mechanical produced glass. Because the rolling of the glass the sheets fluctuated in thickness. You can reconize this in olde buildings.



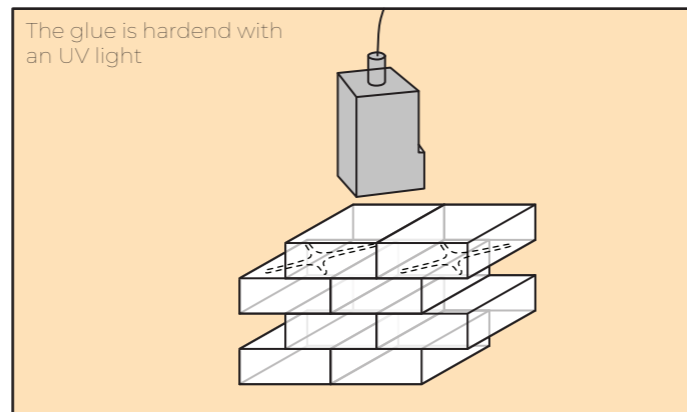
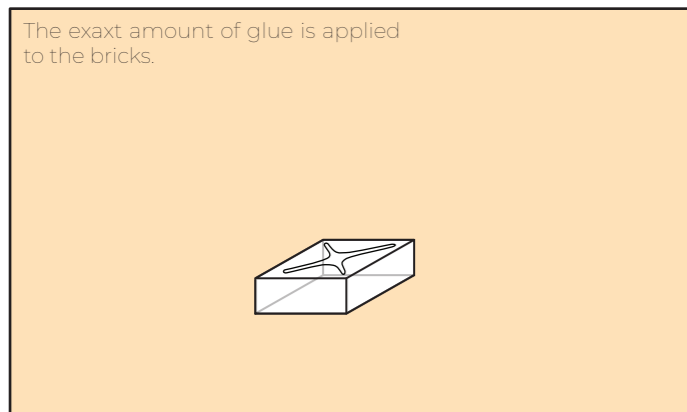
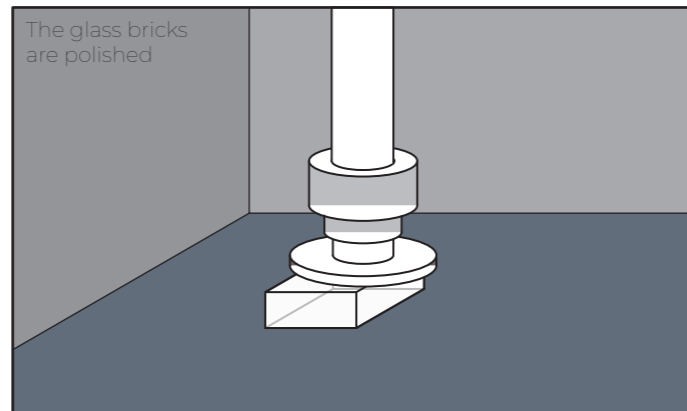
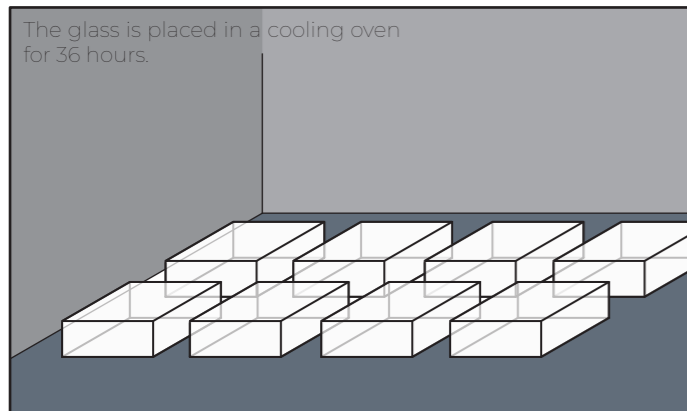
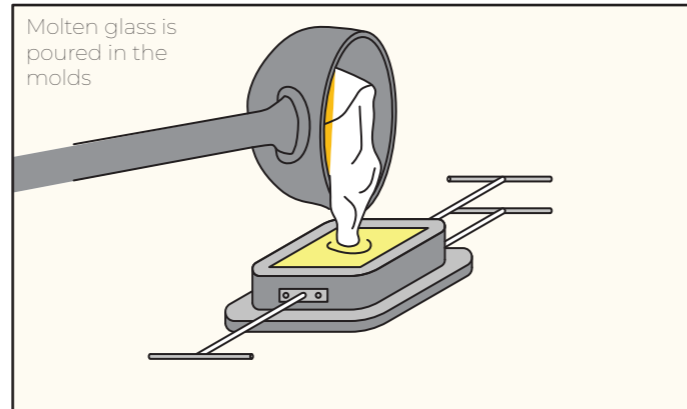
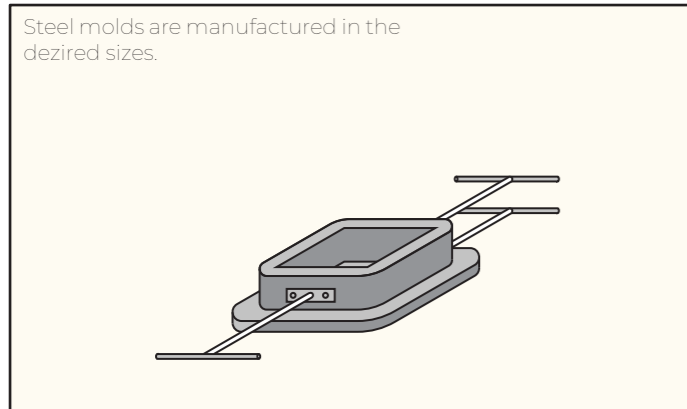
1955

