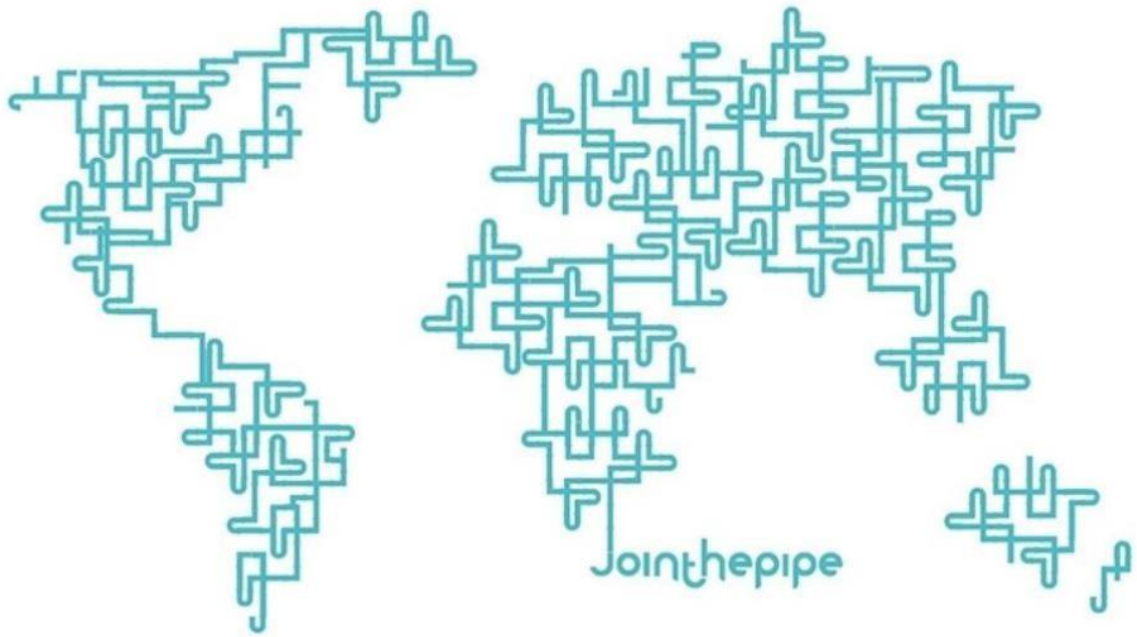
Escuela Técnica Superior de Ingeniería del Diseño

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

Technological improvement of a bidon dispenser.



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Summary

In collaboration with Join the pipe, the project group carried out a project for the lectorate International Water Technology. The project Intelligent drinking water dispenser with tapping system involves creating awareness of reducing plastic waste around the world, this is done in collaboration with Join the pipe. Join the pipe sells reusable bottles of water to create awareness. With part of the revenue from the sale of bottles, city clean-ups are organized in developing countries.

Initially, the project group started with two mechanical engineering students and an IT student. The first goal of the project group was to design and build a new bottle dispenser on the basis of a visual design, which is controlled by a touch screen and in which data is collected. Subsequently, the project group was expanded with two mechanical engineering student and an electrical student because their projects were cancelled due to circumstances. The project group was supported during the project by two part-time electrical students.

Before the design of the new bottle dispenser was started, the old bottle dispenser was examined. The project group found that the machine was not functional because the wiring had been removed. The project group was able to test the stock system of the old bottle dispenser. This showed that it was very difficult to fill and that a solution had to be found for this. The project group invented a system through which the stock system could be pulled out, making it possible to fill the bottles from the side.

Due to the complexity of the new bottle dispenser and the amount of work, the project group was unable to manage the planning. The purpose of the project has been adjusted for this reason. The project group was given the task of making the old bottle dispenser work and delivering a drawing package for the new bottle dispenser. To test the new systems, it was decided to make a test setup, in which the new stock system with drawer system, touchscreen and IOT part will be tested.

The project group delivered a working version of the old bottle dispenser, the old bottle dispenser was rewired and all electrical components were placed in a control cabinet. Through a water cooler, cooled water is supplied to the new water tap from Join the pipe. Also, a test setup with the new stock system which is controlled with a touchscreen was made. Through software, data is also collected and displayed on a dashboard. The project group has built up a 3D model of the new bottle dispenser, in which all improvements of the old bottle dispenser have been implemented. Finally, there are production drawings made, based on applicable drawing standards. A report has been made to justify all design choices, all the recommendations can also be read here.

Preface

This report is written for the course ‘Smart Solution Semester’, offered at the Saxion University of Applied Sciences, with ‘International Water Technology’ as a client. We are Stefan Braakman, Sander Brand, Marijn ten Cate, Gemma Dasi Ruiz, Jim Lamers and Sander Wiggers. This report relates to the design phase of making the water bottle dispenser ready for production. During this project we are going to take a look at a lot of different parts of the machine like the mechanical, electrical, software and internet of things solutions.

We want to thank our client Harry Futselaar of the research group ‘International Water Technology’ for the amazing assignment and the good support during the project. Our thanks also go to our tutors Christiaen Slot and Ruben Timmers for the great guidance and support during the project.

Enschede, Thursday, 27 June 2019

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1 Introduction

1.1 Organization

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Table 1 Organization

1.2 Planning

The project planning is used to obtain a global overview in activities for upcoming semester. These are subdivided into: the preparation of the project plan, engineering, build and deliver business case, portfolio and group report. Subsequently all delivery points were processed in the project planning, so the project group knows when documents have to be delivered. The project plan can be seen in '*Appendix A: Planning*'.

The group is located in room W2.06 at Saxion Enschede. This room will be used as working place during the Smart Solutions Semester. Every Monday morning there will be a general meeting about what has been done the week before and what needs to be done during that week.

Day	Working time
Monday until Thursday	08:30-16:30
General meeting (Monday)	11:00-12:00

Table 2 Week planning

1.3 Working methodology

In this project we are going to use the VDI-model to engineer a whole new design of the Bottle Dispenser from Join the Pipe. The VDI-model will be used for the mechanical engineering and for the IT-engineering.

VDI model

The development and engineering process will be defined in seven steps:

Step 1: Clarify and specify the tasks.

Step 2: Determine the functions and their structures.

Step 3: Search for basic solutions and their structures.

Step 4: Separate in to feasible modules.

Step 5: Design of the different modules.

Step 6: Design of the whole product.

Step 7: Work out the product- and usage data.

When you are building machines the production process is separated in four headcases:

Planning > Draft > Design > Work out in detail (total design).

In '*Figure 1 VDI-Model*' you will find those headcases and their activities that you need to do in that phase and the decision moments to bring the project to a higher level.

After clarifying the development process, the program of requirements follows. In the program of requirements, the project team needs to write down all the information they get from the customer. This concern, among other things, all requirements and wishes that are set by the customer for the design. For example; the dimensions, performance, operation, maintenance and costs. These requirements are for a later assessment of the solutions and for easy decision-making between fixed and minimum requirements in the project.

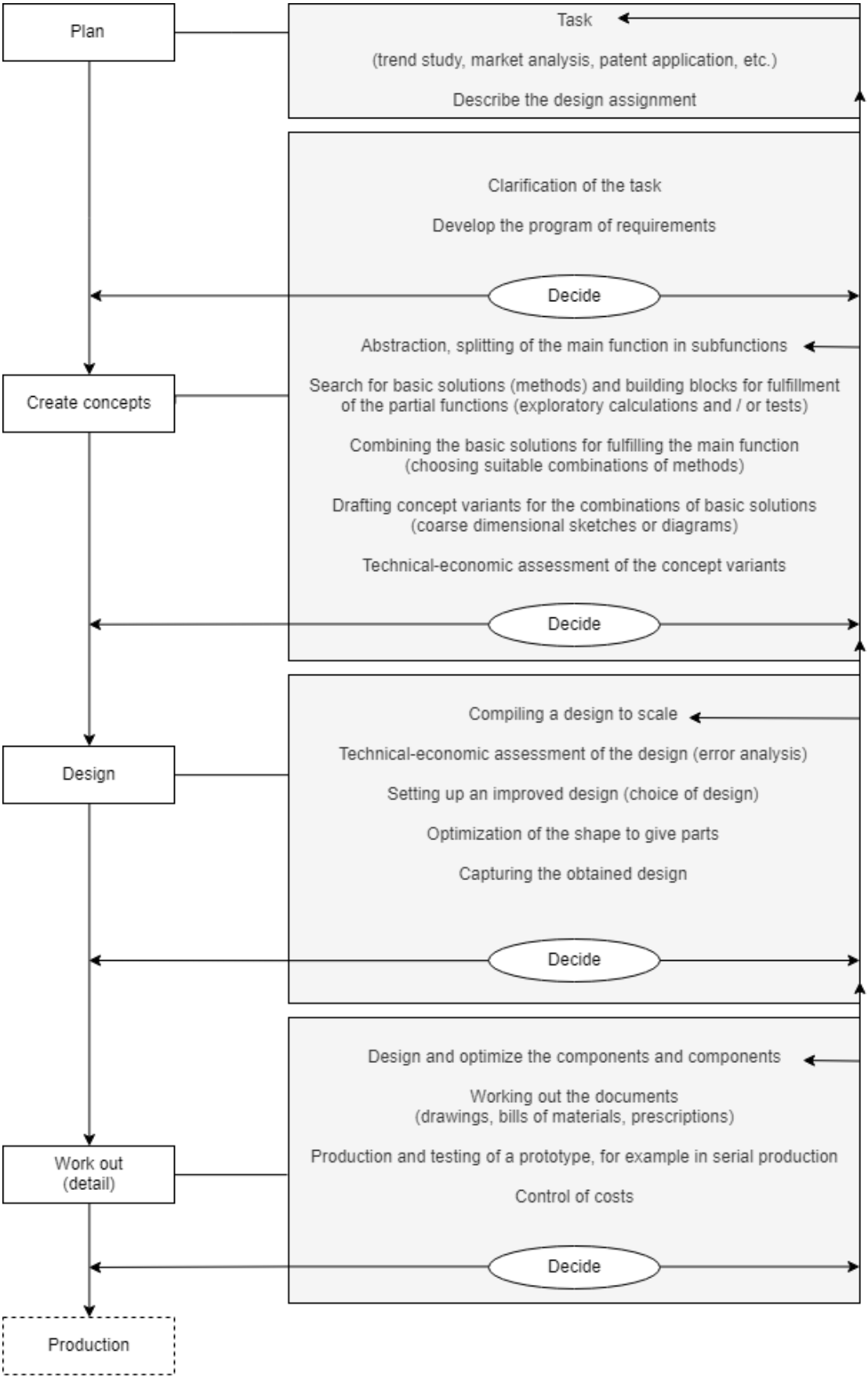


Figure 1 VDI-Model

1.4 List of requirements

In order to make a machine that meets the requirements and wishes of the customer, a package of wishes and requirements has been drawn up for different parts and functions of the machine. All these requirements are merged together and listed in the table below.

Table 3 List of requirements

Join the pipe Bottle Dispenser				
Nr.	Fixed	Variable	Wish	Requirement
Drawer system				
x				Easy to fill the machine with bottles.
x				Old and new Join the Pipe bottles need to fit.
	x			All components with a limited live cycle should be easily accessible for replacement.
	x			Bottle capacity per drawer: >67 bottles.
x				No moving parts within reach.
	x			Lifetime of the drawer system needs to be at least 5 years
Frame				
x				The machine needs to be vandalism proof
x				The machine needs to be transportable by two adults.
x				The machine needs to be transportable with a pallet truck.
	x			The machine needs to fit through a door (width: 930 mm).
	x			The machine needs to fit in an elevator (WxLxH: 900x1350x2100).
	x			The frame must be able to made in series production.
	x			The frame must be able to carry the weight and forces of the machine.
x				The lifetime of the bottle dispenser must be at least 5 years

Fixed	Variable	Wish	Requirement
The water cooling for the tap			
x			The tap should dispense cooled water (3 – 8 ˚C)
x			The tapping water should be drinkable
x			The water cooler is fully integrated into the machine
	x		The water cooler and cooling system combined has to fit into the bottom part of the machine
The cooling system for the bottles			
x			The cooling system is fully integrated into the machine
x			The bottle dispenser should dispense cooled water bottles (3 – 8 ˚C)
	x		Dimension for the evaporator (500x400x100) mm
	x		The water cooler and cooling system combined has to fit into the bottom part of the machine
Door			
		x	The outside must be flawless (no bolts, rivets or visible seams)
		x	The front must be rounded to represent a Join the Pip bottle
x			The door must house a touchscreen monitor
x			The door must house a payment terminal
x			The door must house a water tapping point
x			The door must house a water drain
		x	Lockable
		x	The machine and all accessible components must be vandalism proof
	x		Height of interface must be suitable for 95% of users
x			The customer may not get hurt

Cable management			
x			The cable’s may not be stuck behind moving parts
x			The folding mechanism may not be stuck behind moving parts

2 Design Phase

The water bottle dispenser with tap system consists of 6 main functions. The main functions are:

- Drawer System (01.-)
- Frame (02.-)
- Cooling system (03.-)
- Door (04.-)
- Cable Management (05.-)
- Electrical system (06.-)

Behind the main functions are the first 2 numbers of the drawings. These technical drawings can be found in Appendix C: Technical drawings. A list of requirements has been made for each component. The list of requirements makes clear what the important points are when designing the parts. After the list of requirements, a number of solutions were made. The best solution is chosen and explained. After that the requirements and the solution are known, a 3D-design is made.

2.1 Drawer system

In this chapter the design of the drawer system will be explained. The drawer is a huge part of the mechanical function to get a water bottle out of the machine. This newly drawn part of the water bottle dispenser is designed to improve the ease of use of the machine.

2.1.1 List of requirements

As can be seen earlier in this chapter there is a long list of requirements for the bottle dispenser. The requirements that apply to the drawer system is repeated here to show what was taken into consideration during the design phase.

Table 4 List of requirements drawer system

Drawer system				
Nr.	Fixed	Variable	Wish	Requirement
	x			Easy to fill the machine with bottles.
	x			Old and new Join the Pipe bottles need to fit.
		x		All components with a limited live cycle should be easily accessible for replacement.
		x		Bottle capacity per drawer: >67 bottles.
	x			No moving parts within reach.
		x		Lifetime of the drawer system needs to be at least 5 years

2.1.2 Concepts

Filling the machine

Filling the machine has been very difficult. The bottles had to be placed from the front of the machine on the upper side of the columns. The bottles then fell from the top down onto the rolling mechanism, this does not benefit the appearance of the bottles. This method is not fast enough and also very dangerous due to the sharp edges inside the columns. This can be seen in Figure 2.

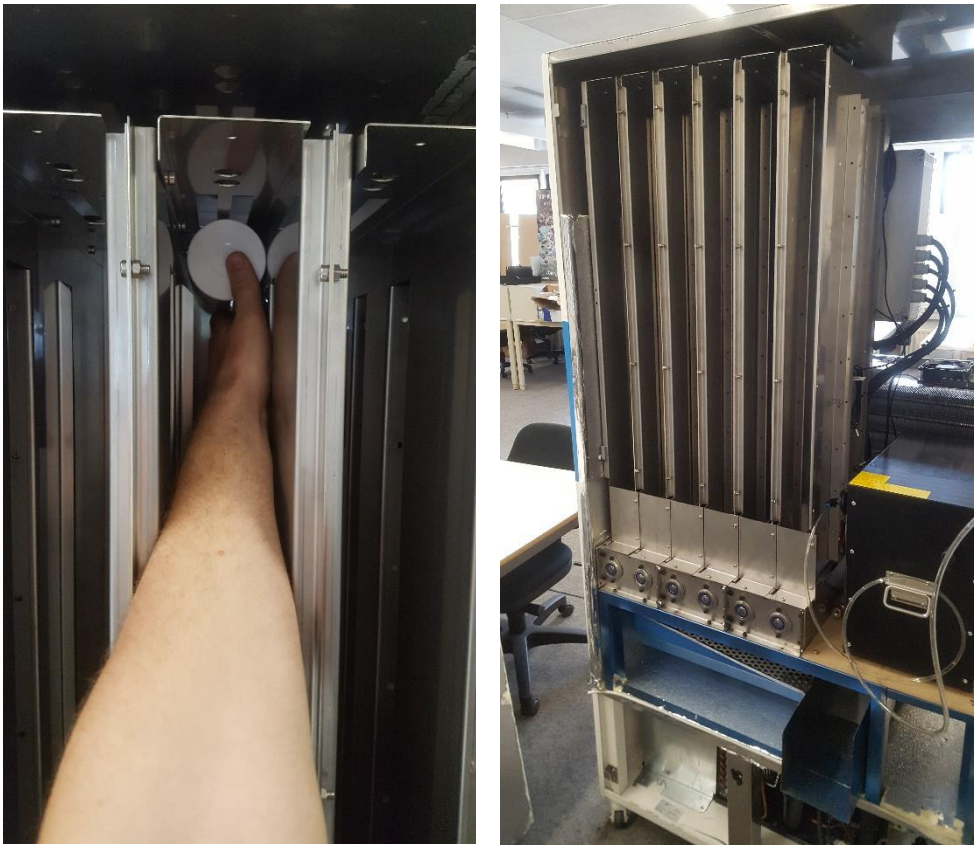


Figure 2 Old columns

During the initial phase of the design process, 3 alternatives were devised for the columns to make it easier to fill:

- Fill the from the frontside with a filling mechanism.
- Turn the columns 90° so that they can all be filled from the side of the columns.
- Add a rail system to extend the drawer and then fill from the side.

Fill the from the frontside with a filling mechanism

To ensure that the bottles will not be damage during filling, they can be collected until the entire column is filled on a filling tool. When the column is completely filled, the tool must be removed or folded away so that the bottles are placed on the rollers. A sketch drawing of this concept can be seen in *Figure 3* where the bottles are filled from the top side off the columns until they are full.

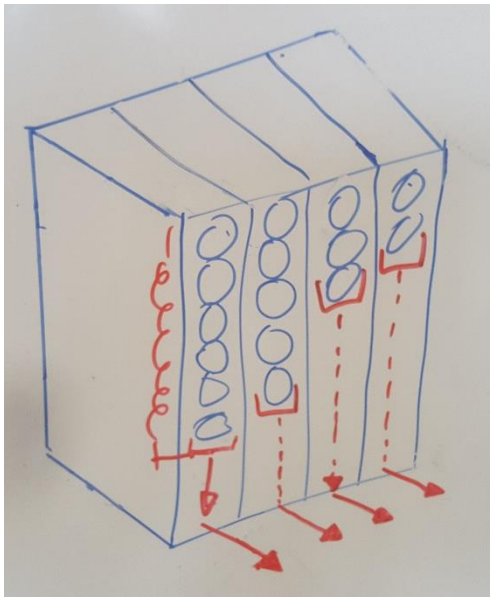


Figure 3 Filling mechanism

Pros

- Doesn't damage the bottles
- Easier move to fill the machine

Cons

- Difficult system
- Extra moving parts
- A lot of moving parts

Turn the columns 90° and fill from the side

During a brainstorming session in the concept phase, it emerged that filling through the entire side (from down to the top level) of the column can be a good solution. This brought forward the idea of turning the columns in the machine a quarter turn and making holes on the sides of the columns to allow the bottles to be placed at any height in the column. In Figure 4 there is a sketch drawing of this concept.

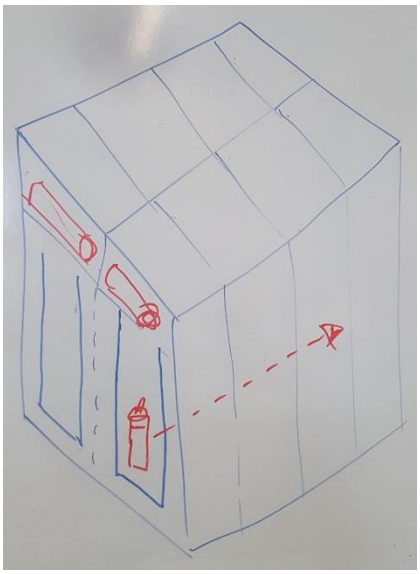


Figure 4 Fill sideways/ turn the columns

Pros

- Good space usage
- Easier move to fill the machine
- No moving parts

Cons

- Difficult to fill the last column

Add a rail system to extend the drawer and then fill from the side

In the previous concept, the principle of filling from the side was found to be very favourable, but it became difficult to properly fill the columns. The third and final concept to fill the last columns came forward later on in the brainstorming session. The idea is to build a drawer from two columns, in that case it is possible to slide the columns forward out of the machine. This makes it possible to completely fill both columns on both sides of columns with bottles. The filled drawer must be pushed back into the machine, after that it is possible to fill the next drawer in line. This is shown in Figure 5.

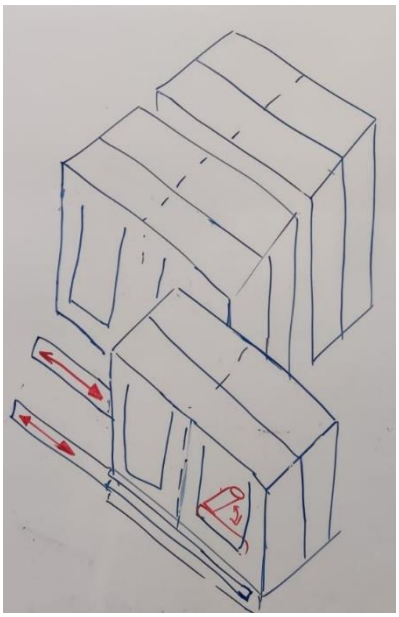


Figure 5 Drawer system

Pros

- Doesn't damage the bottles
- Easier move to fill the machine
- Easy system
- Purchase parts only

Cons

- Less free space in the machine
- Extra moving parts

2.1.2.1 Bottle detection

In the recommendations of the previous group they told that the used ultrasonic sensors didn't work properly. The ultrasonic sensors were above the bottles in the columns. The ultrasonic sensors were used because they could count the number of bottles, but they did not correctly detect the number of bottles. problem occurred because the sensors detected the walls of the stainless-steel columns.

Various solutions have been devised to solve this problem. For example, by covering the walls with non-reflective tape, using other sensors or by software that counts the number of bottles. Taping the walls could work well but is extra work. Counting the bottles in terms of software is a lot of work, since it is then always necessary to keep track of how many bottles have been refilled and if the power goes out, it would also have lost the count. The most obvious solution was to change the sensors.

The ultrasonic sensors have been replaced by simple microswitches. These are located at the bottom of the columns and only detect the bottom bottles. If the sensor isn't pressed, it can be assumed that the column is empty. The sensor is then not operated and the underlying program knows that no bottles are present and displays a red cross on the touchscreen where the sensor is not being operated. This way the customer also knows that this column is empty.

2.1.3 Design

2.1.3.1 Drawer system

In the previous design, no proper consideration was given to filling the columns, therefore a new solution had to be found in this machine. In Figure 6 you will find a full 3D drawing of the system. This drawer system is builded up by two sub-assemblies called the “Rolling mechanism” and the “Columns”.

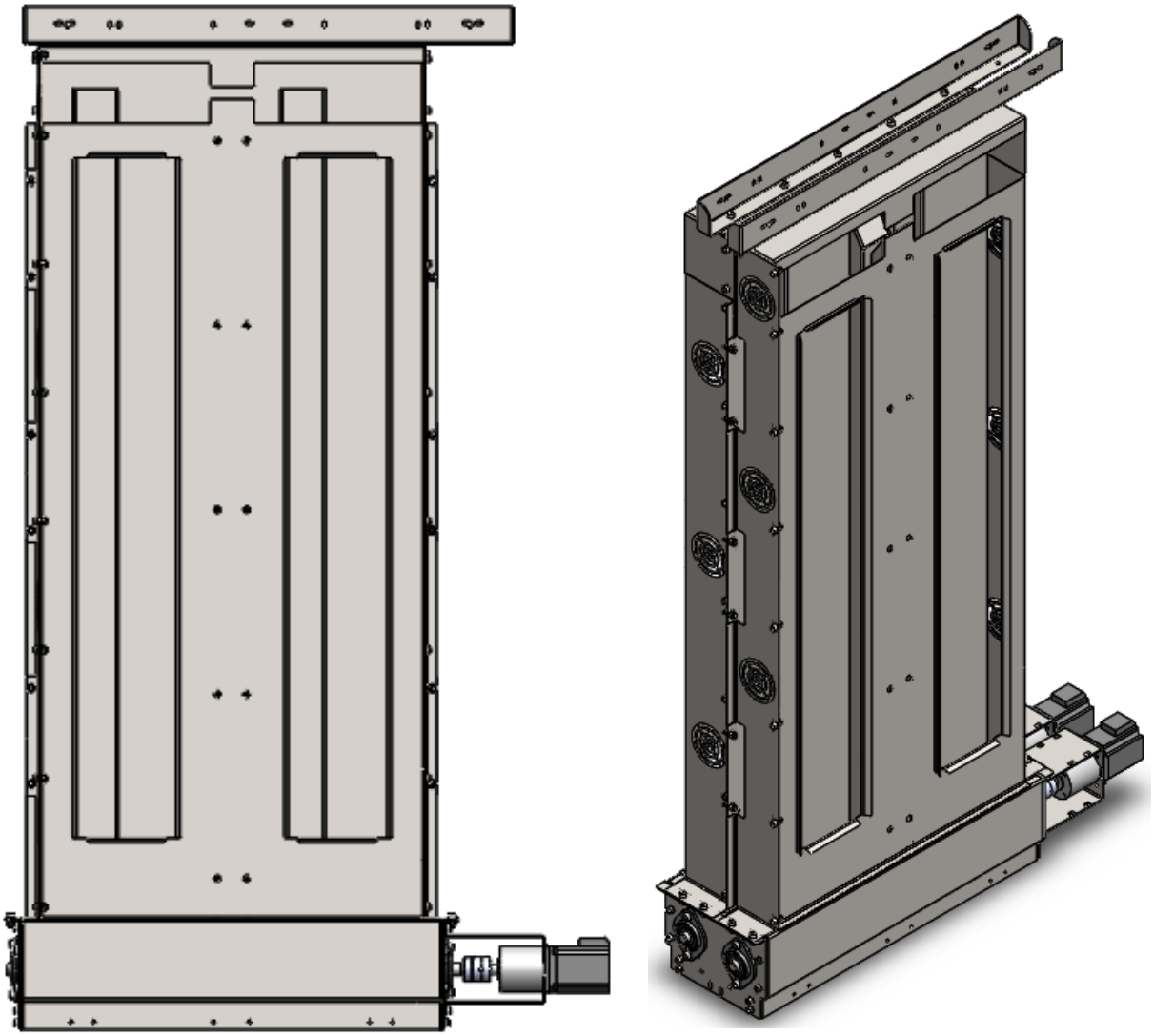


Figure 6 New drawer system

2.1.3.2 Rolling mechanism

In order to be able to carry out a bottle one by one, a roller-system was used in the previous versions that each had to rotate half a round to be able to carry out a bottle. The production of the roller-system was found to be very difficult during the construction of the bottle dispenser. Also, during the design phase of this construction the previous group didn't look properly at the symmetry of the different parts. As a result, they made use of many different parts with the result that the production cost is unnecessarily increased.

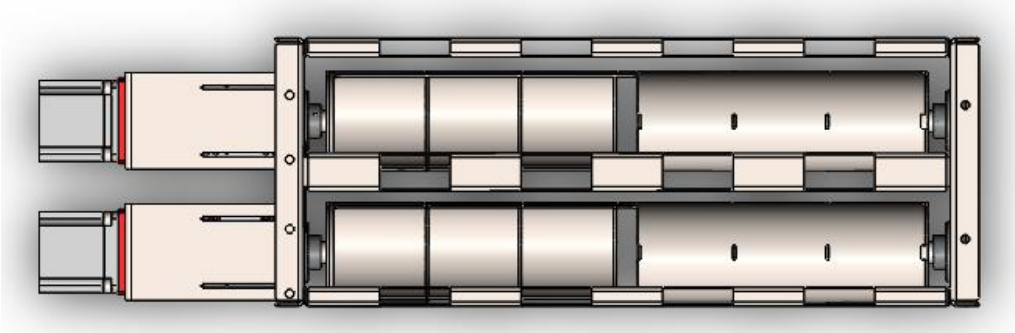


Figure 7 Old version roller mechanism

In the previous design, shown above in *Figure 7*, it can be seen that the rollers aren't placed symmetrically in the housing around it. This is probably done to rotate the bottles at all time to the same direction. It can also be seen as a result the bottles cannot fall vertically downwards, this is not conducive to the flow of the bottles and the position of the columns.

Because of all these different reasons, we are forced to completely re-engineer this system during the design process, which is ready for series production. In this new design, the length of the newly designed "Join the Pipe" bottle must be taken into account. The length of the roller must be extended, it has also been decided to lower the bottle deeper into the tube in order to reduce the outer turning circle.

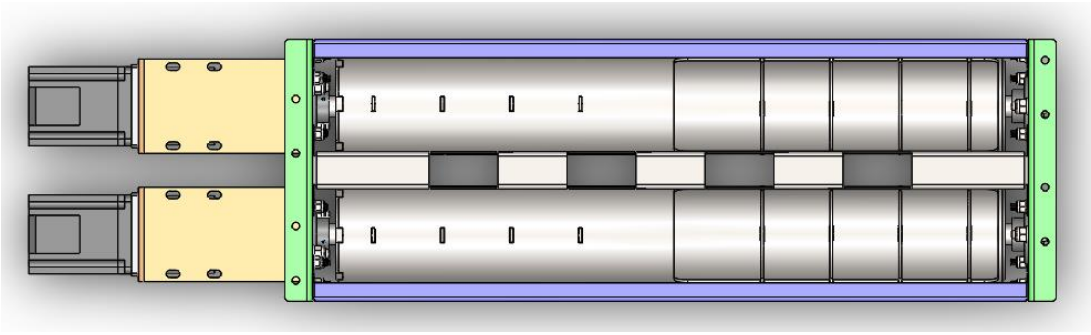


Figure 8 Newer version roller mechanism

Figure 8 shows the new version of the rolling mechanism. By means of different colors it's indicated which parts are exactly the same. In this version it was decided to place the rollers and to rotate both to the inside of the housing. As a result, the entire width of the composition is reduced and the throughput of the bottles is directly above the rollers.

The new rolling mechanism is shown below in *Figure 9*. This shows that the engines are mounted with four identical engine mounts. The recording points are also visible for the rail system on the side of the blue plates.

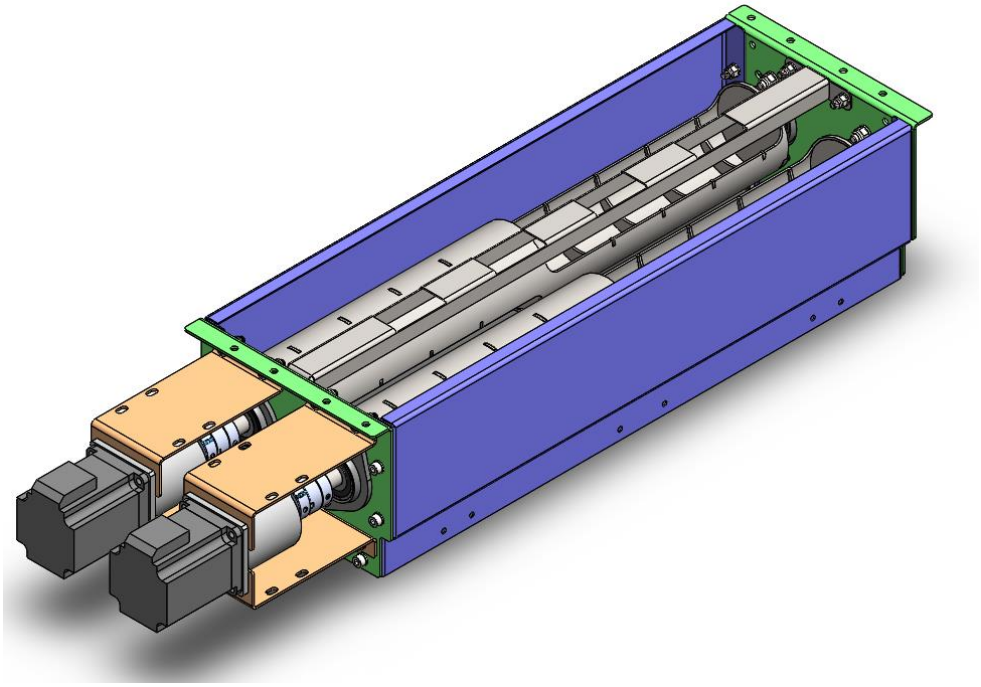


Figure 9 New roller mechanism isometric

2.1.3.3 Columns

To provide the rolling mechanism with bottles, two columns have been placed on top. Because “Join the Pipe” has brought new bottles to the market and would like to use them together with the previous type, he columns had to be updated. The updates of the rolling mechanism must also be included, as a result of which places to attachment points changed.

In the previous design, the columns also served as support for the subsequent columns. Because two columns are used in this design, they had to be designed in such a way that sufficient stiffness can be obtained here.

Figure 10 shows the undersides of the old and new designed columns. This shows that the new columns are narrower ans slightly longer. In the middle of the new columns. (orange) guide tubes have been placed to accommodate both the new ande the old “Join the Pipe” bottles in these new columns.

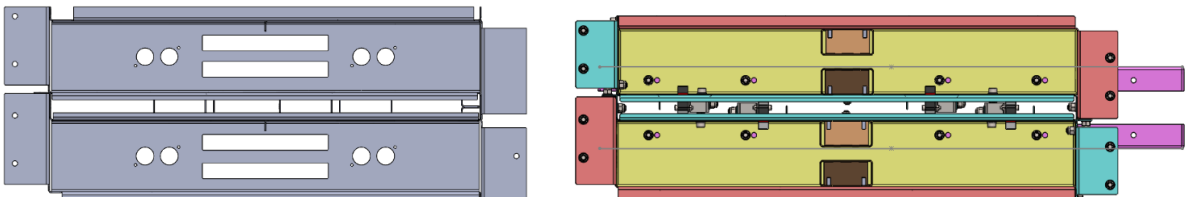


Figure 10 Old and new columns

Figure 11 shows a picture of the new columns with on top the bracket for the rails of the rail-system that is used to slid the columns out of the water bottle dispenser.

Below that are the yellow mounting plates that ensure a stable connection between the two columns.

To place the bottles in a safe way where one of the things taken into account while designing the columns. This includes the height of the columns and the removal of sharp edges.

Both in the front and in the back the columns are equipped with vents for a good flow of the cold air that is located in the cooled part of the machine.

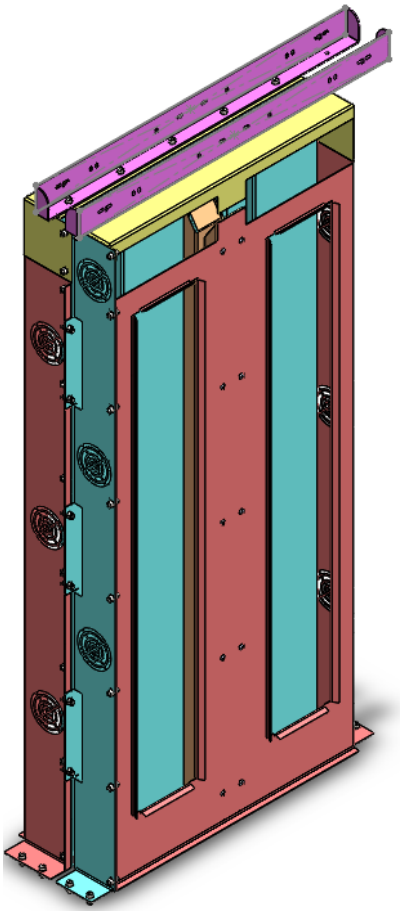


Figure 11 New columns

2.1.3.4 Bottle detection

To detect the bottom bottle, the placement of the microswitches has to be directly above the rotator as can be seen in Figure 12.

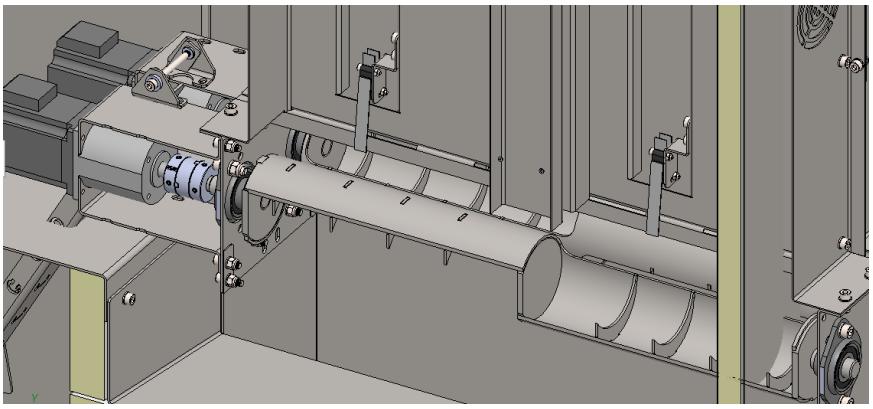


Figure 12 Placement microswitches

When the rotators are running, the lowest bottle can be at different heights in a range of 30mm. By compensating for this difference, a microswitch with a long lever is used as been seen in Figure 13.

Figure 13 Microswitch

The alignment of the microswitches is made possible by being able to adjust the height of the brackets, this can be seen in Figure 15. On the bracket there is a slot for horizontal adjustment, this can be seen in Figure 14.

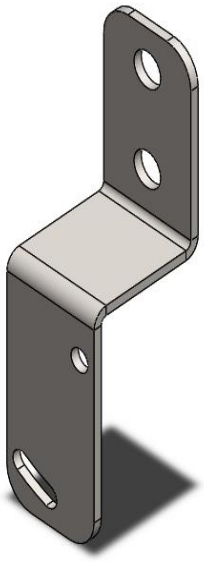


Figure 14 Microswitch

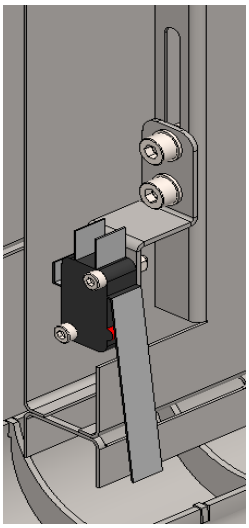


Figure 15 Attachment microswitch

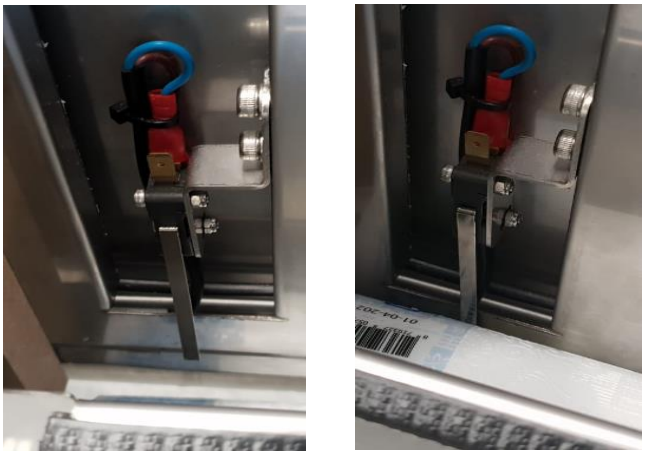


Figure 16 Bottle detection

2.1.4 Improvements

In theory everything should work. During the testing of the machine we will find out if it works properly. This can be found in paragraph 3 Test assembly.

2.2 Frame

In this chapter the development of the frame for the bottle dispenser is explained. The frame must be stiff and strong because the frame is the basis for the bottle dispenser.

2.2.1 List of requirements

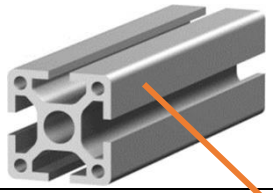
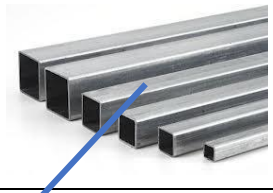
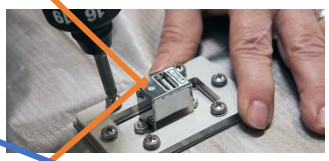
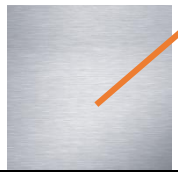
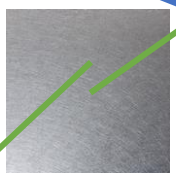
the frame for the bottle dispenser must meet a number of requirements, these requirements are listed in the table below.

Table 5 List of requirements frame

Join the pipe Bottle Dispenser			
Fixed	Variable	Wish	Requirement
x			The machine needs to be vandalism proof
x			The machine needs to be transportable by two adults.
x			The machine needs to be transportable with a pallet truck.
	x		The machine needs to fit through a door (width: 930 mm).
	x		The machine needs to fit in an elevator (WxLxH: 900x1350x2100).
	x		The frame must be able to made in series production.
	x		The frame must be able to carry the weight and forces of the machine.
x			The lifetime of the bottle dispenser must be at least 5 years

The frame for the bottle dispenser can be produced by different production methods and from different materials. Based on a morphological overview, different production methods are listed, after which a definitive choice is made for the manufacture of the frame.

Table 6 morphological overview

morphological overview			
Criteria	Possible solution 1	Possible solution 2	Possible solution 3
Shape			
	Extrusion profile	Beams	Sheet material
Fabrication			
	Welding	Assemble	Forming
Material			
	Aluminium	Steel	Stainless steel
Surface treatment			
	(Spray) paint	Galvanize	Soda blasting

Description orange path

The frame will be made by using aluminium extrusion profiles, these profiles will be assembled to a frame.

Description blue path

The frame will be made by using stainless steel beams, the beams will be welded together to build a frame, the frame will then be soda blasted.

Description green path

The frame will be made by using steel sheet metal, the sheet metal parts will be bend into the right shapes and build together to get a frame. The frame will be (spray) painted in the correct color.

Option statement paths						
Different paths	**review criteria**					
	Weight	producibility	Costs estimation	Stiffness / strong	Life time	**Total points**
Orange path	5	1	1	1	3	11
Blue path	3	5	3	5	5	21
Green path	3	3	3	3	3	15
Notes						
Rating	**Points**					
Good	5					
Mediocre	3					
Bad	1					

Table 7 option statement paths

According to the option statement the blue path is the best solution for the frame. The project group is going the design a frame which satisfies the requirements which can be seen in Table 5 List of requirements frame.

2.2.2 Design frame

The design of the frame consists of three different types of tubes:

- Tube stainless steel 40x40x2
- Tube stainless steel 40x20x2
- Tube stainless steel 20x20x2

The tubes can be purchased from a trade length of six meters. In the tubes are a number of holes on which the panels of the bottle dispener are mounted. The tubes can be machined on a tube laser, the production speed on a tube laser is high and the accuracy is high. Then all the parts are combined and will be fitted in the right place. The whole frame is then TIG-welded together, the reason the project group chose for TIG-welding is the minimal heat input. To get a nice finish, the frame is soda blasted, the frame can be seen in Figure 17.

The bottom of the frame is made out of 40x20x2 and 20x20x2 tubes. These tubes will support the frame when it is lifted by a pallet truck, they also support the cooling installation that will cool the bottles and the water for the water tap.

A frame of 40x40x20 tubes is attached to the bottom frame. This frame gives rigidity to the panels that will be mounted to the bottom frame. The frame will also support the rear door so the back of the machine will be accessible for a technician.

The dimensions of the frame have been constantly taken into account during the design of the frame. The frame determines the final size of the machine which must remain within the standards, which can be read in the requirements.

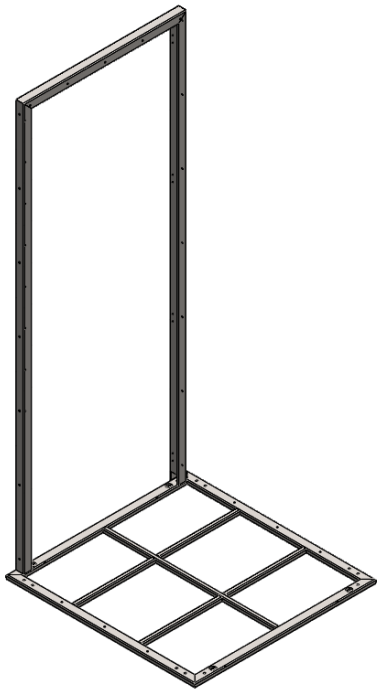


Figure 17 assembly frame

2.2.3 Construction steps bottle dispenser

The frame acts as the basis for the panels that are attached to the frame. The panels can be easily attached through the holes in the tubes of the frame. A bottom plate is placed on the bottom of the frame, which serves to attach the cooling system. Because the frame is under these components, all forces are absorbed by the frame when it is lifted by, for example a pallet truck, so the components remain protected, this can be seen in Figure 18.

Foot plates with levelling feet are attached to the underside of the frame, these levelling feet provide ground clearance so that a pallet truck can be driven under the machine. When the machine is placed on an uneven surface, the machine can be levelled using the adjustable feet.

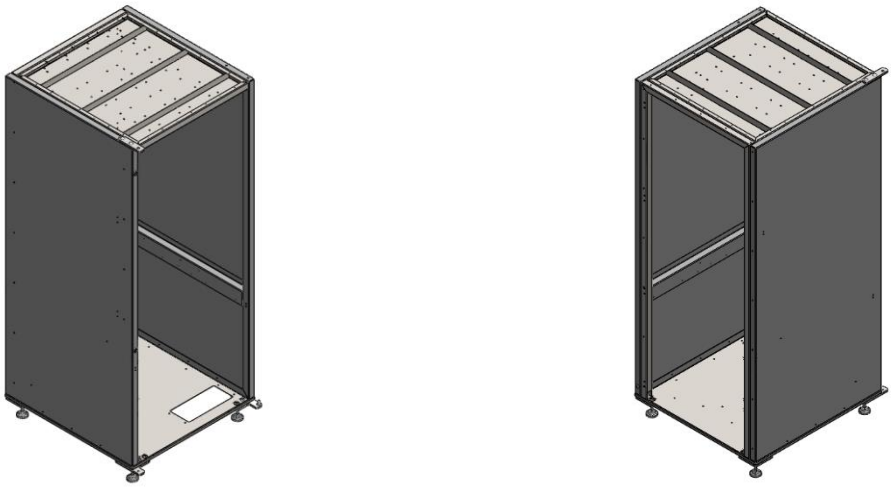


Figure 18 frame with panels

The next step is to install the cooling system, this is easily done by mounting the cooling system on the bottom plate. Holes have been provided for this, making it easy to attach the cooling system. At the rear of the machine, the control cabinet is mounted to the base plate via the rear door. The reason the control cabinet is placed at the back, is that it is easy reachable for mechanics. The cooling system will eject hot air, to remove the hot air as quickly as possible, air ducts are installed at the back of each cooling system. The hot air will be blown away at the bottom of the frame, this can be seen in Figure 19.

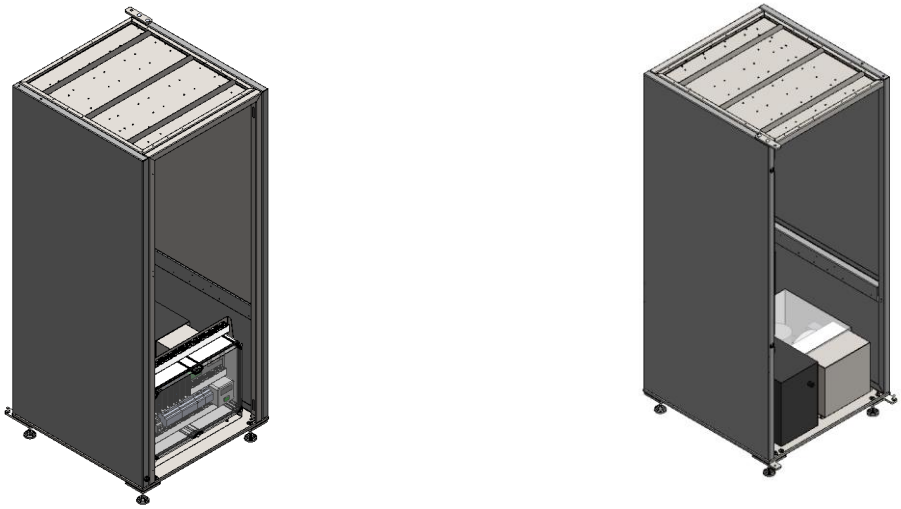


Figure 19 cooling system and electrical cabinet

The bottle ejector is mounted between the two support beams. The support beams are then mounted on the side walls of the machine. Two beams are mounted on the ejector which the drawer guides for the drawer system are mounted on. The ejection system is insulated with PIR-Insulation plates, this is done to keep the cooled bottle storage cold. The front of the output is fitted with a rubber seal which will seal of the gap between the output channel of the door, this can be seen in Figure 20.