The Float glass proced is the most common way of producing glass and 90% of the glass today is made via this method. Because of bath of molten metal it was possible to create perfectly flas surfaces in an ongoing process.



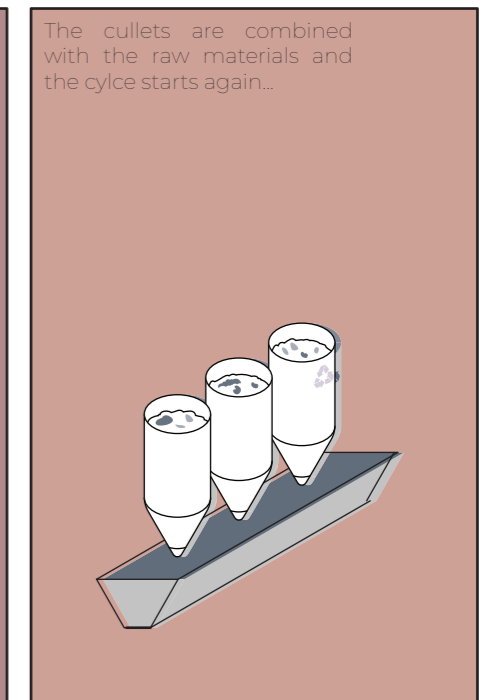
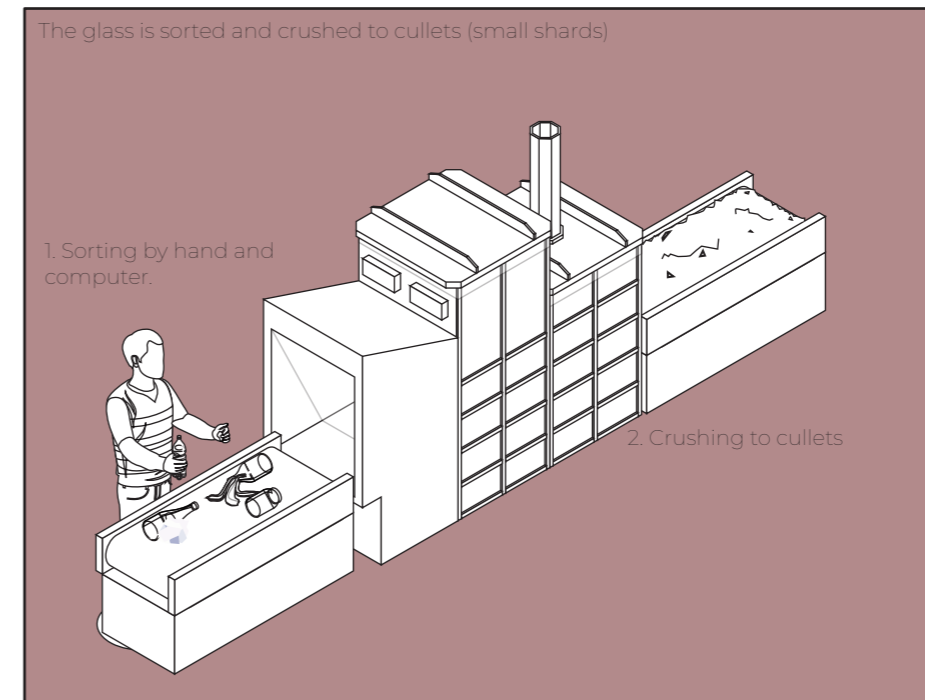
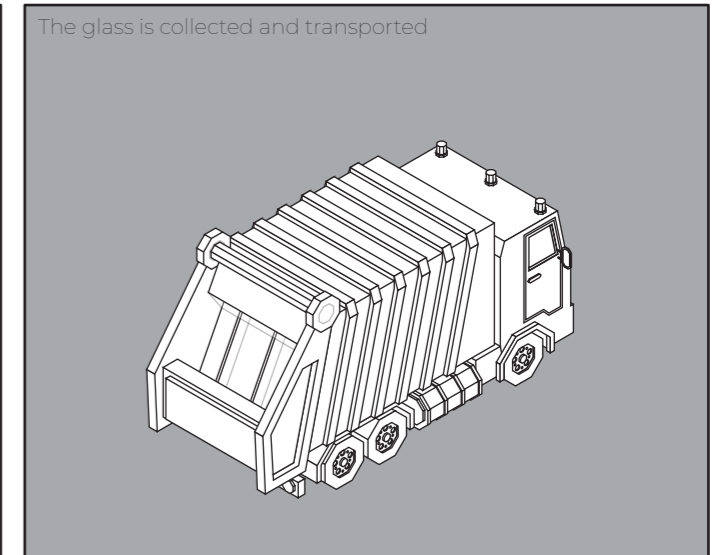
2016

The crystal houses in Amsterdam was the first project where glass blocks are used with no additional structure to support the facade. The glass blocks are created with a size deviation less than 0.25 mm to allow for an even spread of the adhesive.