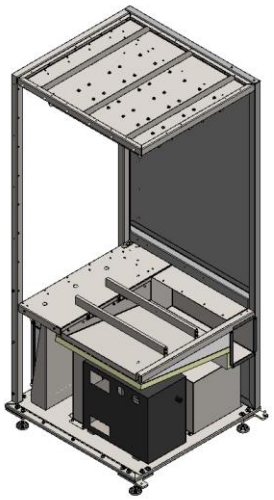


Figure 20 ejector system

Then the panels are mounted which define the cooling compartment of the machine. There is a little bit of space between the cooling compartment and the side panel, this is done so cables can be guided from the electrical cabinet to the door. There are two types of cable ducts, one cable duct for low voltage and one cable duct for high voltage. A conscious choice was made to separate the low and high voltage cables from each other so that no interference occurs. PIR-insulation is installed between and behind the mounted panels, this can be seen in Figure 21.

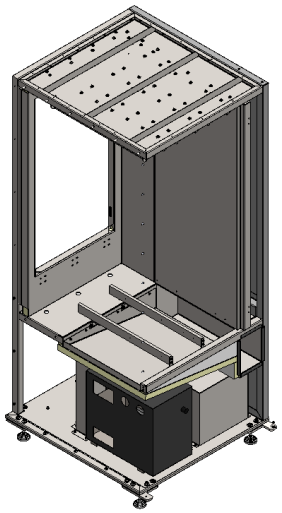


Figure 21 cooling compartment

To cool the cooling compartment an evaporator is mounted in a support which is attached to the ceiling of the machine. The support is fitted with a drip tray with a slope, so the cooling liquid will drain into a container, this can be seen in Figure 22.

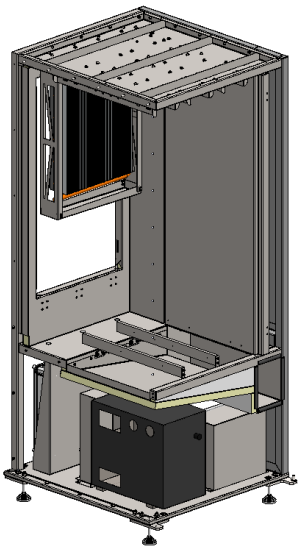


Figure 22 evaporator mount

The next step is to place the drawer system with the associated cable routing system. The drawer system is attached to the side walls and support beam. To achieve rigidity, the project team decided to place rails at the top and bottom of the drawer system. The rails are mounted to the ceiling with brackets. The rails are equipped with a self-locking mechanism, so the drawer system will never open on their own.

The folding cable guide is mounted on the two stepper motor mounts of the drawer system, slotted holes in the mounts are used to adjust the cable guide. The other side of the cable guide is mounted on the back plate, this can be seen in Figure 23.

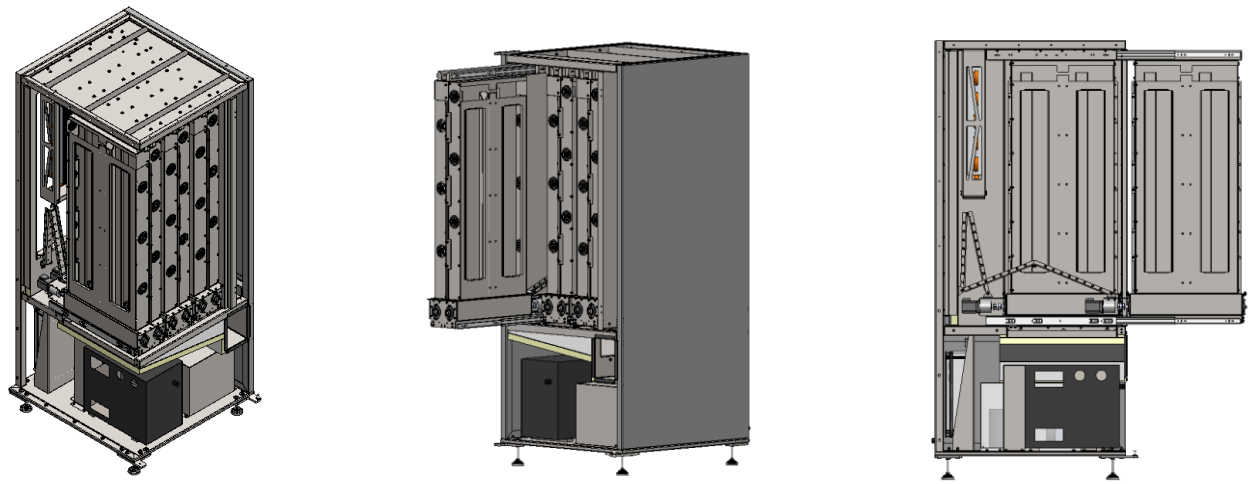


Figure 23 drawer system and cable management

The cooling compartment is closed off by mounting a cooling door with insulation material inside. The cooling door is attached to the machine by two heavy duty hinges. A sealing rubber has been applied to the edges of the door the completely seal the door and make it airtight, this can be seen in Figure 24.

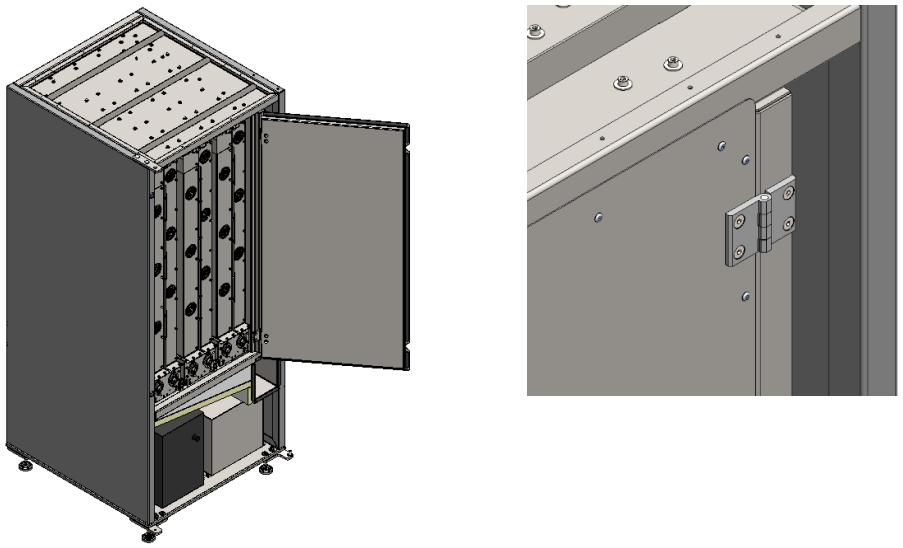


Figure 24 cooling door

The rear of the machine is closed with a large door. The project group chose for a large door at the back of the machine so there is enough room for a technician to do maintenance. The door is attached to the frame by using four heavy duty hinges. The is done because the door has a large mass and cannot sag because it cannot be closed then. The door is locked by using two locks with a keyhole.

The rear wall is closed off by a removable hatch, the hatch is provided with two handles so it can easily be removed. The hatch is closed by using four locks which can be opened with a universal cabinet key. The hatch can be used during assembly and maintenance work on the machine, this can be seen in Figure 25.

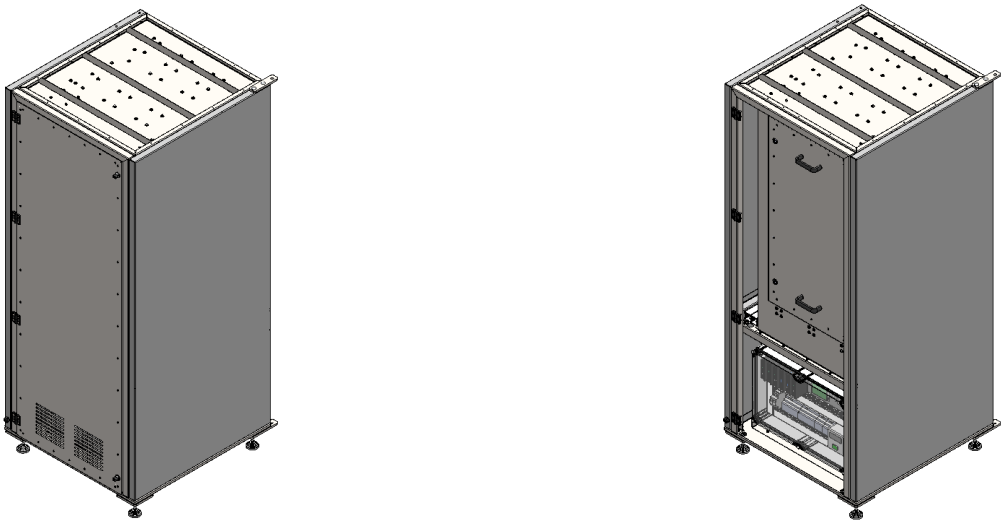


Figure 25 back door and hatch

The final step is to place the door on the lower hinge, then the door is locked by attaching the upper hinge plate. The ceiling is then provided with insulation material and sealed off with a plate, this can be seen in Figure 26.

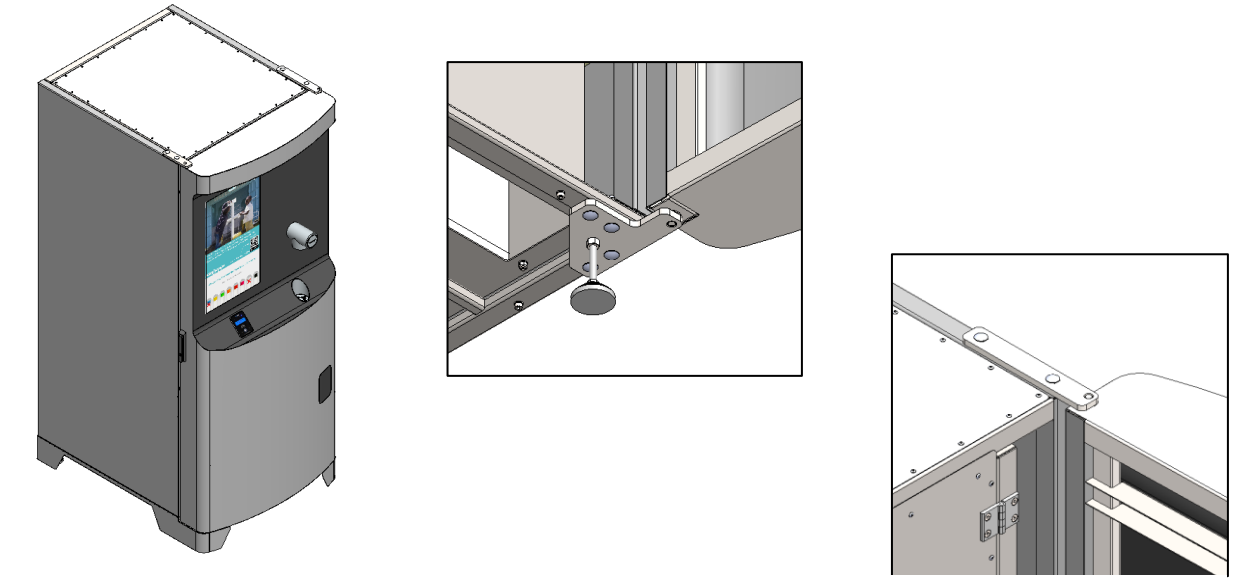


Figure 26 assembly front door

To complete the machine, the customer specific top is placed on the machine. The design and geometry of the cap will be the same for each machine, the color and logo of the customer can be placed on the cap. Finally, the decorative feet are attached under the machine. These feet are clear at the front so that a pallet truck can be driven under the machine the transport it, this can be seen in Figure 27.

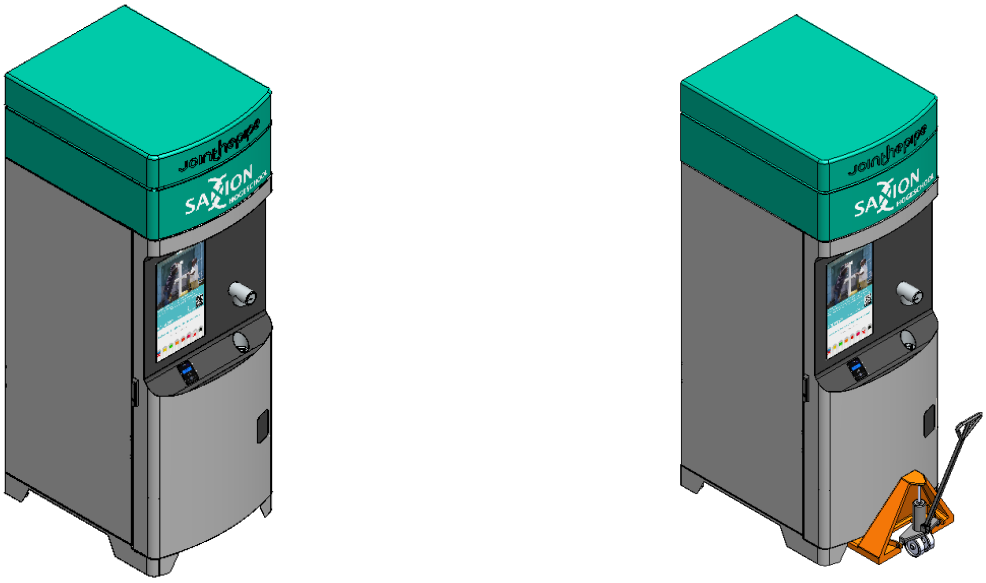


Figure 27 customer cap and pallet truck

2.2.4 Recommendations frame

Custom customer cover

The custom customer cover on the bottle dispenser has not yet been worked out by the project group. First of all, a production method must be found which the cover can be produced with for series production. The project group chose rotational moulding technique for producing the cover. The project group asked Pentas for a cost overview for producing the cover. Pentas starts producing from a minimal of 300 pieces.

The design of the hood can be looked at where it can be used as a functional addition to the machine. Now it is just a cover that can be put on the machine with no function then a cosmetic point of view. For example, you can make a compartment in the cover that can be used to stock of bottles of water.

Drawer system

At this moment the user can extend all three drawer systems, due to the weight of the bottles in combination with the drawer system there is a chance that the machine will tip over, the user may be injured. In order to ensure that only one drawer system can be extended at a time, a locking system must be developed so that the user cannot extend all drawer systems at the same time.

Safety features

At the moment the machine is not equipped with safety devices, when the front door or cooling door is opened, the machine must be switched off so that the ejection system is not put into operation, this is currently not the case. This also applies when the back door or hatch is opened.

Flow meter water tap

The machine is equipped with a water tap from join the pipe, the user can have his or her bottle refilled for a small amount at the bottle dispenser. It must be possible for the user to select a quantity of water via the interface. The user pays through the contactless payment system, instructions must be displayed on the screen. The instructions tell the user that the bottle must be placed. When the push button of the tapping point is pressed, the flow meter starts to measure the water consumption, the instruction screen shows how much water the user can still tap. At this moment the flow meter and the instruction on the display are not developed and integrated in the new design.

2.3 Cooling system

In this chapter the design of the cooling system will be explained. The cooling section consist of two parts:

- The water cooling for the tap
- The cooling system for the bottles

2.3.1 List of requirements

As can be seen earlier in this chapter there is a long list of requirements for the Bottle dispenser. The requirements that apply to the design of the cooling system are repeated here to show what was taken into consideration during the design phase.

Table 8 List of requirements cooling system

Cooling system				
Nr.	Fixed	Variable	Wish	Requirement
The water cooling for the tap				
	x			The tap should dispense cooled water (3 – 8˚ C)
	x			The tapping water should be drinkable
	x			The water cooler is fully integrated into the machine
		x		The water cooler and cooling system combined has to fit into the bottom part of the machine
The cooling system for the bottles				
	x			The cooling system is fully integrated into the machine
	x			The bottle dispenser should dispense cooled water bottles (3 – 8˚ C)
		x		Dimension for the evaporator (500x400x100) mm
		x		The water cooler and cooling system combined has to fit into the bottom part of the machine

2.3.2 Concepts

2.3.2.1 Water cooler

The water bottle dispenser needs an integrated tap system with cooled water. The temperature of the water has to be approximately 5˚C. The cooling system contains a buffer tank that keeps the cooled water cold. The capacity of this tank depends of the customers usage.

There are 3 kinds of bottles that can be filled of join the pipe. The 1,5-liter, 1-liter and 0,5 liters. The fill time of 0,5 liters takes 10 seconds. On the screen there is information about the join the pipe bottles and their charity's. This will take approximately 50 seconds. The payment will take approximately 20 seconds. This means that the duration of a person buying a bottle will take 90 seconds. This is equal to 40 liters each hour.

In one of the older versions of the water bottle dispenser they implemented a water cooler with carbonator. This cooler could handle 10 liters each hour, this was way to low so a new water cooler has to be chosen. The 'join the pipe bottles' could not contain the pressure of the carbonated water as well so the carbonator function has been deleted.

2.3.2.2 Cooling system for the bottles

The previous group that worked on this project had a cooling system installed by the company Lasscher & Keizer. In their report they had a meeting with an engineer about the replacement of the cooling system (UNEK6214Z/VVC5T-2R) into a machine with three quarters of the capacity of the cooled bottles. The part of the report can be seen in appendix Lasscher & Keizer**.** The same condenser can be used. For the new water bottle dispenser, we only need a different evaporator to fit into the new dimensions.

2.3.3 Design

Space has been created in the bottom part of the machine. These cooling systems are next to each other suck in cooling air at the rear of the machine see Figure 28. The hot air must be able to escape easily for an optimum cooling system. A sheet metal case was made and placed immediately after the fan, the air is then forced to leave the machine and there is place for new cooling air. See Figure 29 for the placement of the cooling systems, Figure 30 and Figure 31 for the seperated cooling systems and their sheet metal case.

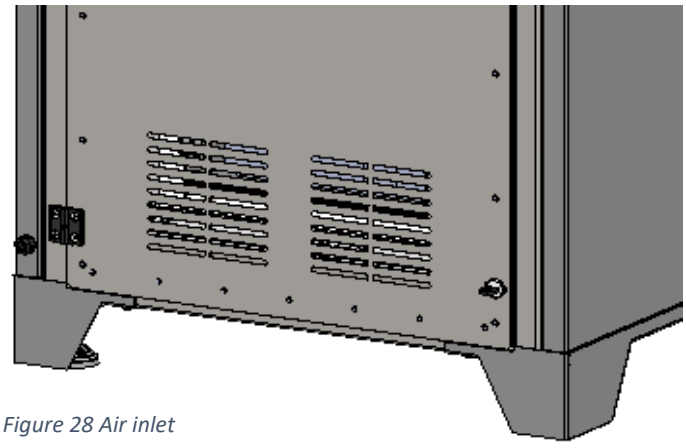


Figure 28 Air inlet

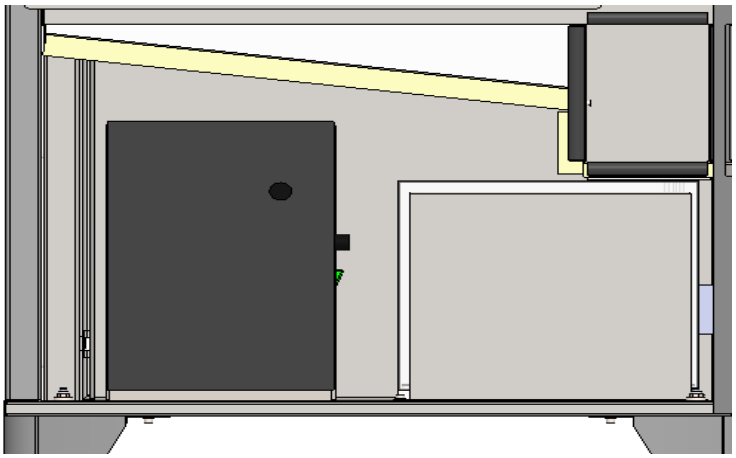


Figure 29 Placement cooling systems

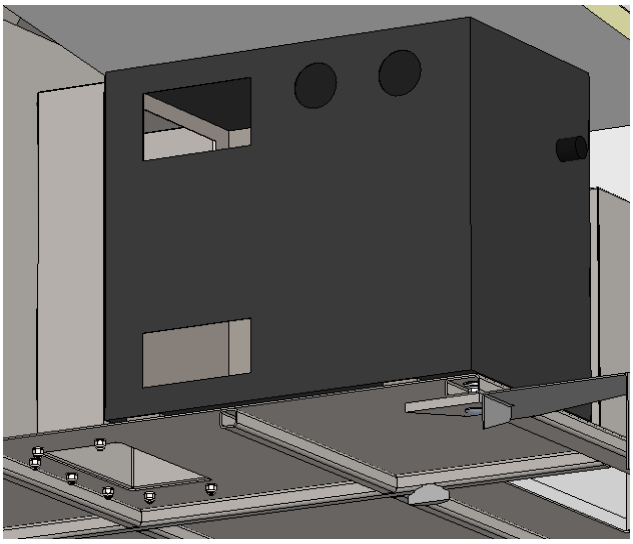


Figure 30 AS-40 with sheet metal case

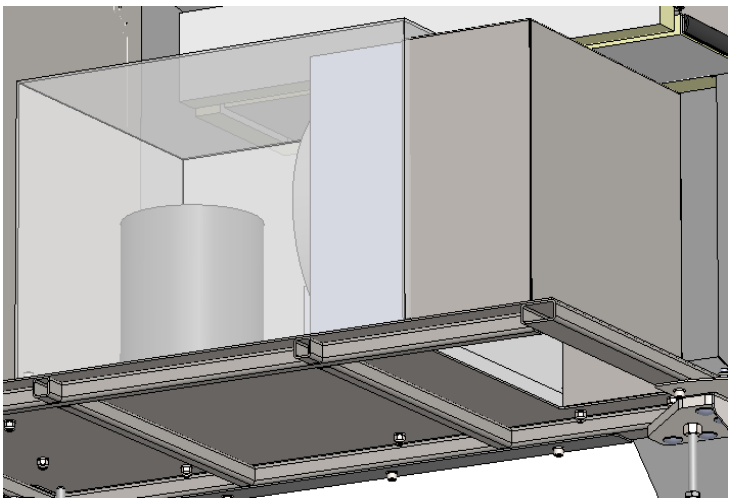


Figure 31 Condenser with sheet metal case

2.3.3.1 Water cooler

The used water cooler of the following type: AS-40. The cooler can handle 40 liters each hour and does not have a carbonator. The two spirals that are in the cooled part are connected for optimal use of the cooling capacity, see Figure 32. The inlet of this cooler is connected to an 8mm hose. The hose is connected to a standard 3/4-inch coupling. The other end is attached to the join the pipe tap.

Figure 32 Spirals connected together

2.3.3.2 Cooling system for the bottles

The condenser used by the previous group can be used again in the new machine. Space has been made for the condenser in the lower part of the machine. The evaporator needs to be changed, because the old evaporator is too wide for the new machine. Space has been created for the evaporator in the cooling area of the machine. The maximum dimensions for the evaporator may be 500x400x100mm. According to Lasscher and Keizer this should fit well. In Figure 33 the evaporator can be seen in its suspension.

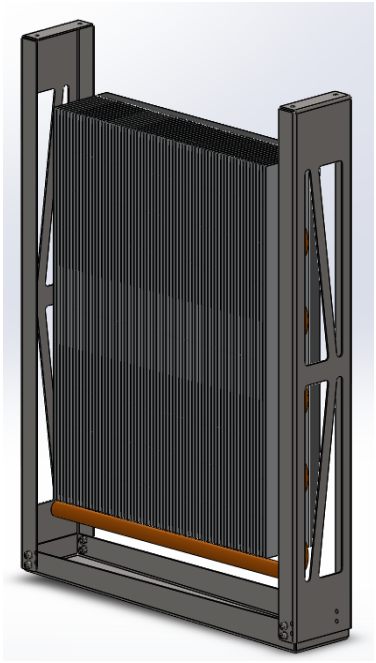


Figure 33 Eveporator and suspension

2.3.4 Improvements

The bottom part is used for the bottles cooling system and water cooling. The hot air is blown down the machine. Both the inlets are at the rear of the machine. Between the air inlet of the machine at the rear and the air inlet for the cooling systems is the power box. Unfortunately, there is no better place for the power box. If you place it higher, it is in the cooled area of the machine.

The used condenser is the condenser used by the previous iterations. When this condenser was chosen, a calculation was made by Lasscher and Keizer. Because the situation is changed in terms of capacity and cooling area, it may be that in addition to the evaporator, the condenser must be selected differently. Fortunately, the condenser from the previous iteration was calculated for a larger cooling area and more bottles. This would mean that if a new condenser is needed, it is smaller than the current one.

2.4 Door

In this chapter the design of the door will be explained. The door is the first thing that people see of the Bottle dispenser. Therefore, the door must be both functional and attractive looking.

First the requirements are determined, then the components for the door will be picked. When this is done there is a section about the safety feature where the door plays a role. Next the production method will be chosen and then some ergonomic design choices will be explained. Lastly the design of the door is explained with a number of drawings.

The design process of the door does not completely follow the chosen VDI design model. The main appearance of the door was determined by a previous group. During their project they have done an extensive design study where the following design was chosen.

Figure 34 Final design of version 5

2.4.1 List of requirements

When designing the door for a series producible machine this design is the starting point. The following requirements were then determined.

- The outside must be flawless (no bolts, rivets or visible seams)
- The front must be rounded to represent a Join the Pipe bottle
- The door must house the following components
    - Touchscreen monitor
    - Payment terminal
    - Water tapping point
    - Water drain
- The door must be lockable
- The machine and all accessible components must be vandalism proof
- Height of interface must be suitable for 95% of users
- The customer may not get hurt

2.4.2 Concepts

In this paragraph the different options are discussed and the design choices will be explained.

2.4.2.1 Screen

The screen of the machine is the interface with the users. With a well-built interface the engagement with the user can be better. There are three options for the type of screen being used. A custom-made touchscreen, standardized touchscreen or monitor without touch. For every option the pros and cons are summarized.

Custom touchscreen

A custom touchscreen will be developed to fit the machine exactly. This means the resolution, touch interface type, connection types and integration with a protective layer can be made to any specification. The estimated cost of this is 2500 euro per screen

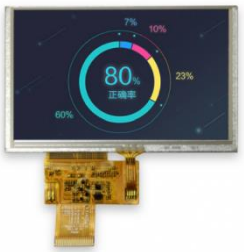


Figure 35 custom touchscreen

Pros

- Customize everything
- Better integration with top layer

Cons

- Expensive
- Long lead time
- Custom driver required

Standard touchscreen

A standard touchscreen can be bought from a local supplier or from a Chinese supplier. The difference between these is the price and the amount of support that is available. With a local supplier the protective layer can be specified to fit the touchscreen. With a Chinese supplier this service cannot be guaranteed. If cost is the most important factor a Chinese supplier can be considered (500 euro). But for this concept only the local supplier is considered (1000 euro per screen)

Figure 36 Standard touchscreen

Pros

- Standard driver support

Cons

- limited design options

Standard monitor

In the previous version there was no touchscreen. When this option is chosen there needs to be a different way of interacting with the user, for example buttons below the screen. This is the fastest and cheapest options, but sacrifices options for user engagement.

Figure 37 standard monitor

Pros

- Cheap
- No lead time

Cons

- Another interface required
- Less engagement

Conclusion

Of these choices the standard touchscreen seems like the best option. The ease of implementation and the lower price is a big advantage of this option. The normal monitor is also a good option but has less client engagement. Because the deliverables changed during the project the design ended up with a standard monitor, this should be changed to a standard touchscreen. For this to be possible the touchscreen should be bought first.

2.4.2.2 Screen protector

The machine needs to be vandalism proof so there needs to be some sort of protector on top of the screen. A touchscreen requires a different type of protector than a normal monitor. There are also two touch compatible materials that can be used.

Glass overlay

The best-looking option is a glass overlay. Tempered glass varying between 4 and 6 mm is placed on top of the screen. The glass is glued onto the frame, or a bracket so it is inseparable from the machine. The touchscreen can then be mounted against the glass. gluing the screen gets the best result as there can be no separation. If no glue Is used the construction must connect the screen perfectly to the glass.

A downside to a glass overlay is the glare when there is sunlight.

Figure 38 Glass overlay

Pros	Cons
• Best looking design • Sharp colors	• Glare • Cutting risk when broken

Plastic overlay

Instead of a glass top layer, plastic can also be used. Plastic usually has a matte finish, which reduces glare but makes colors less vibrant. This makes this option less good looking. Due to the plastic being softer the screen is not protected as well as behind glass, but it is almost impossible to break the protector itself.

Figure 39 Plastic overlay

Pros	Cons
• Cheaper than glass • No glare	• Screen less protected • “Vague” colors

No touch overlay

When there is no touch monitor the top layer does not have to be touch friendly. The same options as described above can be used, but the thickness and mounting options are less constrained. This means that the protector doesn’t have to come from a touchscreen specialist.

Pros	Cons
• Cheapest option • No design constraints	• Not touch compatible

Conclusion

The glass overlay is the best option. it looks the best and is equally difficult to design. The glass protector design must be made to fit together with the touchscreen. Because this part is not ordered yet it was not implemented.

2.4.2.3 Payterminal

The payment terminal is where the user can pay for their order. The options for payment terminals are endless, but due to safety and ease of use it is better to go for a standard solution. Payter is a company that makes universal payment solutions, and are used throughout Saxion. Choosing a company that has a working relation with the school and that has good support seemed the logical choice.

Design wise there are two options that were considered.

Integrated behind top layer

This option has the payment terminal mounted behind the protective top layer. The same layer thickness constraint as for touch compatibility exists. When a thicker top layer is used the terminal will not work.

Integrating behind the top layer makes the design more complicated and expensive.

Figure 40 Integrated behind top layer payter system

Pros
- Best looking design

Cons
- More expensive
- Max layer thickness

Front mounted

Mounting the terminal on the front is the cheaper and easier option. The bulk of the terminal is inside the machine, mounted on a bracket. The front sticks out through a hole in the door.

Figure 41 Front mounted payter system

Pros
- Easier design
- Cheaper

Cons
- Less waterproof

Conclusion

The Payter will be front mounted because it is easier and cheaper. The less good-looking design is not as important.

2.4.2.4 Lock

The door has to be locked. There are two options that were considered.

Figure 42 Cabinet lock

Cabinet lock

The simplest option is a cabinet lock, this kind of lock is mounted in a round hole and the lever falls inside a slot. The lever can be notched so it can also lock lengthwise. This type of lock was used previously but did not work properly. A minimal deflection of the door caused the lock to open without key.

Pros	Cons
• Simplest option	• Low security

Rod lock

A rod lock consists of 2 rods that are extended through holes. This type of lock is more difficult to design but will provide more security. Bending of the door will not cause the door to open.

Figure 43 Rod lock

Pros	Cons
• High security	• Difficult design

Conclusion

The rod lock is the best option. The alternative that was considered is not actually safe so this is an easy choice.

2.4.2.5 Safety feature

For a machine to be sold commercially it should be absolutely safe when used. The process of safety proofing is very time consuming, and cannot be done within the time frame of a Smart Solutions Semester.

Of course, there was some research into the safety of the design. The main thing was making sure people can't reach the moving parts of the machine. It was decided that this safety feature should be integrated in both the door design and the dispensing mechanism. Therefore, it is covered in this chapter.

2.4.2.6 Bottle flap

The rotating parts are in the dispensing mechanism of the bottle dispenser. When reaching into the machine it is theoretically possible to reach these parts. This problem can be overcome by adding a safety flap as often seen in other vending machines.

In our design this flap was supposed to be placed at the end of the ramp. This can be seen in Figure 44.

The flap would have to stay close with some sort of mechanism. To design this the VDI model was used.

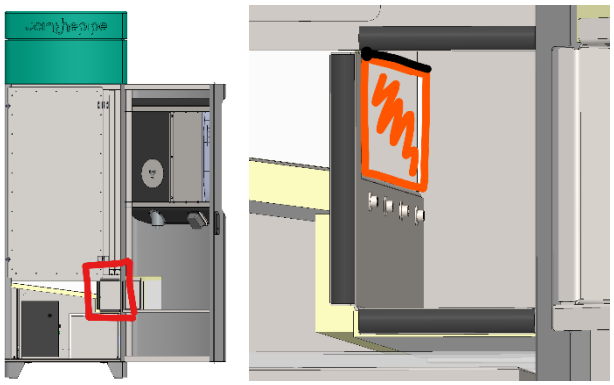


Figure 44 bottle flap

2.4.2.7 Requirements

The bottle flap mechanism must be built to the following requirements.

- A bottle can open the flap with rolling force
- Flap stays closed when air is circulated
- User can't open flap from outside

2.4.2.8 Concepts

A number of concepts were developed to see what would work best. In this section the different concepts are summarized and the pros and cons are written down so a choice can be made later.

Flap with spring hinges

The safety flap is closed with a set of spring hinges. When a bottle is bought, the flap opens due to the rolling force of the bottle. This means the spring must be weak. At the same time the flap must stay closed when air is being circulated. The force of the rolling bottle can be calculated but the force of the moving air is unclear. When the machine is physically built there can be some testing to find the required spring force.

Figure 45 Flap with spring hinges

Pros
- Cheap
- Simple construction

Cons
- Hard to find required force
- Ideal force might not exist

Magnets

An electromagnet is a device that upon applying voltage will energize to create a magnetic force. Also possible is a combination with a permanent magnet. The electromagnet will then overcome the force of the permanent magnet. Basically, a normally open or closed system.

The bottle flap is magnetically closed until a bottle is dispensed. It then opens and closes after the bottle rolls out. The flap needs a thick steel plate to be attracted. The flap also needs to close to a gap of 5mm by itself before the magnet will work.

Figure 46 Magnets

Pros
- Can be controlled electrically
- Keeps machine closed until bottle Is dispensed

Cons
- Heavy plate needed
- Max. 5 mm gap allowed

Switch

With a microswitch it can be detected when the flap in the door is opened. A safety feature in the software stops the machine from turning when this happens.

Figure 47 Microswitch

Pros
- Cheap
- Easy implementation

Cons
- Dependent on software

Series of linkages

The front flap is connected to another flap that closes the dispensing mechanism through a series of linkages. When the front flap is opened, this closes the other flap so the mechanism can't be reached.

The difficulty in this design is the orientation between both flaps, one is oriented width-wise while the other is length-wise. This 90-degree bend can be overcome with ball joints, but those have a limited range in which they can move.

The realization of this concept was very difficult. After 2 days of searching there seemed to be no manufacturer that makes linkages with the required range of motion. It would have to be made custom which is expensive, or the design would have to be changed.

Figure 48 Serie of linkages

Pros
- Reliable
- Simple construction

Cons
- Parts not available
- Expensive custom parts

Canted surfaces

Just as in the previous concept there are two flaps in this design. When the front flap is opened, another flap closes protecting the user from the mechanism. In this concept the flaps are not connected together. The front flap is shaped in such a way that when it opens it pushes the other flap closed through a canted contact surface.

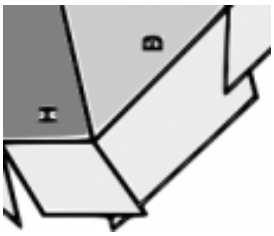


Figure 49 Canted surfaces

Pros
- Simple construction

Cons
- High force required
- Unreliable

2.4.2.9 Concept choice

All of the options were seriously considered, but for two options it was decided to stop investigating. The series of linkages was not feasible because of the lack of suitable parts, and the canted surfaces was too rough of a design to put into the machine.

The remaining three concepts are then evaluated on price, safety, reliability and ease of implementation. The scoring will be done on a scale from 1 to 5 where 1 is bad and 5 is good.

Spring hinges

This option costs around 20 euro to buy, so it is cheap. Safety wise the flap could be opened by the user if they really tried. It is therefore not entirely safe. The reliability is uncertain due to the unknown required spring forces. The ease of implementation seems very easy because only the hinges need to be mounted, but if the required spring force is not right it could prove to be very difficult.

Magnets

This option is the most expensive one, the parts will cost around 200 euro. Safety wise this is the best option because it requires a lot of force to overcome the magnet. The reliability is mediocre because of the max 5 mm gap for the magnet to work. The ease of implementation is also mediocre. The mounting is more complicated than the other concepts and there needs to be a software implementation as well.

Switches

This option is comparable to the cost of the spring hinges. Safety wise a faulty software solution can be dangerous, but if it's done right it is absolutely safe. The reliability with this solution has the same problem as safety, it depends on the quality of the programming. The ease of implementation is good, because the mounting of the switches is easy and the programming seems basic.

	Price	safety	Reliability	Ease of implementation	total
Spring hinges	5	3	3	2	13
Magnets	3	5	3	3	14
Switches	5	4	4	5	18

Conclusion

The spring hinges and magnet option are comparable in score. The switches concept scores considerably better, it is therefore logical to choose this option in the final design.

2.4.2.10 Production method

The rounded design that was chosen proves difficult to produce. Ideally the sheet metal would be bent into shape but with multiple rounded surfaces this is not possible. The design was split up in different section that need to be connected together.

Figure 50 Door design

Welding

Design wise welding is the easier option. Two metal sheets can be welded together as long as they are close enough together. But production wise welding needs more work than other methods. Welding puts heat in the product which can deform it. Welding seams need to be post processed to make them look good. Welding also requires more expensive employees and limits the material choice.

It is common practice to match plate thickness to aid weldability. The minimum thickness for stainless steel welding is 1.5 mm. Welding even thicker material is easier and gives more margin for error.

Pros
- Easy design

Cons
- expensive
- No adjustment possible
- Material choice limited

Glue

Gluing is a good option as it is easy to do and cheap. In this design it might not be possible for all connections as there needs to be overlap between parts.

Pros
- Easy assembly

Cons
- Difficult design
- No adjustment possible

Fasteners

Using fasteners is also easy to do. It makes the design adjustable, and makes disassembly possible. For this design the connections may not be possible. There needs to be overlap between parts and there must be space for the fasteners to be mounted. The fasteners will also be visible which does not suit this design.

Pros
- Easy assembly
- Adjustment possible

Cons
- Difficult design
- Visible fasteners

2.4.3 Ergonomic considerations

Some of the design choices are based upon ergonomic design principles. For example, the ergonomics of the design are based upon the following pictures.

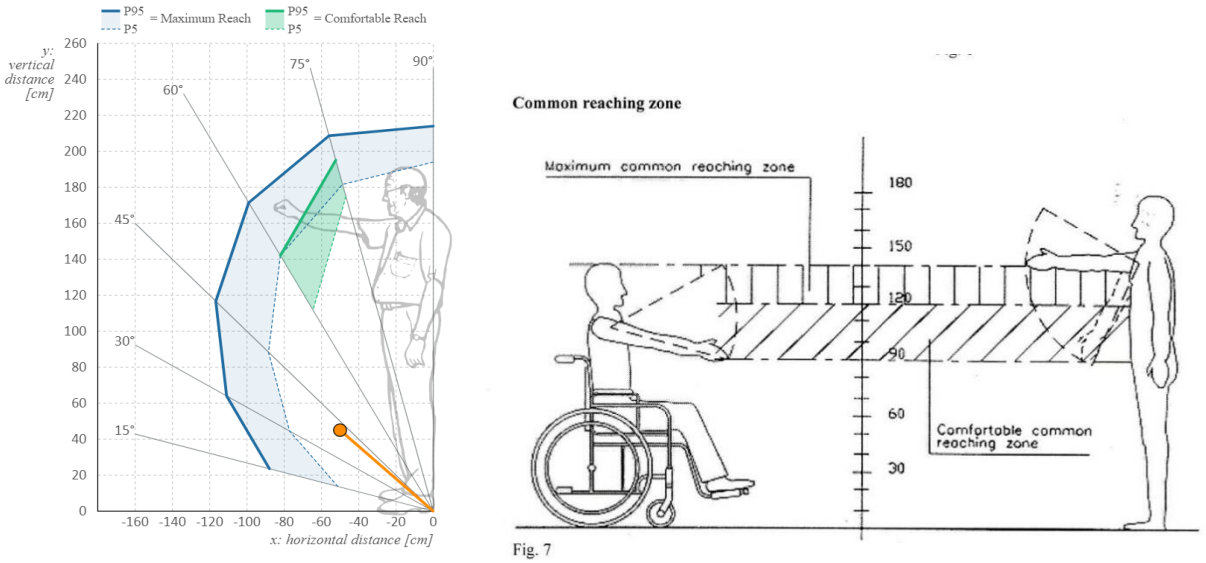


Figure 51 Ergonomic heights

In these pictures you can see the comfortable reaching zone for both standing people and wheelchair bound people. It can be concluded that the mostly used parts of the machine, such as the tapping point and the touchscreen, must be placed within this reach. The tapping point should be mounted between 1200 and 1400 mm high. The interface should be between 1200 and 1400 as well, but this can be done in the software design. The screen would then be mounted from 1200 mm up. You can find this in the design of the door.

2.4.4 Design

In this part of the report the design considerations of the door are explained. Here you can find why it was designed this way. This way future engineers don't have to guess and can make changes faster.

Figure 52 Door design

General shape and frame

Underneath the outside shell there is a frame. This frame makes it easy to house the hinges and the lock. The frame is built up from 40x20x2 stainless steel tubes. The hinges are made from 40x40x2 tubes and the locking rod guides are made from flat stock.

Figure 53 Hinges attachments

The outside is made from sheet metal. The rounded shape that is chosen requires the sheet metal to consist of two separate parts that are welded together. To aid the weldability to each other and to the frame a thickness of 2 mm was chosen. This thickness leaves a bigger margin for error compared to 1.5 mm. Design-wise it is no problem to go back to 1.5 mm in the future. This would save material cost and weight but makes production more difficult.

Figure 54 Door shapes

2.4.4.1 Tapping point

The water tap is supposed to represent a Join the Pipe water tapping point. The production of this tapping point is done by a company called 'Korver B.V.'. It was based upon the standard tap they produce but only the end of the pipe is used. In the back of the pipe a laser cut ring is welded that bolts to the front of the machine.

The tap is mounted at a height of 1410 mm from the floor. This is determined from the ergonomic principles discussed earlier in this report.

Figure 55 Join the pipe tap point

2.4.4.2 Design of drain

The drain is mounted underneath the water tap. The size of the tube is larger than the bottle so it can be placed into the drain. The bottle should then be centered perfectly under the tap.

The plate that the bottle rests on is laser cut to represent the Join the Pipe logo. In the bottom of the drain there is a ½" BSP threaded welding socket. This is welded on to allow a hose to be attached easily.

Most likely there is no drainage available where the machine is used. Therefore, the water must be stored inside the machine. The parts to store this are not drawn, but there is enough space for a jerry-can to fit behind the door.

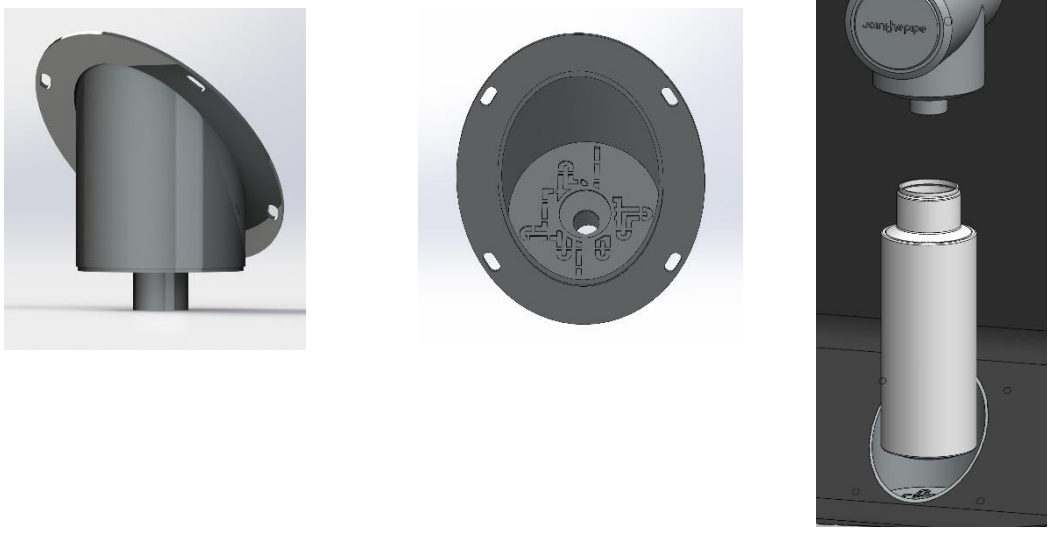


Figure 56 Drain

2.4.4.3 Screen mount

The screen mount is copied from the last version, this is due to the change of deliverables during the project. When the machine was supposed to actually be built, the old screen would still be used. When it was decided to only produce the design the old screen was still in the design. In order to change this, a touchscreen should be bought to see how the design can be custom made to fit.

The height of the screen is one of the things that has been specifically chosen to adhere to ergonomic standards as discussed earlier. 1210 mm to 1820 mm high

2.4.4.4 Payter mount

The Payter is mounted with a pair of custom brackets. The way these are designed can be seen in the picture on the right. The result is the Payter sticking out through the canted part below the screen as can be seen below.

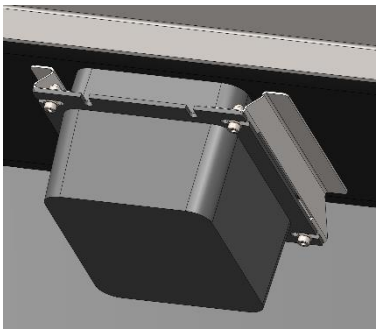


Figure 57 Payter mount

2.4.5 Improvements

2.4.5.1 Add water tank holder and hoses

The door is designed with a drain with a ½” BSP welding socket. A fitting can be screwed into this directly. But in the design the rest of the water drain system was not drawn. In the door there is room for a jerry can, which should be made custom with a fitting. The two fittings should be connected with a flexible hose.

2.4.5.2 Thinner outer shell

The outer shell could be made thinner to reduce material cost and weight.

2.4.5.3 Change screen design

When a touchscreen is chosen the screen design should be changed to the different mounting mechanism it has.

2.5 Cable management

In this chapter the design of the cable management will be explained. In a machine such as the water bottle dispenser with tap system, many cables and pipes are present. If these cables and pipes are loose in the cabinet, it can happen that they can stuck behind moving parts. Especially now that the drawer system can be pulled forward for easier and saver refilling of the machine.

2.5.1 List of requirements

As can be seen earlier in this chapter there is a long list of requirements for the bottle dispenser. The requirements that apply to the cable management are repeated here to show what was taken into consideration during the design phase.

Table 9 List of requirements for cable management

Cable management				
Nr.	Fixed	Variable	Wish	Requirement
	x			The cable's may not be stuck behind moving parts
	x			The folding mechanism may not be stuck behind moving parts

2.5.2 Concepts

In this paragraph the different options of the cable management will be discussed and the design choices will be explained.

The columns are pulled forward so that filling the machine is easier and less dangerous. Because the columns are pulled forward, the cables for the motor and sensors must be able to move without getting stuck. A length of approximately 130 mm had to be 620 mm when unfolded. This can be solved in several ways. The following solutions have been devised for this:

2.5.2.1 Cable rollup

The same system as in a vacuum cleaner. The cable remains under tension, when the space becomes smaller, the cable rolls up.

Pros

- Easy install

Cons

- Only for small cables
- Only for a few cables
- Need more than 1 cable rollup system each column

Figure 58 Cable rollup

2.5.2.2 Cable folding system

In the collapsed state, the two conductors have a much larger angle than in the collapsed state. In this way a large span can be achieved. If you only have enough space above it. In our system there is enough space. This system can be worked out in different ways, such as rods, laser-cut parts, tubes etcetera.

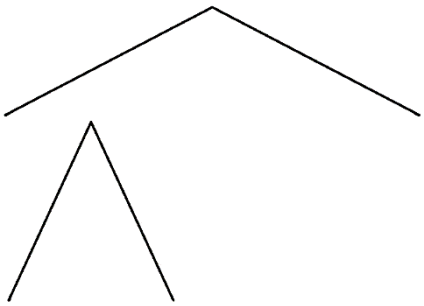


Figure 59 Folding system

Pros	Cons
• As much as needed cables can lay in the conductors • Easy system	• Requires space in the vertical direction • Expensive

2.5.2.3 Cable chain

A cable chain is a very usual way for cable management.

Pros	Cons
• As much as needed cables can lay in the conductors • Buy-part	• Requires space in the horizontal direction

Figure 60 Cable chain

2.5.2.4 Cable suspension

The cable is attached in the middle to a spring that holds it up. When the drawer is pulled out, the spring is pulled. When the drawer is retracted, the spring is released and the cables are pulled up.