Recycling

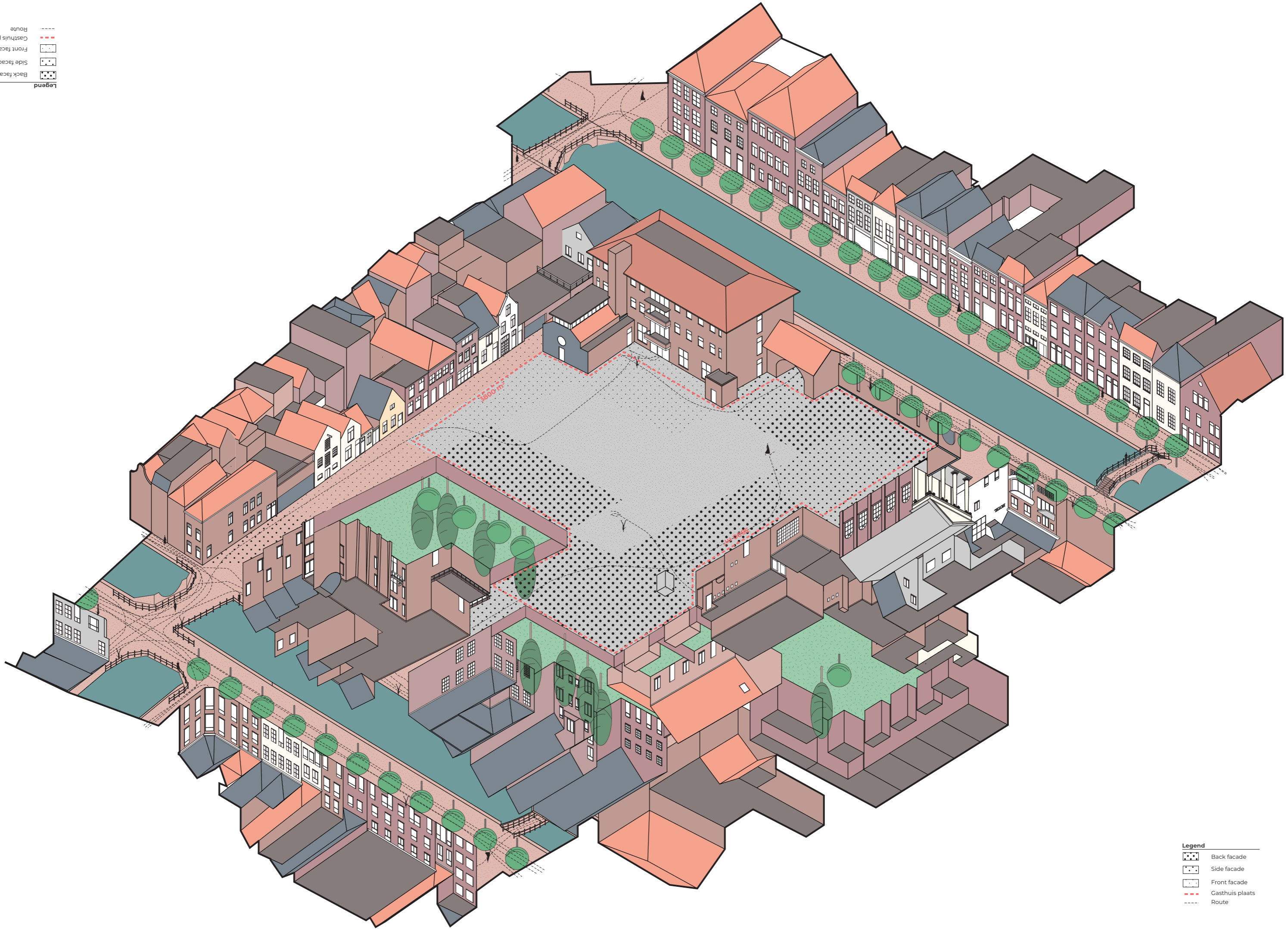
The recycling of glass is not something new. The re-use of broken or spare glass is used since the beginning men started working with the material. It is cost efficient and it enhances the melting process and therefore also energy efficient. Glass is 100% recyclable and can be used endlessly.