Pros	Cons
• As much as needed cables can lay in the conductors	• Requires space in the vertical direction
• Buy-part	• Unsure if the cables aren't touching moving parts

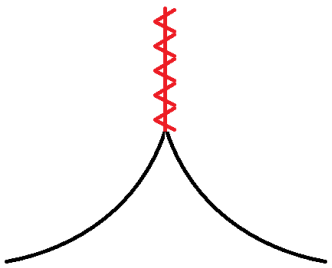


Figure 61 Cable suspension

2.5.3 Design

2.5.3.1 Folding arm

The various solutions have been placed side by side and the cable folding system has been chosen. Since there are many laser-cut parts in the bottle dispenser, extra parts can be cut easily and relatively cheaply. Every 2 columns are 1 drawer together. One folding system must be used for each drawer, as shown in Figure 62 there are 3 in the new bottle dispenser.

The folding arm consist of 4 different parts as can be seen in Figure 63. The other side of the folding arm is mirrored. The profiles that are attached to each other does have holes to which the cables can be attached by means of tyraps.

In Figure 64 and Figure 65 the folding arm is shown in folded and unfolded state.

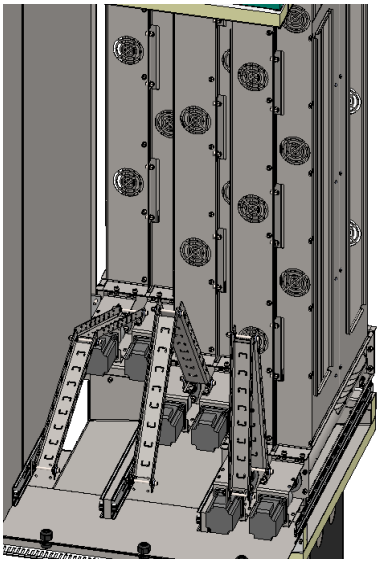


Figure 62 3 columns with folding system

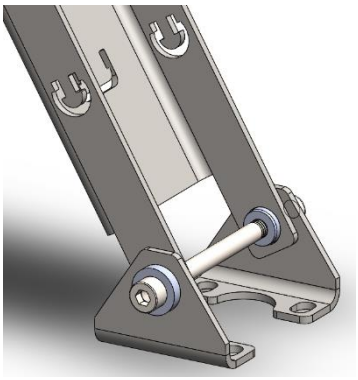


Figure 63 Folding arm parts

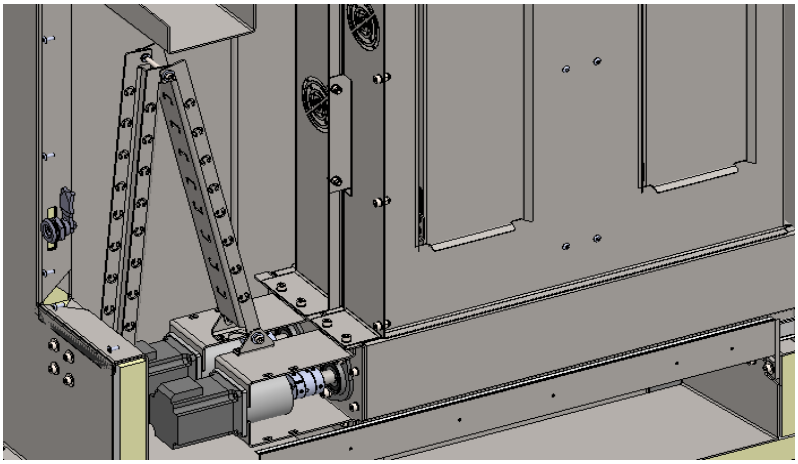


Figure 64 Drawer cable management collapsed

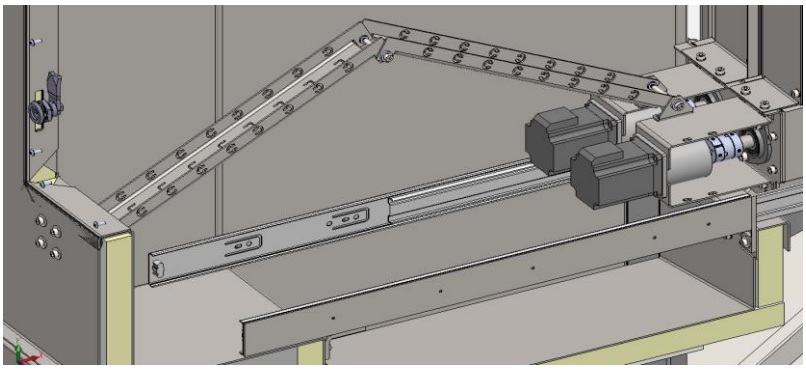


Figure 65 Drawer cable management unfolded

2.5.3.2 Microswitches

The ultrasonic sensors are replaced for microswitches that are attached in the bottom part of the columns. For the sensors there is 24 mm space between the columns. As you can see in Figure 66 the sensors do not have much space. The cable connection on the left side of the picture sticks out, therefore insulated cable lugs must be used. The cables are routed between the columns to the cable folding arm

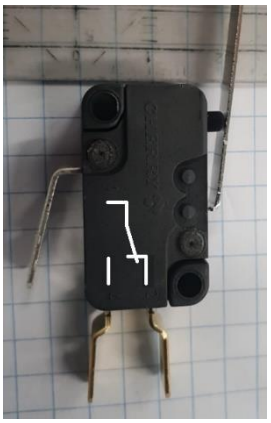


Figure 66 Microswitch for bottle detection

2.5.4 Improvements

The cables of the microswitches are guided between the columns. At the place where the cables enter the folding system, the cables go under the columns just past the rotators. This can be solved by making a slot for the cables between the columns to the folding system.

2.6 Electrical box

In this chapter the considerations for the electrical box are explained. Preferably all of the electrical components are placed together. In the design there was a small space left free for this box to be mounted.

First the electrical components that are used are explained, then the choice for an electrical box is explained. Now that the size is determined, a layout can be made and the electrical specialists can be asked for their approval.

2.6.1 Electrical components

In this paragraph every component that is used is described.

2.6.1.1 Microprocessor

The microprocessor from a previous group is used. This component consists of two PCB's that are connected with three ethernet cables. The microprocessor has a size of 97x67 mm and the breakout board has a size of 100x35 mm. The microprocessor requires a 12V power input

2.6.1.2 Stepper drivers

The stepper drivers convert the pulses sent from the microprocessor into the right signal to make the stepper motors rotate. In the final design six stepper motors are used so six of these stepper drivers are used in the electrical box. The stepper drivers have a size of 120x25x75 mm each and are mounted with a gap of 15 mm between each one for proper cooling. The stepper drivers require a 24V power input

2.6.1.3 Power supplies

The power supplies deliver power to the microprocessor, the stepper drivers and to the raspberry Pi that is mounted in the door. Advised by the electrical engineers 4 DIN rail mounted power supplies were chosen. These are a 5V 60W, 12V 60W, and two 24V 150W power supplies from the manufacturer Meanwell. This row of power supplies has a width of 315 mm and is mounted on a DIN rail.

2.6.1.4 Fuses and terminal blocks

Because a DIN rail is already used it was easy to mount these parts on the same rail. For safety reasons a 16A main fuse was used. This makes for easy and safe shutdown of all components when working inside the electrical box. The 230V mains cable goes into the main fuse and an earthing terminal.

The 230V is then run to a set of terminal blocks that are interconnected. All of the components can be attached to these terminal blocks. When a component needs replacing only those connections have to be disconnected.

2.6.1.5 Temperature controller

The cooling system is run by a temperature controller. This component, switches the compressor on and off at the right time to ensure a constant temperature. The box that houses this was originally mounted next to the cooler, but in a final version this should be placed in the electrical box.

2.6.1.6 Electrical box

the electrical box must fit in the bottom of the machine. A space of 840x570x175mm is available in the bottom part of the machine. A box was found that fits in there easily and it is also waterproof with a rating of IP67 which means it is completely dust proof and will stay watertight up to a half hour at a depth of 1m under water. The box has a size of 600x400x130.

2.6.2 Component layout

All of the components were drawn in Solidworks so a detailed design could be made. They were split into two sections, the high voltage and low voltage sections. This is so there is less interference between the cables.

In the bottom of the case the 230V cables are run inside a cable guide. From this guide the cables run to the bottom parts of the power supplies and into the temperature controller.

From the top of the power supplies the low voltage power cables are run into the low voltage cable guides and then to the stepper driver and the microprocessors. The low voltage cable guide is also where all the data cables are run.

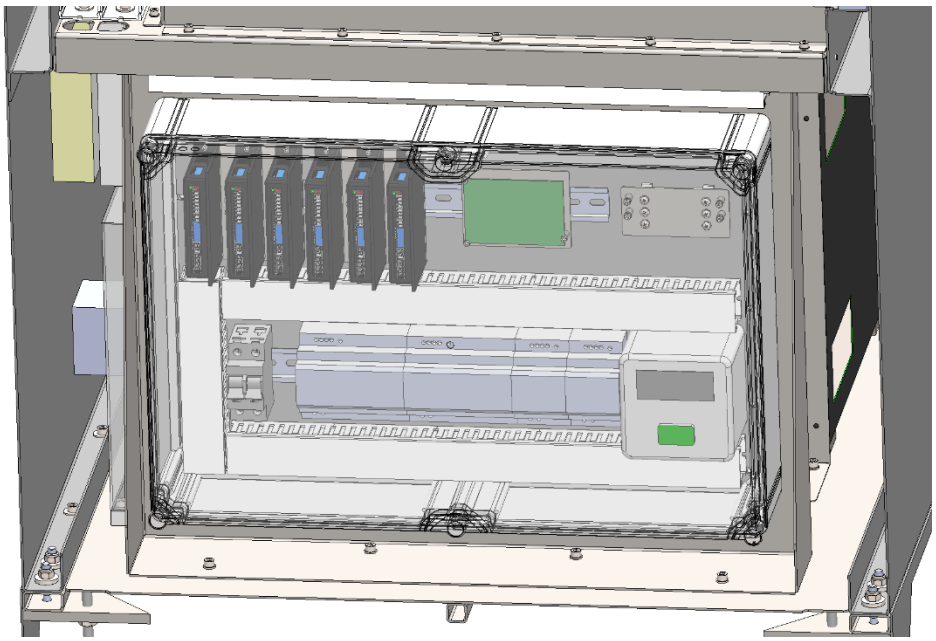


Figure 67 Electrical design proposal

In the figure above the electrical design proposal is shown. The electrical engineers that will do the assembly agreed that this is a good design and that the high and low voltage cables are sufficiently separated that there will be no interference.

The designed box has been built for repairing the old machine, the result of this can be seen in the picture below.

There are a couple of differences between the conceptual design and the final build. The DIN rail adapters were never delivered so the components were mounted directly to the back plate.

2.6.3 Improvements

PCB mounting

The PCB mounting must be very precise because the holes are very small. It is better to let a computer-controlled machine make these mounting holes. It was planned to laser cut a plate for this and mount it on a DIN rail, but the adapters for this were never delivered. The holes could also be cut into the backplate directly.

The mounting should also be done with plastic fasteners to prevent any shorts.

3 Test assembly

In the past six months, much progress has been made regarding the mechanical and electrical part of the machine. A complete series production bottle dispenser has been designed. Because there is not enough time to have the complete drawing package made and assembled, a test set-up has been chosen containing the major changes/improvements that we have made over the past six months. The test setup consists of:

- Frame
- Housing
- Drawer system
- Cable management
- Integrated touchscreen

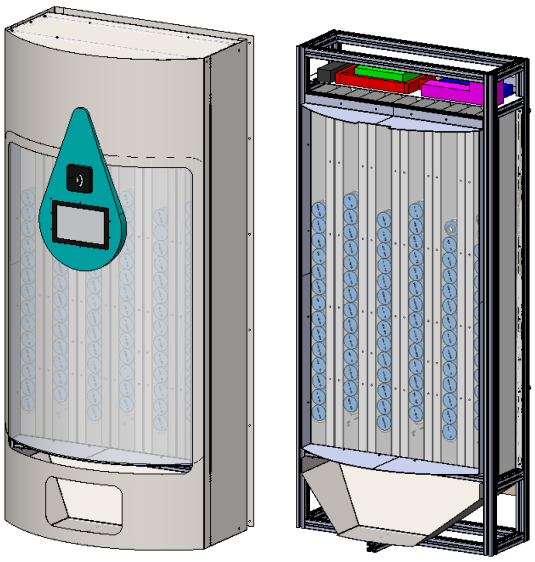


Figure 68 Frame bidon dispenser V1

3.1 Frame

The frame of the first version of the bottle dispenser as can be seen in Figure 68 has approximately the same dimensions as the built-in size of the new drawer system. The 40x40 aluminum extrusion profile used for this are relatively expensive. To save money, the old machine was disassambled and the profile were used for the test assembly as can be seen in Figure 70. The old frame was unstable, therefore 2 crossbars were added with the wheels on both sides. This means that the top-heavy frame can not fall over as can be seen in Figure 69.

Figure 69 Stable chasses

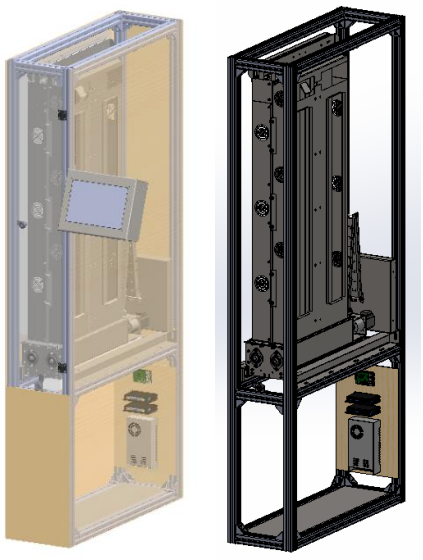


Figure 70 Frame test assembly bidon dispenser

3.2 Housing

Because it is a test setup, little attention has been paid to its appearance. An easy solution has been chosen, namely MDF plates and transparent plastic. To look inside the machine, a window has been made. Where the bottles are ejected, a slot is made to extract the bottle. A hole has been made at the bottom of the machine to access the electricity components, this must be covered when the machine is used. The cover plate lays in the bottom part of the machine. All these parts can be seen in Figure 71. The other side of the machine is fully covered in MDF-plates.

The door through which the drawer is extended is made of transparent plastic. This is kept closed by means of a lock. This can be unlocked with a universal cabinet key.

Figure 71 Housing

3.3 Drawer system & Cable management

One drawer is present in the test set-up. How this works exactly is explained in paragraph 2.1 Drawer system.

3.4 Integrated touchscreen

3.4.1 System requirements

Area	Requirement	Relevance				Functional/Not functional
		M	S	C	W	
Mechanical	Motors turn is 180º	X				Not functional
Programming	Do not wait more than 15 seconds to get the bottle	X				Not functional
Programming	See which model of bottle available and which ones are not.	X				Not functional
Programming	Know what is happening during the process (the delivery is in process etc.)	X				Not functional
Programming	Microswitch read: High level means that the column is empty. Low level means that the column is full.	X				Not functional

Table 10 System requirements

3.4.2 Proposed solution

The application is going to be programmed with the software Visual Studio 2017, the reason of this choice is explained in section of Touch Screen in the document Literature. Indeed, it is necessary to know that this project is a continuation of another previous. That is the reason why some components are going to be reused in the electronic area.

3.4.3 Electronic

The components which are going to be reused are:

-Motors. They are attached with the cylinders. They will do the cylinder spin for deliver the bottles. They will connect with the digital stepper driver. They are power with 24V DC.

-Digital stepper driver They will give voltage to the motors, so they spin. They are connected with the raspberry with a logical convertor in the middle. They need 5V DC for power and a digital pulse.

-Raspberry Pi. It is needed to run the program for the delivery of the bottle. It needs to be supply with 12V DC.

Indeed, most of the wiring used to connect them. These achieve the specifications, and there is no reason to change them. Their high price was considered too.

New components for this version are:

-Microswitches. The lecture of these sensors will indicate if the columns are empty or not. One of its terminals will be connected with ground, and the other one will be connected with a pin of the raspberry.

-Logical convertor to 5 V. The input needed for the digital stepper driver is a voltage between 4.5-5V and the output voltage which the raspberry give is 3.3V. They will be placed between the raspberry and the digital stepper driver.

3.4.4 Programming organization.

The working flow of the application is:

- **Welcome panel.** The main page which will be showed when the application starts and after the bottle is delivered.
- **Zero panel.** This page shows that two model of bottles are unavailable. There is also an adjust button. Pressing this button, it shows the adjust page which will be explained below.
- **Column 1 panel.** This page shows that the black bottle is available and the white one is not. This means that both or one microswitch of the column 1 is pressed. There is also an adjust button. Pressing this button, it shows the adjust page which will be explained below.
- **Column 2 panel**. This page shows that the white bottle is available and the black one is not. This means that both or one microswitch of the column 2 is pressed. There is also an adjust button. Pressing this button, it shows the adjust page which will be explained below.
- **Both columns panel**. This page shows the both model of bottles are available. There is also an adjust button. Pressing this button, it shows the adjust page which will be explained below.
- **Adjust panel**. In this page there are 3 buttons. One to start the motor of the column 1, other to start the motor of the column 2 and a back button to go back to the selection page.
- **Sold out panel**. This page shows the following message: “Thank you! It seems our bottles were a success. They will be available as soon as possible.” Both columns are empty.
- **Thank you, panel.** This page shows a thanks message for buying the bottle. It is showed during the deliver and for 5 seconds.

3.4.5 Flow chart of the application

In Figure 72, a flow chart can be seen how the application works.

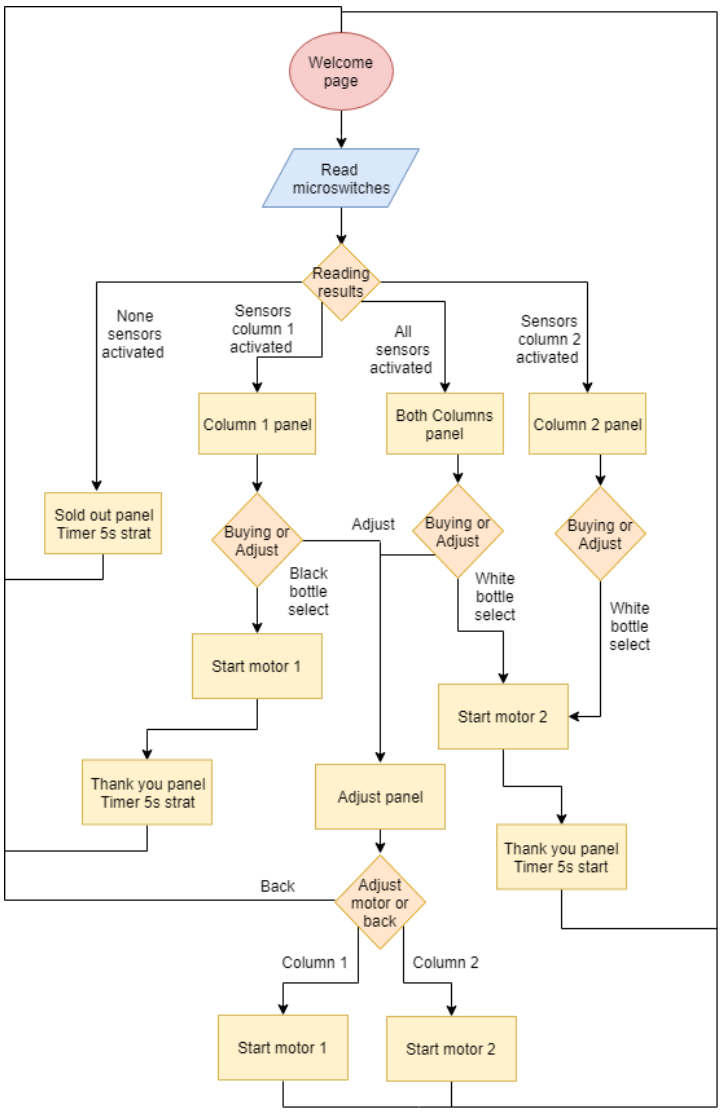


Figure 72 Application Flow Chart

3.4.6 Programming explanation.

When the application is run a welcome panel is showed. In this panel there is a text which asks to press the screen to buy a bottle.

Figure 73- Welcome panel

When this tapped is done, the program reads the pins of the raspberry which are connected with the microswitches. These are 3,4, 5 and 6 GPIO pins. Depending on which sensors are pressed a different panel will be showed.

(1)

(2)

(3)

Figure 74- Selection Panel

The panel on the right (1) is showed when there are bottles in both columns. The panel on the middle (2) is showed when there are black bottles available. When a tapped is done on the bottle image, the process starts. There is an adjust button which will be explained below. Last panel (3) is showed when both columns are empty.

When a bottle is selected, a control signal is sent to the pin which is connected with the digital stepper driver related with that bottle. This signal has a frequency of 1 kHz. It is sent for 3.5 seconds.

Bottle	GPIO pin motor
Black	12
White	27

Table 11 connections

During the ejection of the bottle a thank you panel is showed for 5 seconds.

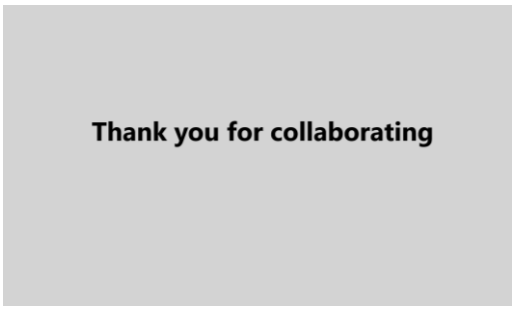


Figure 75-Thank you panel

The welcome panel is showed again after the thank you panel.

The adjust button, which is in the image 1 and 2 from Figure 2-Selection panel, is used to access to the Adjust panel.

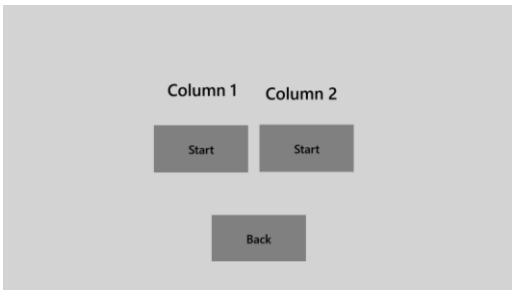


Figure 76- Adjust panel

In this panel it is possible to turn the motors 5 degree with each tapped. So, it is possible to ensure that the motors' orientation is 180º degrees.

3.4.7 Alternative solution

As mentioned previously there are some components which were given. Indeed, they are a good option to develop this project. So, the alternative solutions are going to be considered for the logical convertor and for the flow chart of the application.

Logical convertor. An alternative solution is design and build a PCB which converts the 3.3V to 5V. This solution would take more time and would be more expensive. It is not worthy for a proof of concept.

Related to the panels of the application. It could be designed in a different way, for example it could have a start panel where it shows the bottles available instead of a welcome panel and then a selection panel. Indeed, a confirmation panel where the user verifies its choice before the sale is definitive. This kind of specifications are up to the client. Due this application is a proof of concept, these kinds of specifications were not made.

3.4.8 Testability

During the testing phase there were some changes in the programming in order to solve some errors.

Define ports characteristics. For the pins, which are used to send the PWM signals to start the motor, it is important to define their characteristics (frequency, duty cycle etc.) only once. The reason is that the second time a PWM signal was sent the program frozen. It was tried to dispose the pin, like when the sensor's pins are defined, but it did not work. The solution was defining a variable to ensure that these characteristics were define just 1 time.

Motors' speed. When the application was tested, using the step driver and motor from the previous group, the speed was very slow. One way to rise the speed of the motor is increasing the frequency of the PWM signal. Due to higher frequency more pulses are sent, and it means a higher speed. This solution was not good because the maximum frequency that the raspberry pi can give is 1 kHz. It was not enough.

The step driver can be configured to adjust the speed of the motors depending on the number of pulses that they receive. So, this configuration was changed to spin more degrees with less pulses.

Time for the motors. The degrees that the motors rotate are controlled by the time that the PWM signal is sent. There were many tests to adjust it to rotate 180º degrees.

3.5 Recommendations

Some improvements could be done in this application are:

Define a confirmation panel. Currently when a bottle is selected it is delivered directly, without asking the user for a confirmation of the decision. It would be nice so, if the user can ensure his decision.

Program the motors for half column full option. Currently the application does not contemplate when a column is half full. In this case, the motors will need to spin 360º to deliver one bottle. One option to do it will be: when the sensors are read set the value of one variable. So, when the bottle is selected depends on the value of this variable the program will know if it has to turn 180º or 360º.

Count the numbers of pulses that are sent. In order to be more precise with the degrees that the motor turns, it would be needed to know the exact amount of pulses that are sent.

3.6 Improvements

The changes made by us could be tested with the test assembly. After a number of tests, it soon became clear that there was a problem with the bottles with the eye on the top. The bottles are laid with the eyes toward each other. Due to the weight of the bottles above the rolling mechanism, the second lowest bottle turns with it. Because the guide stops too high regarding the rolling mechanism, the eye of the bottle remains stuck as shown in Figure 78. This has been adjusted by making the guide longer so that it cannot turn the bottles above it. This is drawn in blue.

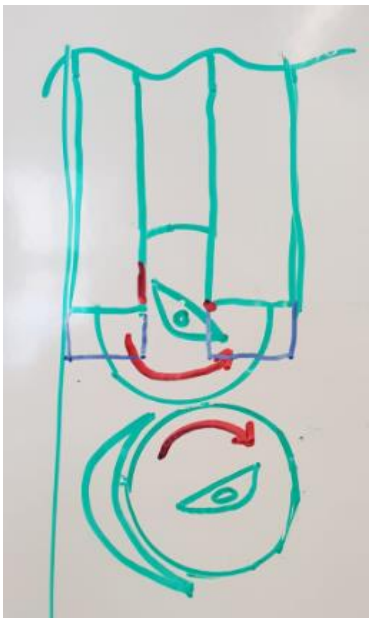


Figure 78 Sketch dysfunction rolling mechanism

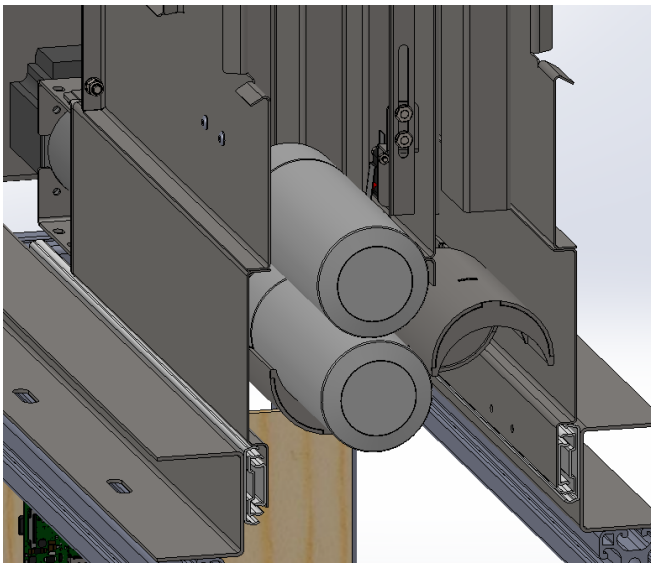


Figure 77 Dysfunction rolling mechanism

4 All recommendations

4.1 Drawer

The changes made by us could be tested with the test assembly. After a number of tests, it soon became clear that there was a problem with the bottles with the eye on the top. The bottles are laid with the eyes toward each other. Due to the weight of the bottles above the rolling mechanism, the second lowest bottle turns with it. Because the guide stops too high regarding the rolling mechanism, the eye of the bottle remains stuck as shown in Figure 80. This has been adjusted by making the guide longer so that it cannot turn the bottles above it. This is drawn in blue.

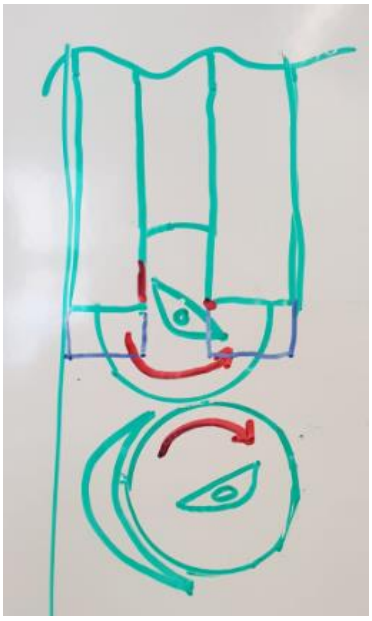


Figure 80 Sketch dysfunction rolling mechanism

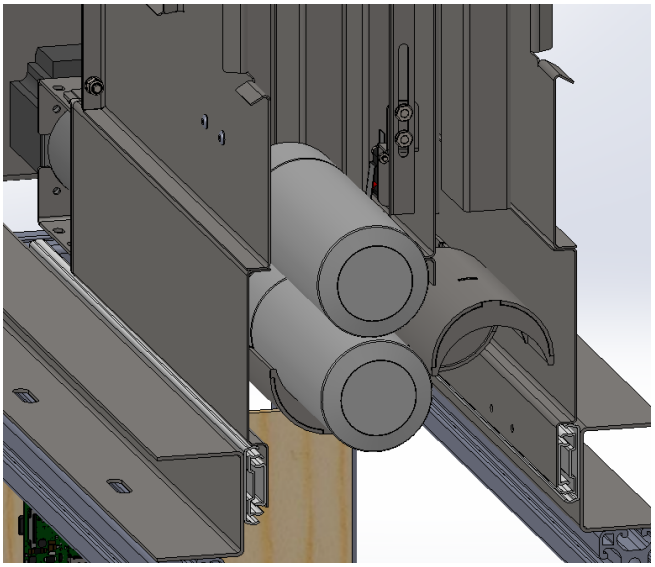


Figure 79 Dysfunction rolling mechanism

4.2 Frame

Custom customer cover

The custom customer cover on the bottle dispenser has not yet been worked out by the project group. First of all, a production method must be found which the cover can be produced with for series production. The project group chose rotational moulding technique for producing the cover. The project group asked Pentas for a cost overview for producing the cover. Pentas starts producing from a minimal of 300 pieces.

The design of the hood can be looked at where it can be used as a functional addition to the machine. Now it is just a cover that can be put on the machine with no function then a cosmetic point of view. For example, you can make a compartment in the cover that can be used to stock of bottles of water.

Drawer system

At this moment the user can extend all three drawer systems, due to the weight of the bottles in combination with the drawer system there is a chance that the machine will tip over, the user may be injured. In order to ensure that only one drawer system can be extended at a time, a locking system must be developed so that the user cannot extend all drawer systems at the same time.

Safety features

At the moment the machine is not equipped with safety devices, when the front door or cooling door is opened, the machine must be switched off so that the ejection system is not put into operation, this is currently not the case. This also applies when the back door or hatch is opened.

Flow meter water tap

The machine is equipped with a water tap from join the pipe, the user can have his or her bottle refilled for a small amount at the bottle dispenser. It must be possible for the user to select a quantity of water via the interface. The user pays through the contactless payment system, instructions must be displayed on the screen. The instructions tell the user that the bottle must be placed. When the push button of the tapping point is pressed, the flow meter starts to measure the water consumption, the instruction screen shows how much water the user can still tap. At this moment the flow meter and the instruction on the display are not developed and integrated in the new design.

Microswitches

The cables of the microswitches are guided between the columns. At the place where the cables enter the folding system, the cables go under the columns just past the rotators. This can be solved by making a slot for the cables between the columns to the folding system.

4.3 Cooling system

The bottom part is used for the bottles cooling system and water cooling. The hot air is blown down the machine. Both the inlets are at the rear of the machine. Between the air inlet of the machine at the rear and the air inlet for the cooling systems is the power box. Unfortunately, there is no better place for the power box. If you place it higher, it is in the cooled area of the machine.

The used condenser is the condenser used by the previous iterations. When this condenser was chosen, a calculation was made by Lasscher and Keizer. Because the situation is changed in terms of capacity and cooling area, it may be that in addition to the evaporator, the condenser must be selected differently. Fortunately, the condenser from the previous iteration was calculated for a larger cooling area and more bottles. This would mean that if a new condenser is needed, it is smaller than the current one.

4.4 Door

Add water tank holder and hoses

The door is designed with a drain with a ½" BSP welding socket. A fitting can be screwed into this directly. But in the design the rest of the water drain system was not drawn. In the door there is room for a jerry can, which should be made custom with a fitting. The two fittings should be connected with a flexible hose.

Thinner outer shell

The outer shell could be made thinner to reduce material cost and weight.

Change screen design

When a touchscreen is chosen the screen design should be changed to the different mounting mechanism it has.

4.5 Electrical box

PCB mounting

The PCB mounting must be very precise because the holes are very small. It is better to let a computer-controlled machine make these mounting holes. It was planned to laser cut a plate for this and mount it on a DIN rail, but the adapters for this were never delivered. The holes could also be cut into the backplate directly.

The mounting should also be done with plastic fasteners to prevent any shorts.

4.6 Touchscreen

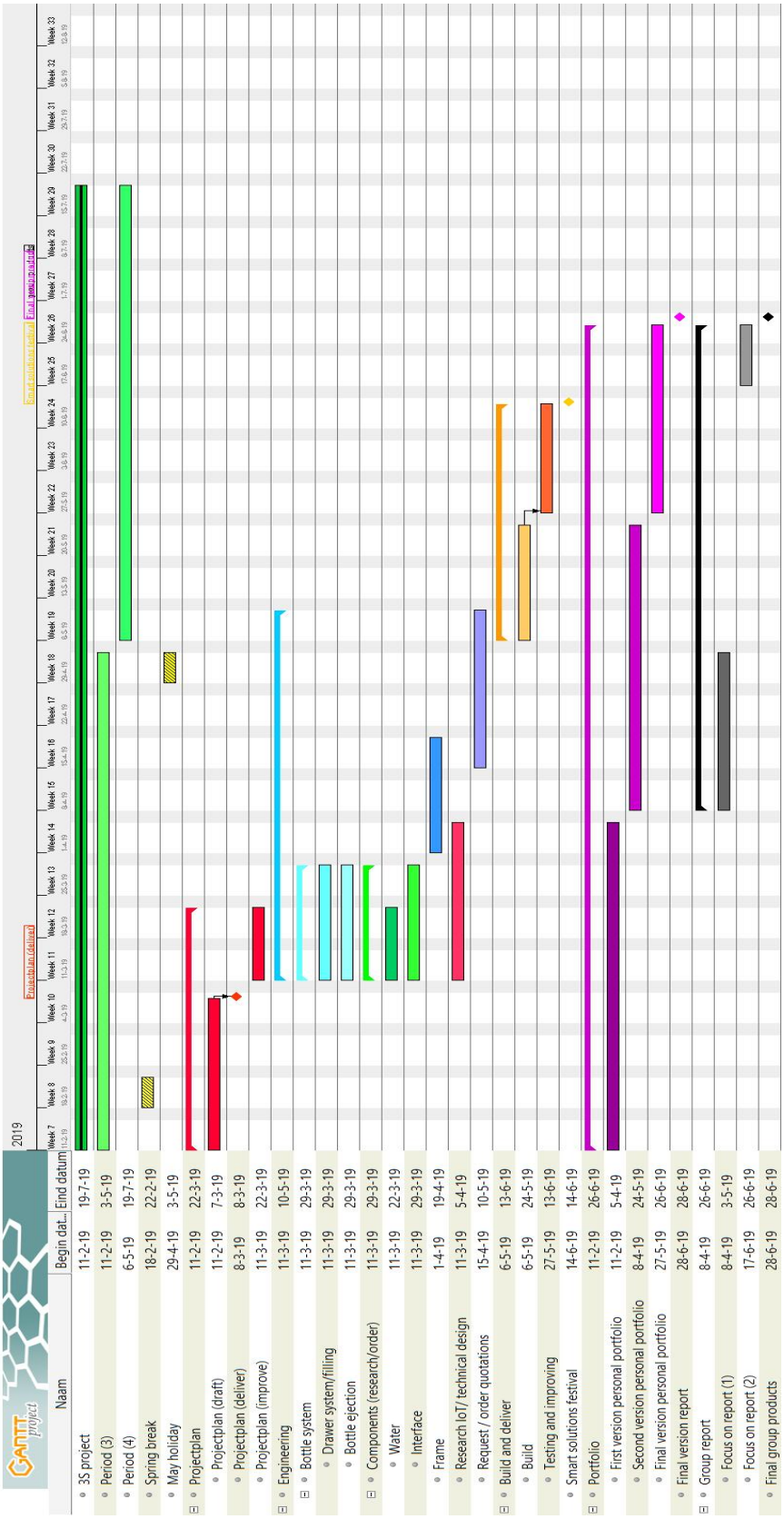
Define a confirmation panel. Currently when a bottle is selected it is delivered directly, without asking the user for a confirmation of the decision. It would be nice so, if the user can ensure his decision.

Program the motors for half column full option. Currently the application does not contemplate when a column is half full. In this case, the motors will need to spin 360º to deliver one bottle. One option to do it will be: when the sensors are read set the value of one variable. So, when the bottle is selected depends on the value of this variable the program will know if it has to turn 180º or 360º.

Count the numbers of pulses that are sent. In order to be more precise with the degrees that the motor turns, it would be needed to know the exact amount of pulses that are sent.

Appendixes

Appendix A: Planning



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3S project	11-2-19	19-7-19
Period (3)	11-2-19	3-5-19
Period (4)	6-5-19	19-7-19
Spring break	18-2-19	22-2-19
May holiday	29-4-19	3-5-19
Projectplan	11-2-19	22-3-19
Projectplan (draft)	11-2-19	7-3-19
Projectplan (deliver)	8-3-19	8-3-19
Projectplan (improve)	11-3-19	22-3-19
Engineering	11-3-19	10-5-19
Bottle system	11-3-19	29-3-19
Drawer system/filling	11-3-19	29-3-19
Bottle ejection	11-3-19	29-3-19
Components (research/order)	11-3-19	29-3-19
Water	11-3-19	22-3-19
Interface	11-3-19	29-3-19
Frame	1-4-19	19-4-19
Research IoT/ technical design	11-3-19	5-4-19
Request / order quotations	15-4-19	10-5-19
Build and deliver	6-5-19	13-6-19
Build	6-5-19	24-5-19
Testing and improving	27-5-19	13-6-19
Smart solutions festival	14-6-19	14-6-19
Portfolio	11-2-19	26-6-19
First version personal portfolio	11-2-19	5-4-19
Second version personal portfolio	8-4-19	24-5-19
Final version personal portfolio	27-5-19	26-6-19
Final version report	28-6-19	28-6-19
Group report	8-4-19	26-6-19
Focus on report (1)	8-4-19	3-5-19
Focus on report (2)	17-6-19	26-6-19
Final group products	28-6-19	28-6-19

Appendix B: Cooling system

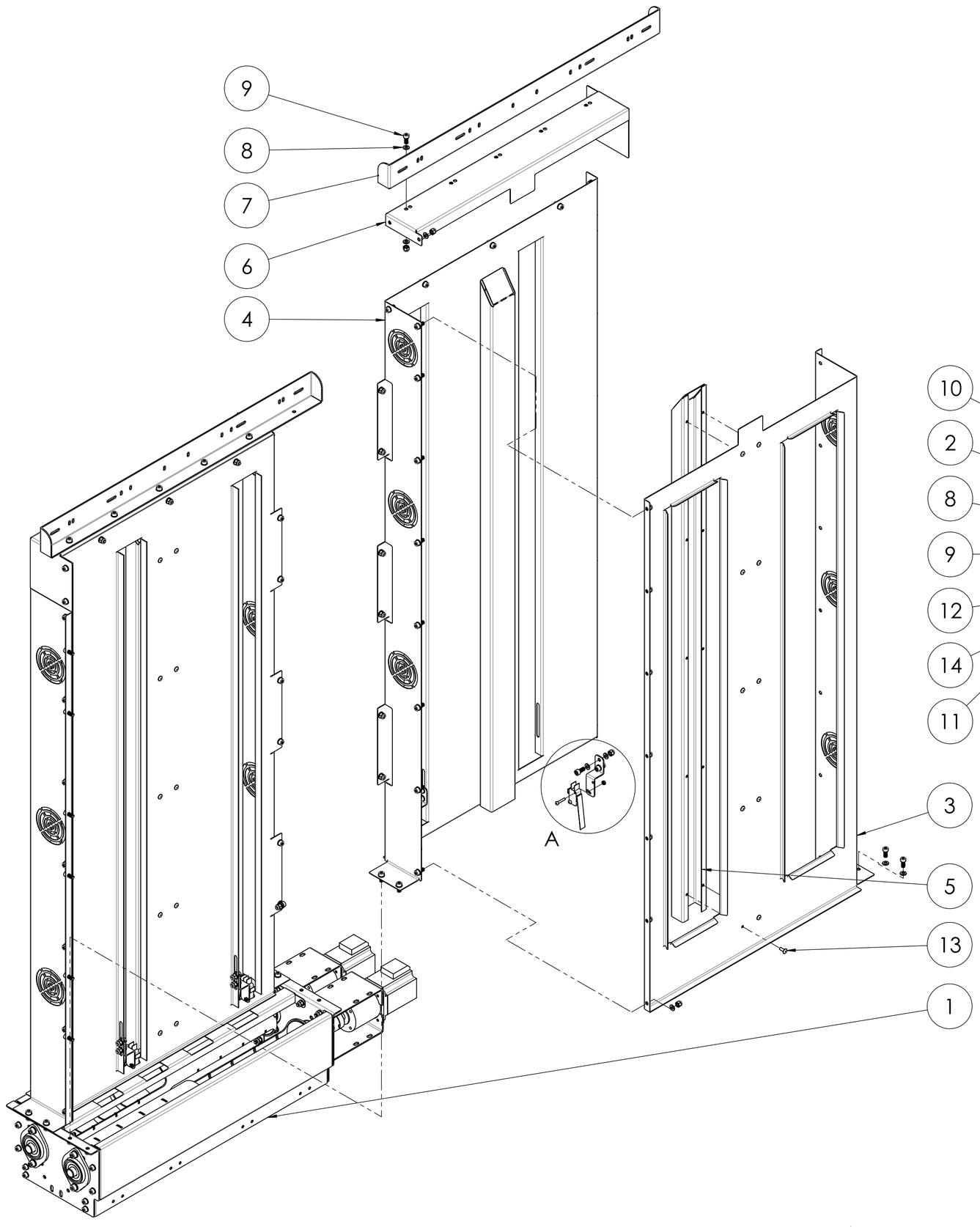
Lassche en keizer

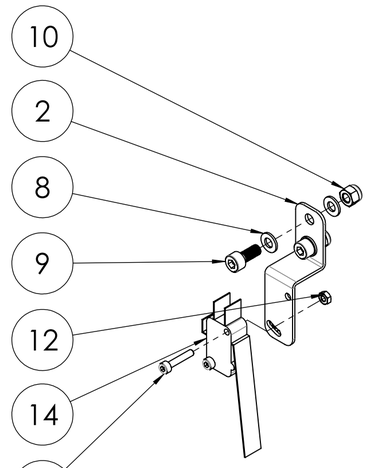
The previous group that worked on the project had an cooling system installed by the companie “Lasscher & Keizer”. A mechanic came to install and test the installation, afterwards a certification sticker was placed inside the bidondispenser.

For this project the same casing is used with the same cooling installation. But the internal is totally different. Also, the airflow is quite different. This raised the question if the certification sticker is still authorized to be placed, since the airflow could affect the cooling. To get an answer to this question we went to Lasscher & Keizer and we had an sit down with the engineer who did the project in the first place. We showed him pictures of the new airflow situation and told him that we didn’t modified the original cooling system except for the airflow. He told us that it is still a closed system and that the airflow shouldn’t matter that much. Although the airflow is a different direction it should work because the airflow is being forced by several fans and airducts. Also, it wasn’t necessary for a mechanic to come down and place a new certification sticker. He advised us that for long term use it would be optimal to force the air out of the hot condenser area to avoid overheating, overheating would have a negative effect on the life span. The conclusion was that we just have to test if the system is operational and is working well. Also, we had to check if the original system doesn’t have any leaks since it could be possible the system is damaged by working on the new internals. If eventually the system is damaged or is isn’t working as it should we must contact the company. If it is working good no further action is required.

Appendix C: Technical drawings

- Drawer System (01.-)
- Frame (02.-)
- Cooling system (03.-)
- Door (04.-)
- Cable Management (05.-)
- Electrical system (06.-)





DETAIL A
SCALE 1 : 2

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
14	4	D3V-013-1A3	Microswitch D459-V3LL 250 V/AC 16 A	
13	40	Rivet R3.8 x10 A2	34180.040.010	
12	8	M3 Hex nut A2	51730.030.001	
11	8	M3 x 16 Hex. socket screw A2	51050.030.016	
10	80	M5 Hex lock nut A2	51730.050.001	
9	80	M5 x 12 Hex. socket screw A2	51050.050.012	
8	160	M5 Washer A2	51420.050.001	
7	2	01.0002	Bracket	AISI 304
6	2	01.0026	Cover	AISI 304
5	4	01.0022	Support	AISI 304
4	2	01.0004	Plate	AISI 304
3	2	01.0025	Plate	AISI 304
2	4	01.0027	Bracket	AISI 304
1	1	01.0021	Ejector assembly	Material <not specified>

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

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Drawn:	M. ten Cate		27-5-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

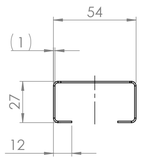
Finish:

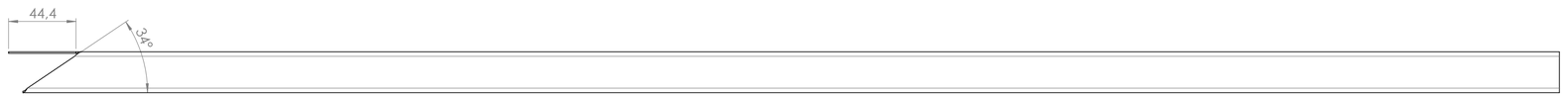
Material: Material <not specified>

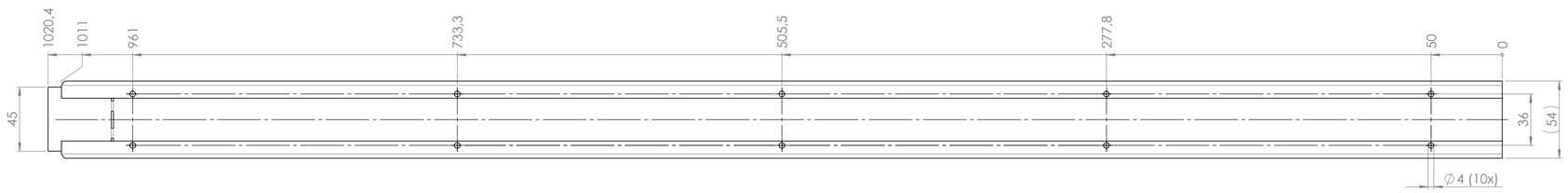
Description:

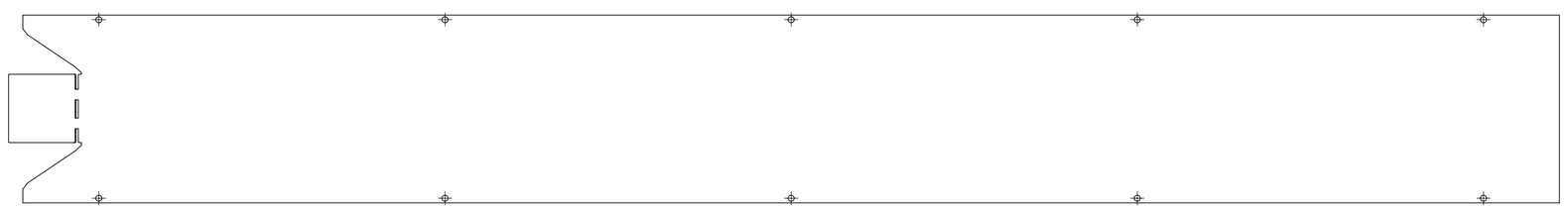
Stockroom assembly

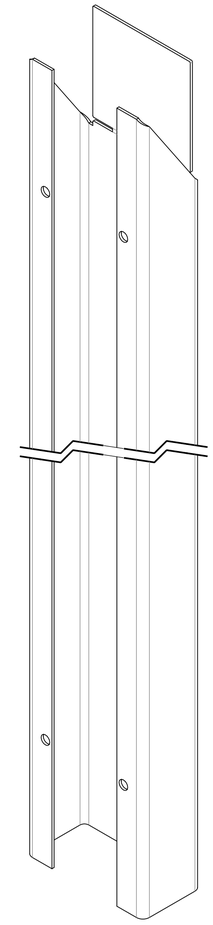
Drawing number:	Revision:	Format
01.0001		A2
Weight: 32596.08	SCALE: 1:5	SHEET: 1 OF 1