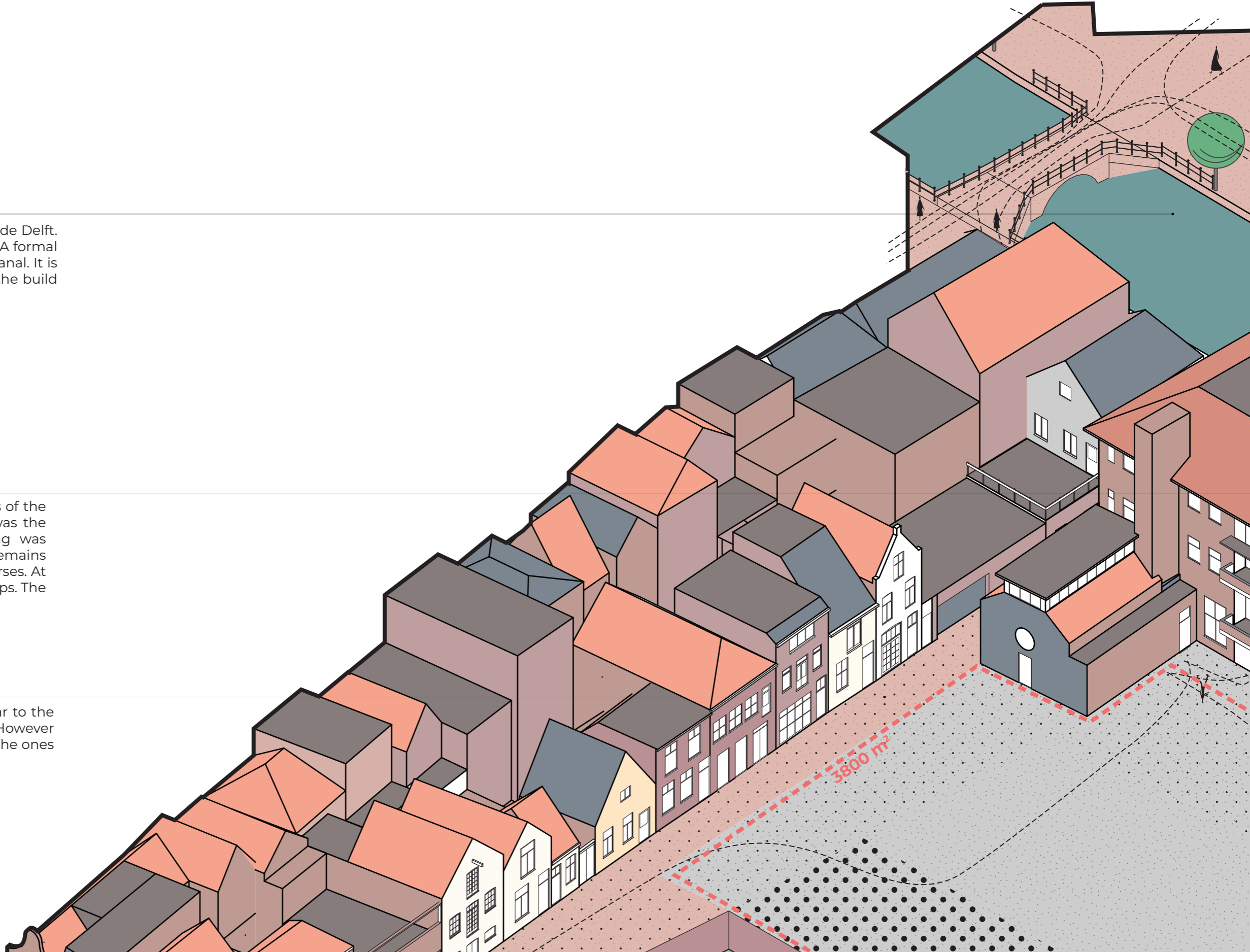
DELFT

- Route
- - - Gasthuis plaats
- Front facade
- Side facade
- Back facade



- Legend**
- Back facade
 - Side facade
 - Front facade
 - - - Gasthuis plaats
 - Route

- Legend**
- Back facade 
 - Side facade 
 - Front facade 
 - Gasthuis plaats 
 - Route 



Koornmarkt

The second best known canal in Delft, after the Oude Delft. All the facades are built in dutch neo-classical way. A formal street with its façade and the trees along side the canal. It is mostly residential but some offices are housed in the buildings as well.

De zuster

This building is one of the last remaining buildings of the old hospital. The hospital on the Gasthuisplaats was the oldest in the Netherlands, however, the building was demolished in the last century. The building that remains was built in 1930 and its function was to educate nurses. At the moment it houses small companies and start-ups. The wall is also part of the extension.

Gasthuissteeg

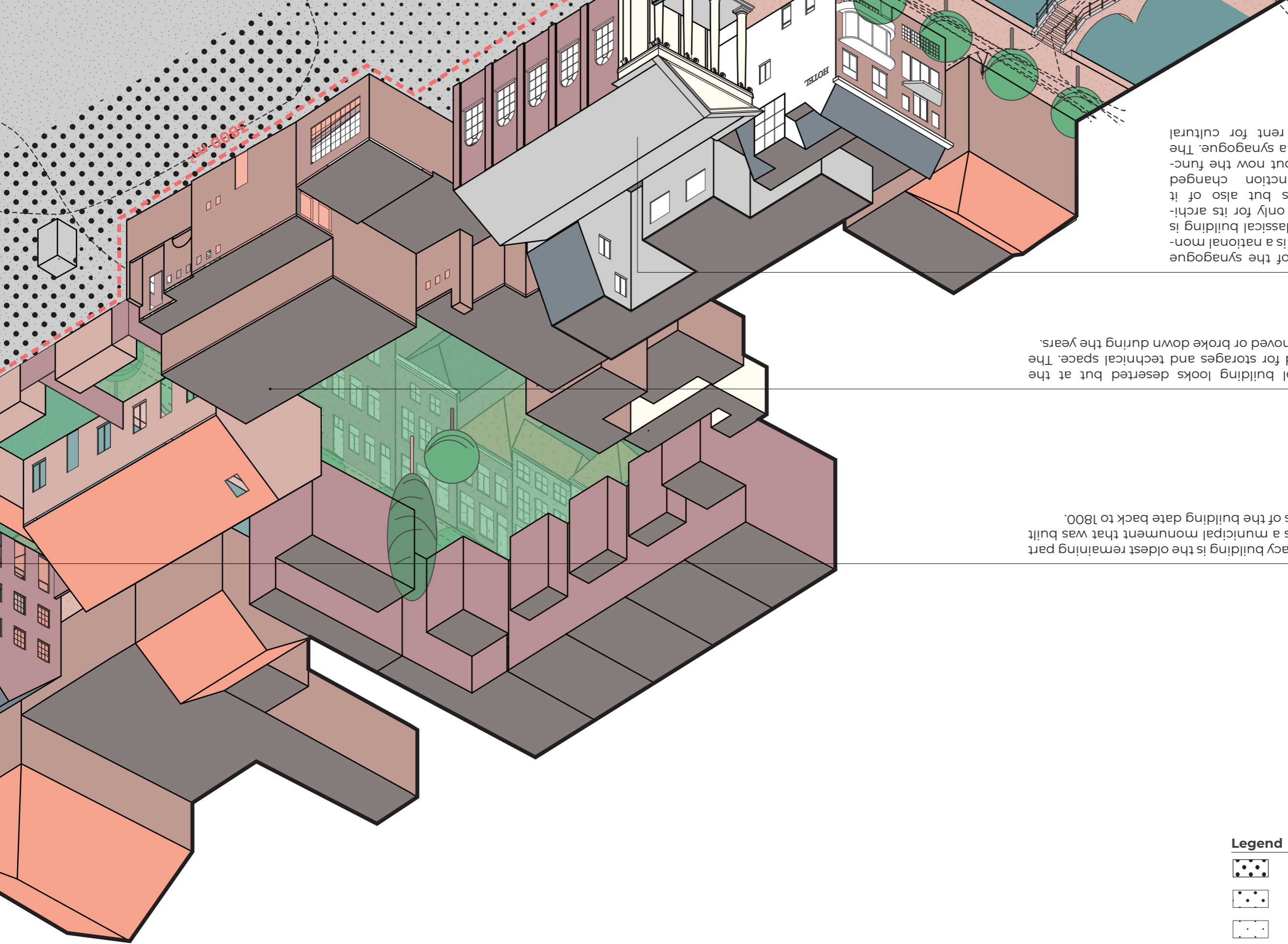
The buildings alongside this small street look similar to the ones along the Koornmarkt or the B. Turfmarkt. However the buildings are a sober detailed lot smaller than the ones around the corner, this can be 2 to 3 stories.










Brabantse Turfmarkt
Smaller than the Koornmarkt. The buildings are smaller and the canal is narrower. A street that connects the old city to the new shopping area. Different functions like, retail and hospitality in the plinth. Once a week on Thursday it has a market.

Cultuur lab
Culture lab has multiple rooms and stages for social, musical, cultural or sports. Multiple associations are connected to this building and use it for practice. The building was built in 1958.



- Legend**
-  Back facade
 -  Side facade
 -  Front facade
 -  Gasthuis plaats
 -  Route

Old pharmacy
 This former pharmacy building is the oldest remaining part of the hospital. It is a municipal monument that was built in 1895. Some parts of the building date back to 1800.

Old school
 The former school building looks deserted but at the moment it is used for storages and technical space. The first floor is not removed or broke down during the years.

Synagogue
 The construction of the synagogue started in 1861 and is a national monument. This neo-classical building is an exception. Not only for its architectural aesthetics but also of its set-back. Its function changed during the years but now the function is restored to a synagogue. The building can be rent for cultural purposes.