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Class: SSS	Student No.			Weight: 992.95 grams	SCALE: 1:2 / SHEET: 1 OF 2

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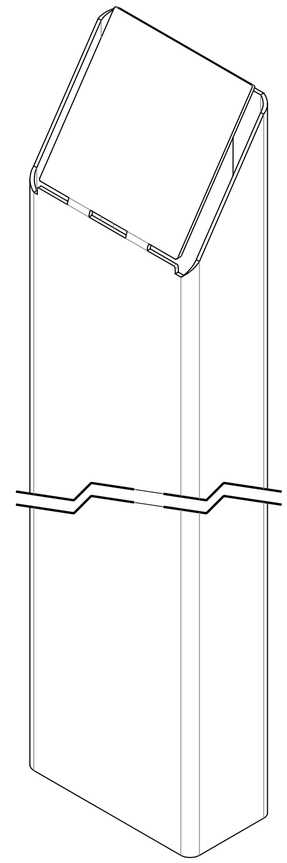
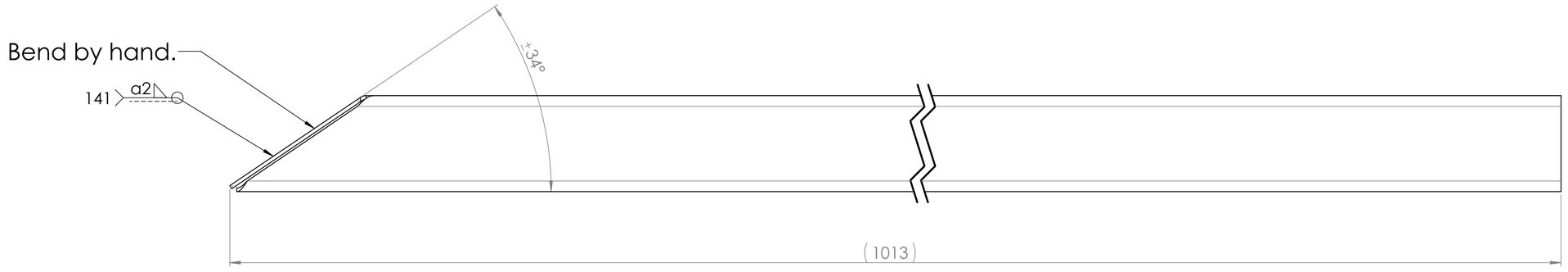
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl





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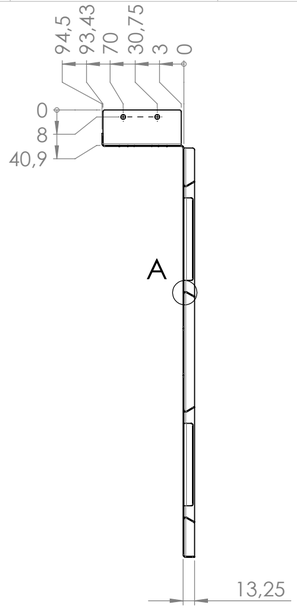

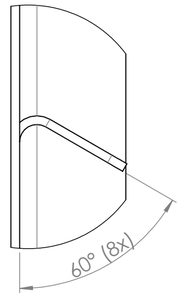

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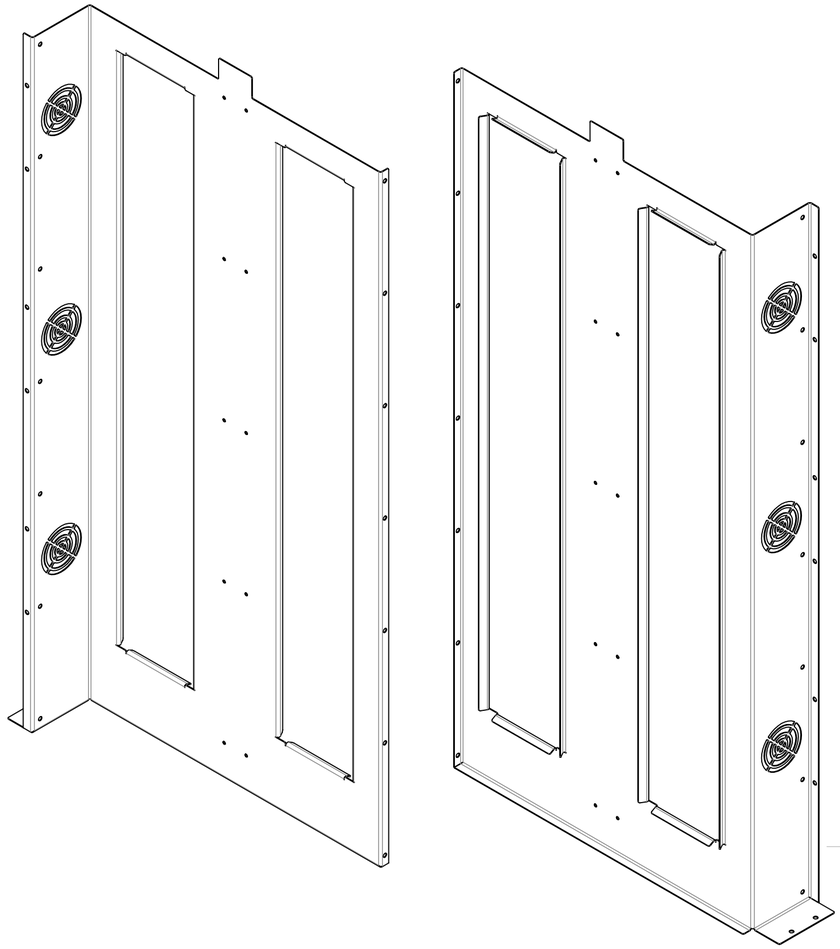

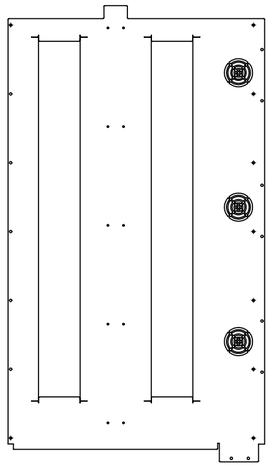

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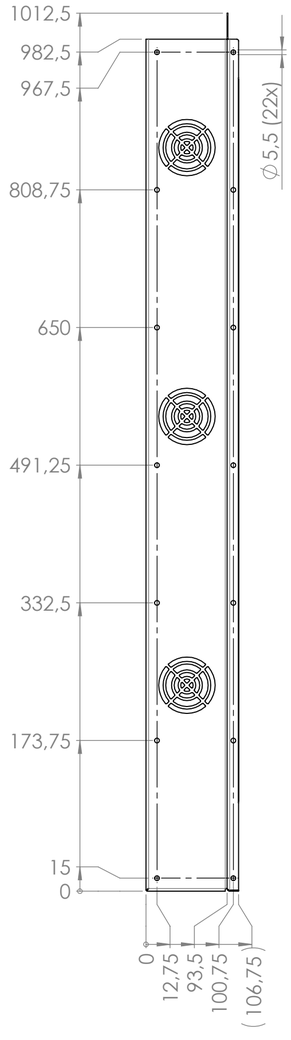

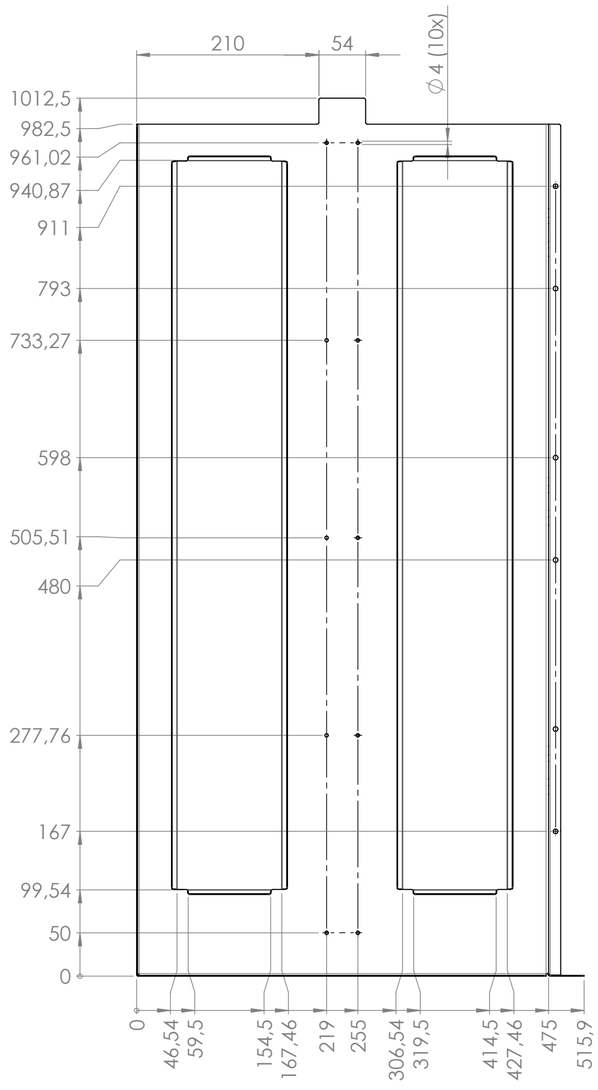

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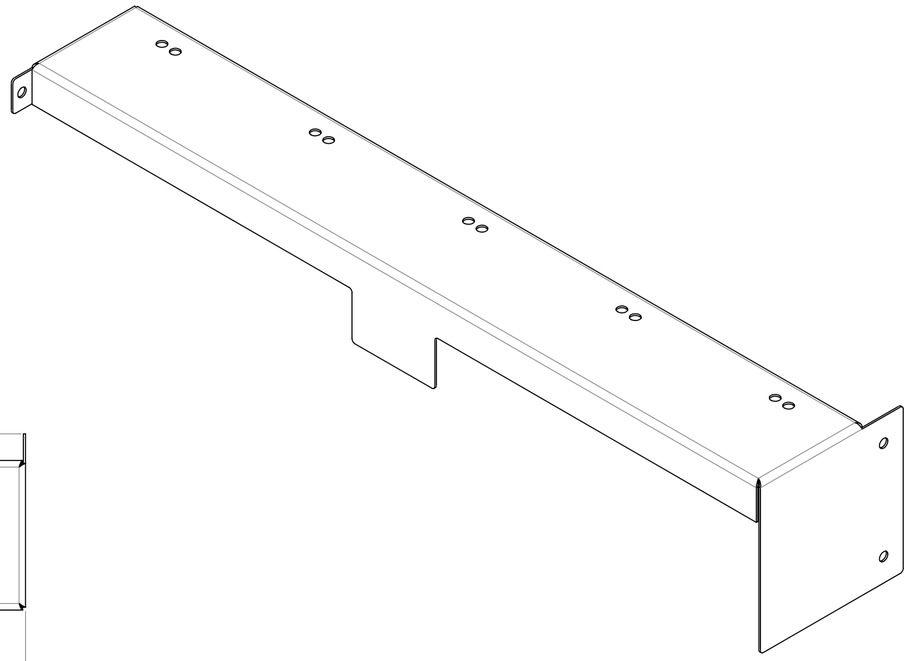

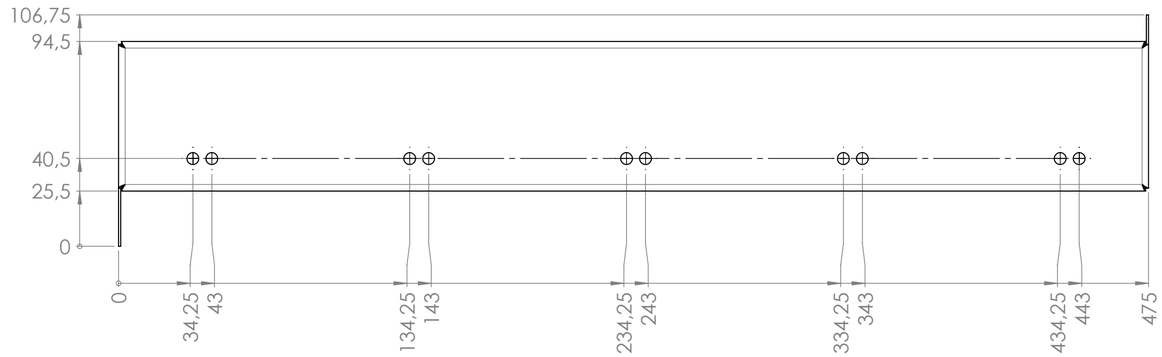

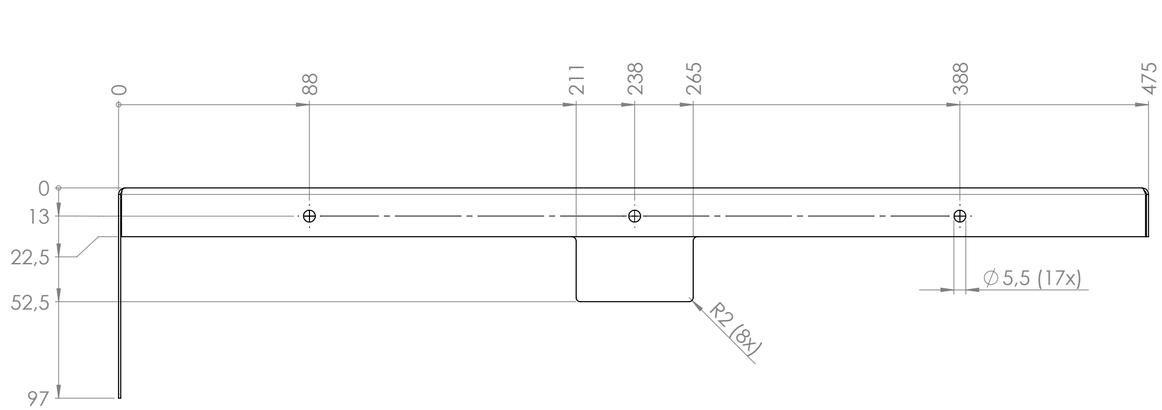

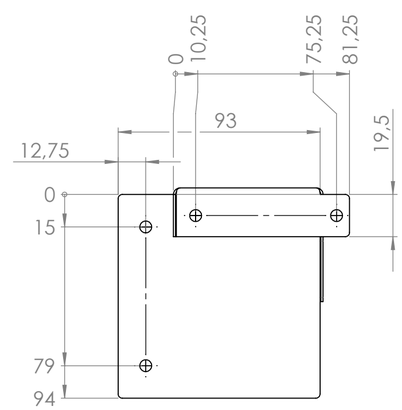

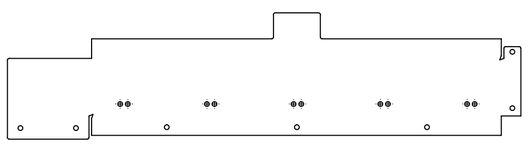

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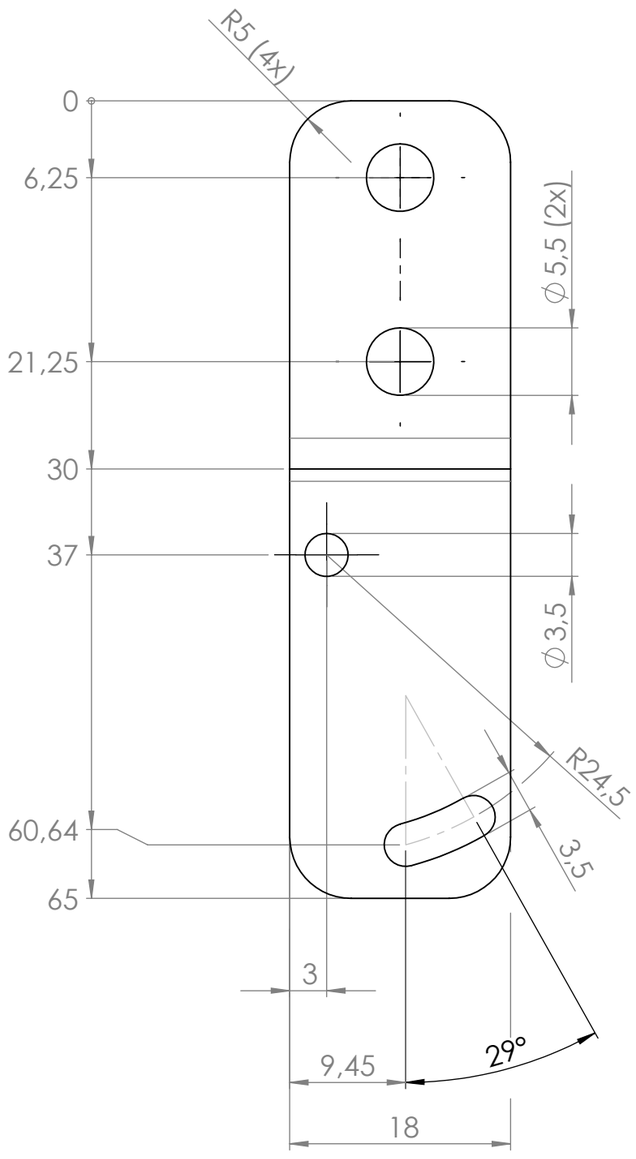
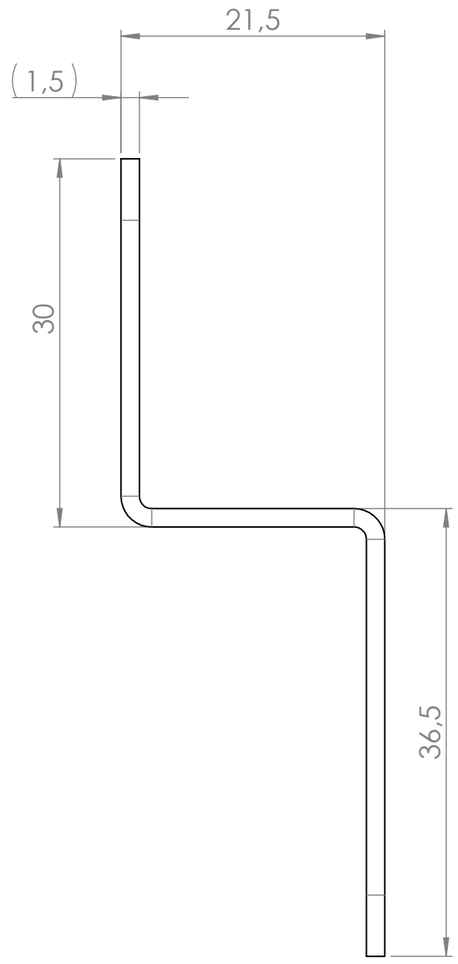
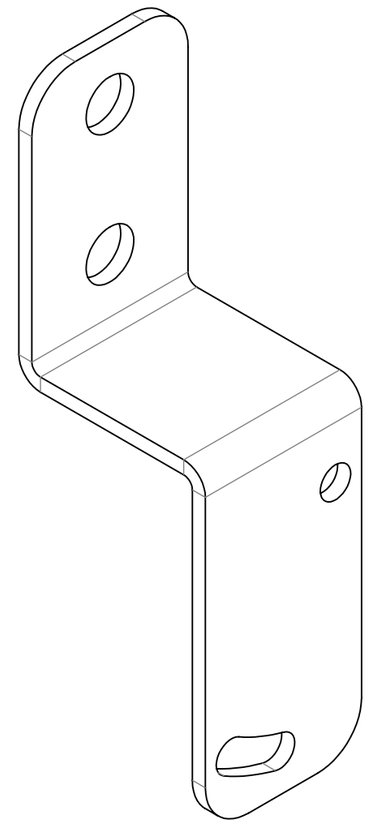
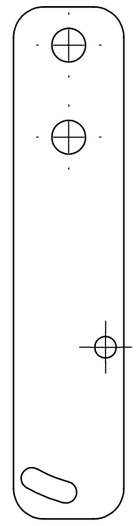
Class: SSS StudentNo.			Weight: 509.60 grams	SCALE: 1:2	SHEET: 1 OF 1



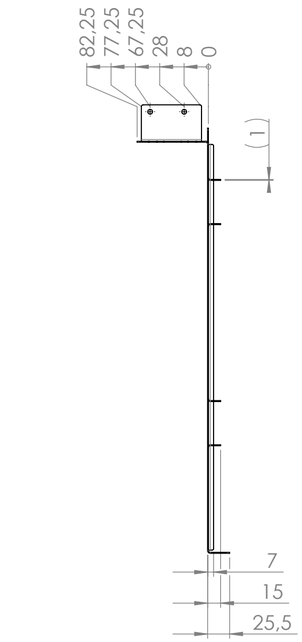


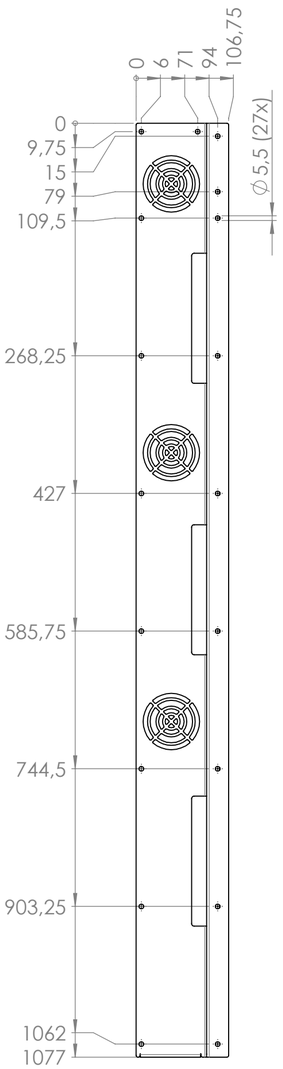


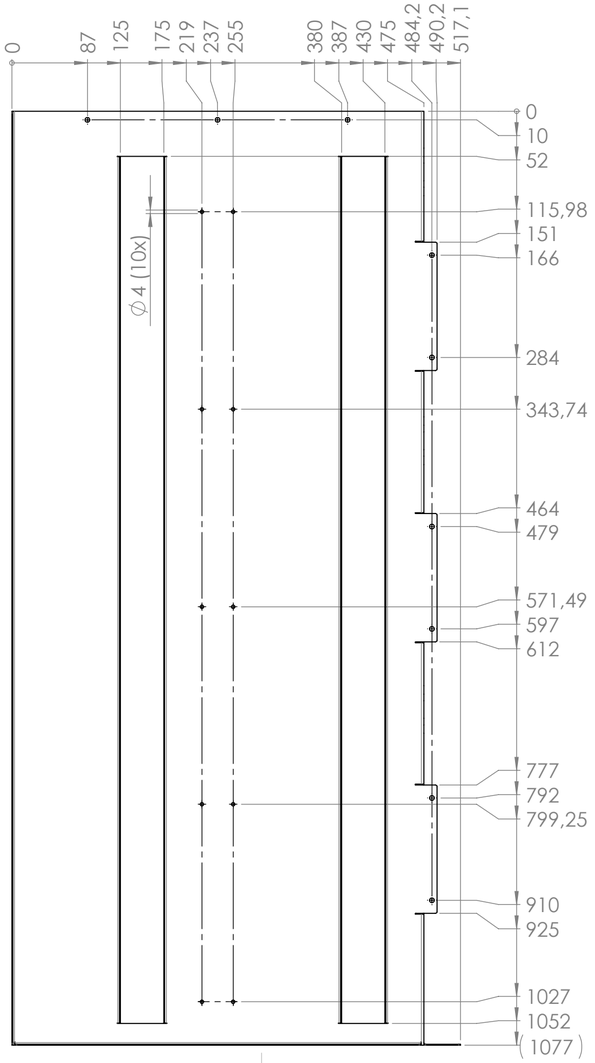


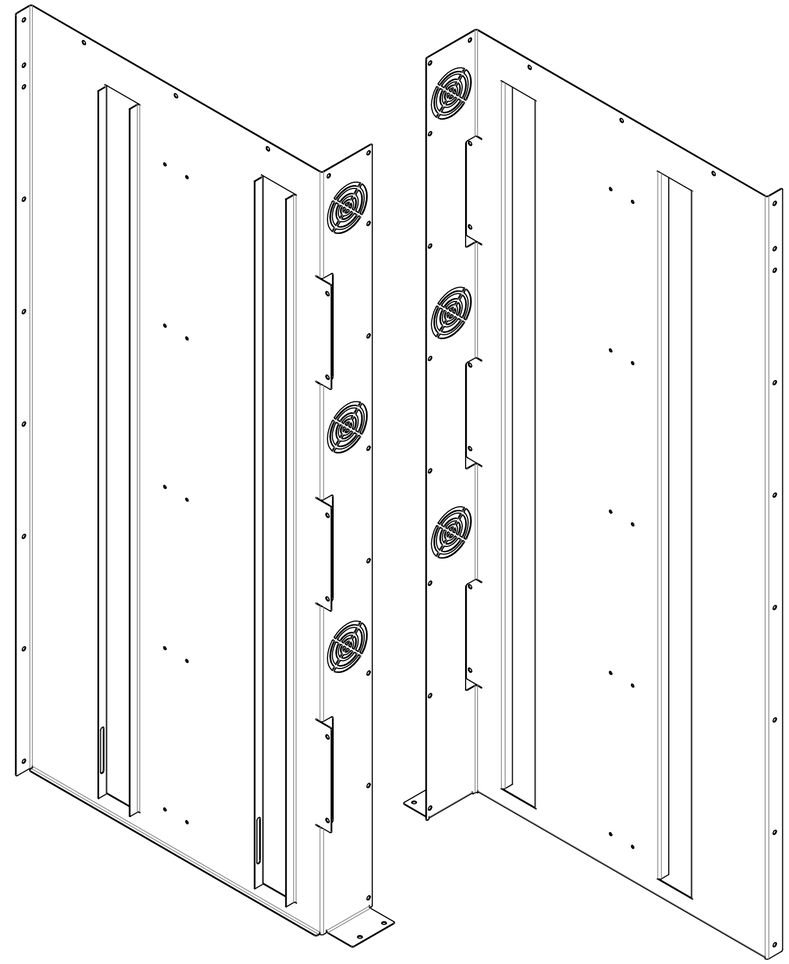
For information (1:1).

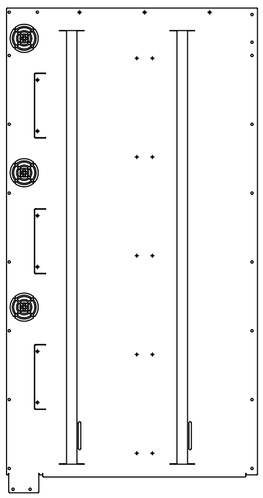
Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
					Material: AISI 304
	Name	Signature	Date	SAXION	Description: **Bracket**
Drawn:	S.Wiggers		21-5-2019		
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **01.0021** / Revision: / Format A3
Class:	SSS	StudentNo.			
					Weight: 16.72 grams / SCALE: 2:1 / SHEET: 1 OF 1





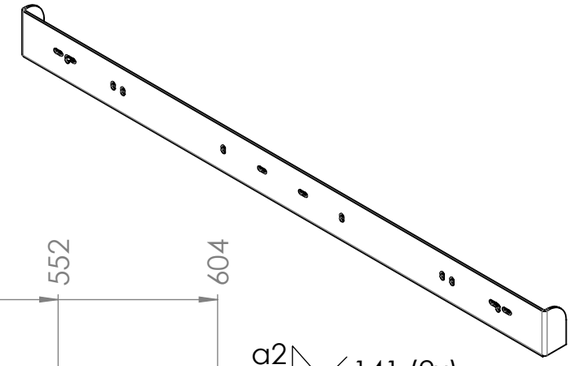


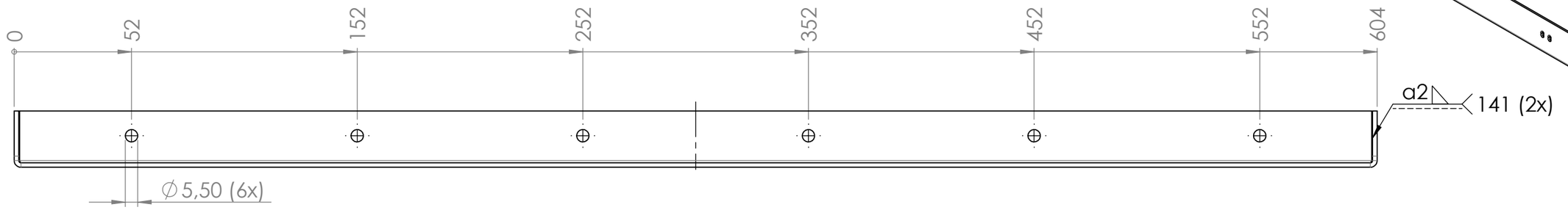


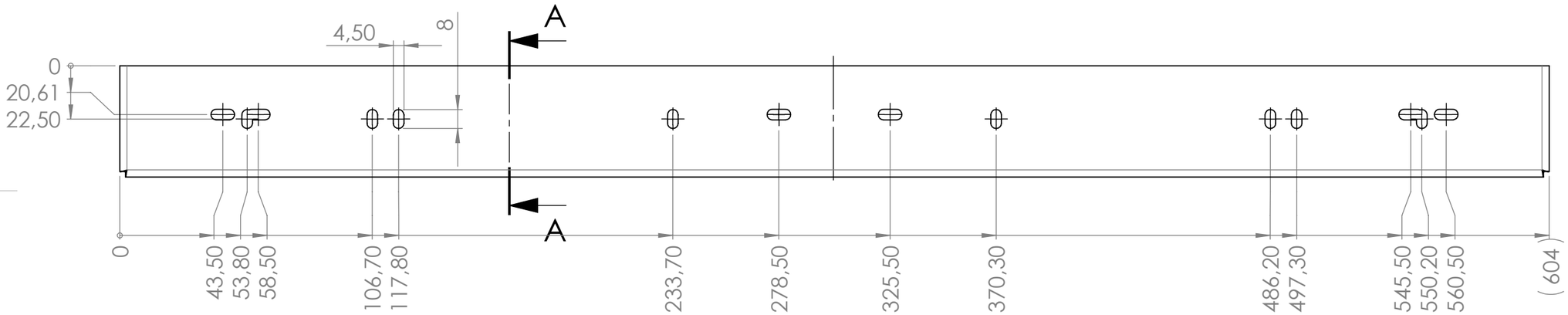


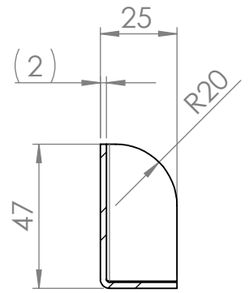
For information (1:10)

Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
				Material: AISI 304	
	Name / Signature / Date	SAXION		Description: **Plate**	
Drawn:	M. ten Cate / 20-5-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl		Drawing number: **01.0004**	Revision: / Format A2
Checked:				Weight: 4572.85 grams	SCALE: 1:5 / SHEET: 1 OF 1
Class:	SSS / StudentNo.				

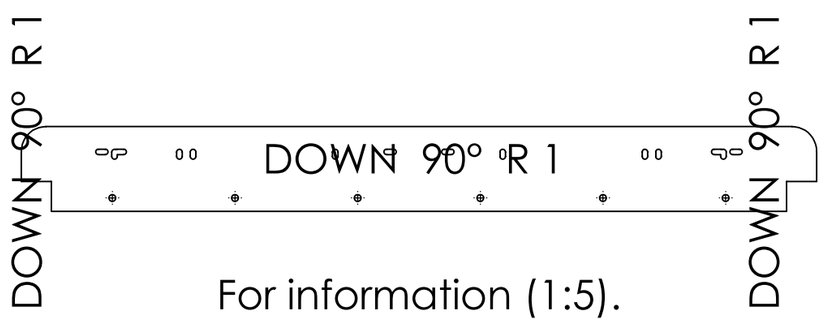






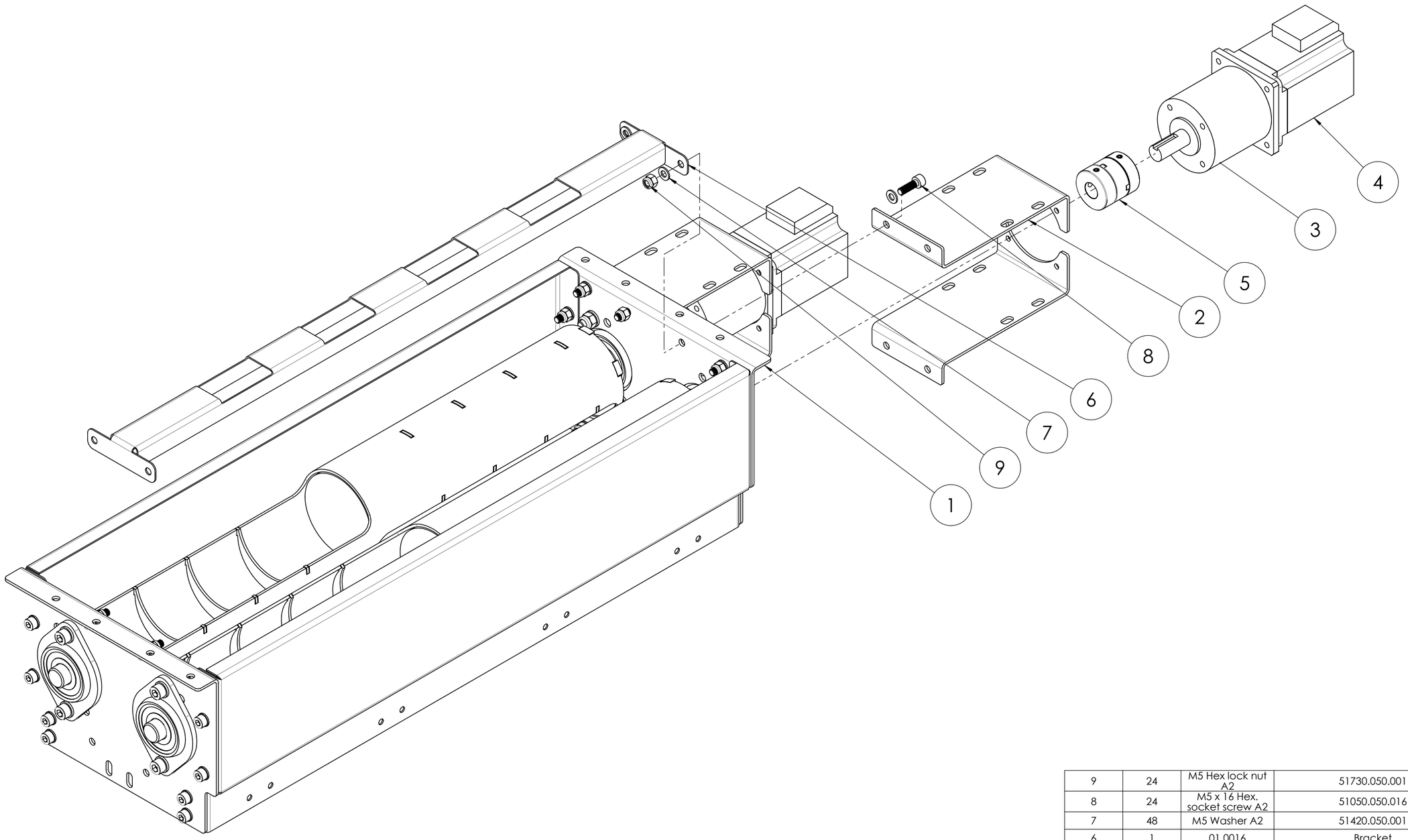


SECTION A-A



For information (1:5).

Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish: Soda blasting	
				Material: AISI 304	
	Name / Signature / Date	SAXION		Description: **Bracket**	
Drawn:	M. ten Cate / 20-5-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl		Drawing number: **01.0002**	Revision: / Format: A3
Checked:					
Class:	SSS / StudentNo.			Weight: 685.20 grams	SCALE: 1:2 / SHEET: 1 OF 1



ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
9	24	M5 Hex lock nut A2	51730.050.001	
8	24	M5 x 16 Hex. socket screw A2	51050.050.016	
7	48	M5 Washer A2	51420.050.001	
6	1	01.0016	Bracket	AISI 304
5	2	NKB MOR-30 coupling	Flexible coupling	
4	2	23HS22-2804D-PG15-E1000	Nema 23 steppermotor	
3	2	Nema 23 planetary gear	Nema 23 gearbox (1:15)	
2	4	01.0019	Bracket	AISI 304
1	1	01.0020	Output assembly	

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

	Name	Signature	Date
Drawn:	M. ten Cate		27-5-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Finish:

Material: Material <not specified>

Description:

Ejector assembly

Drawing number: **01.0021**

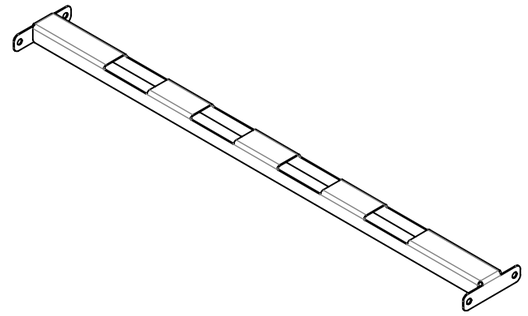
Revision:

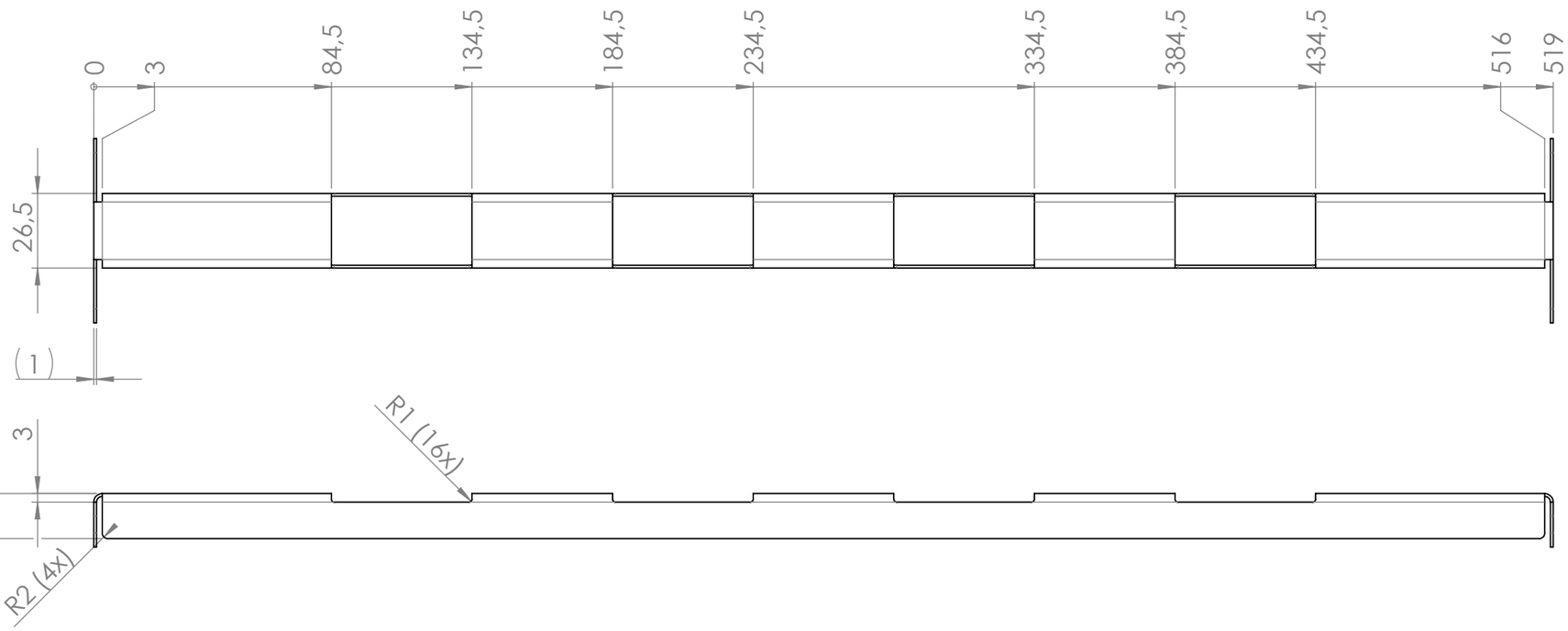
Format: A2

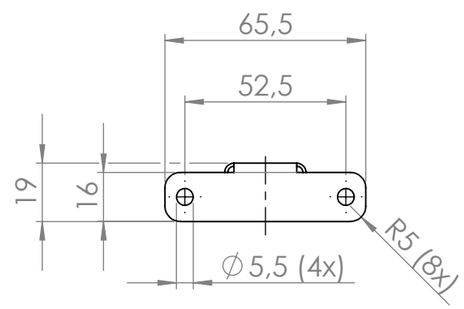
Weight: 10087.86

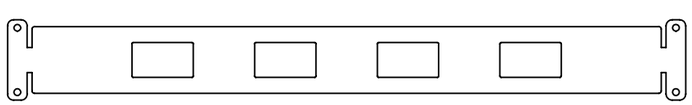
SCALE: 1:2

SHEET: 1 OF 1



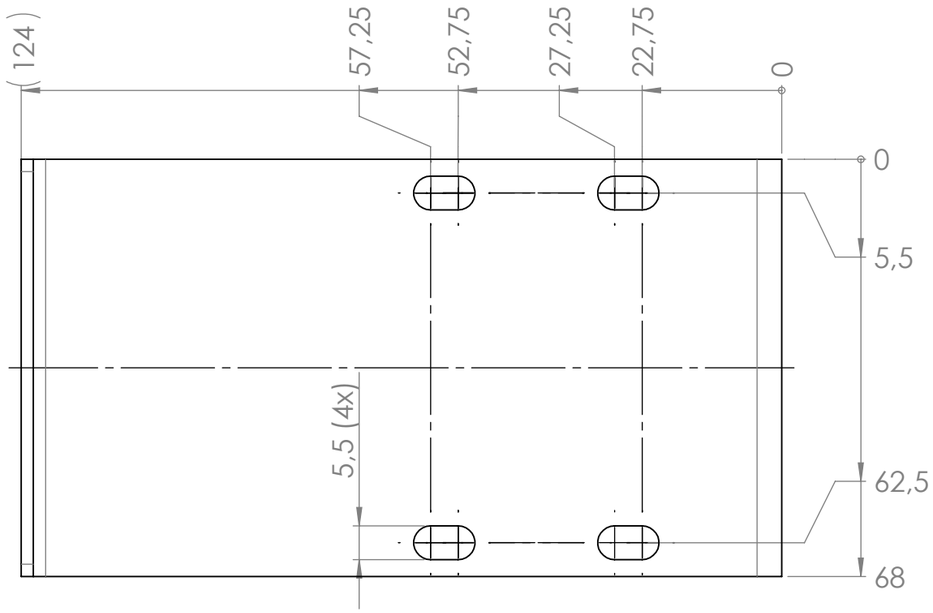


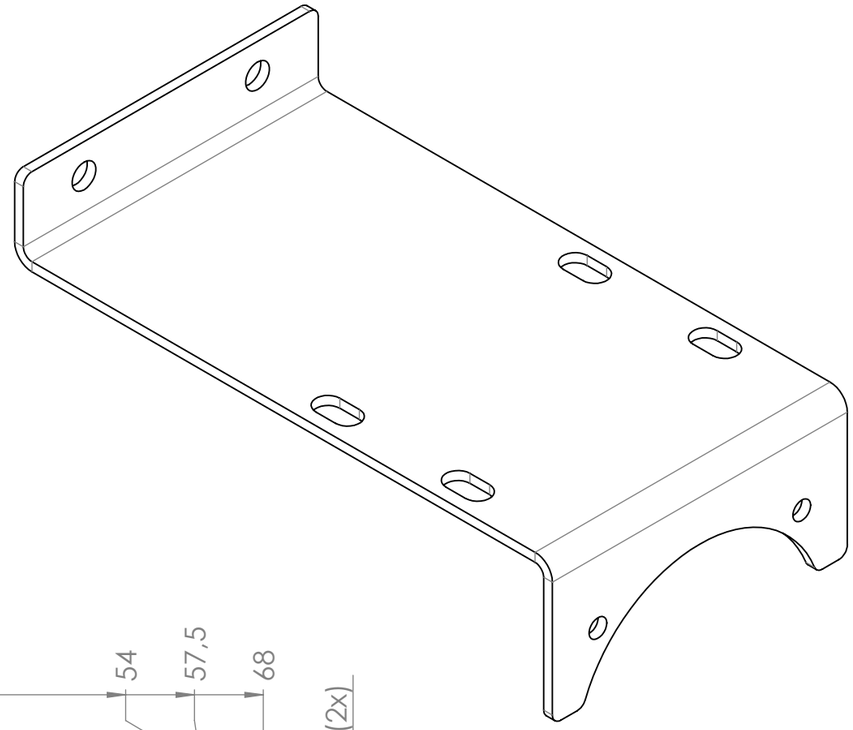


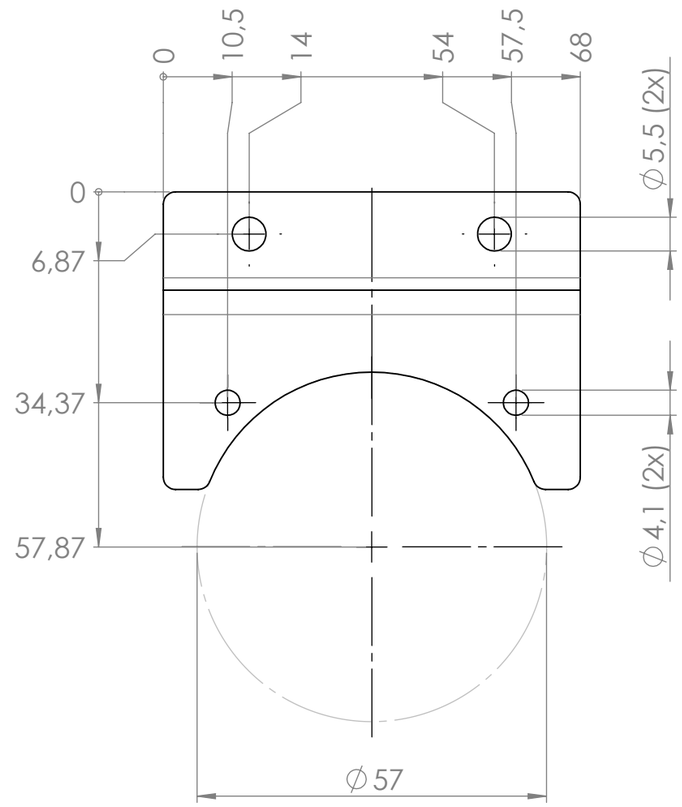


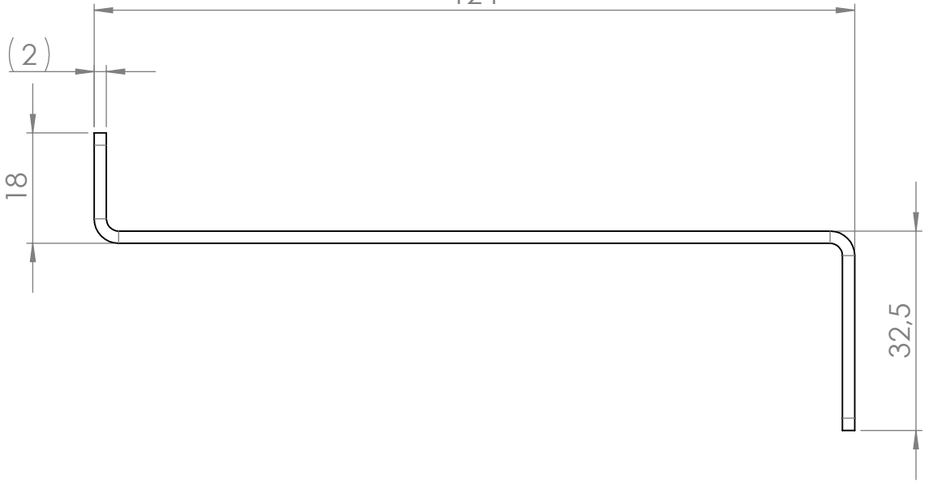
Ter informatie (1:5).

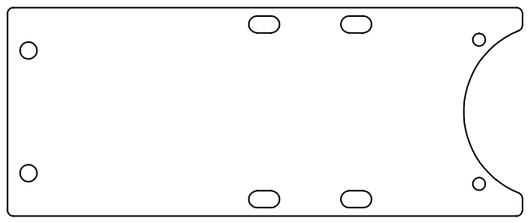
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:		
				Material: AISI 304		
	Name / Signature / Date	SAXION		Description:		
Drawn:	M. ten Cate / 21-5-2019			**Bracket**		
Checked:		Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl		Drawing number: **01.0016**	Revision:	Format A3
Class:	SSS / StudentNo.			Weight: 194.66 grams	SCALE: 1:2	SHEET: 1 OF 1







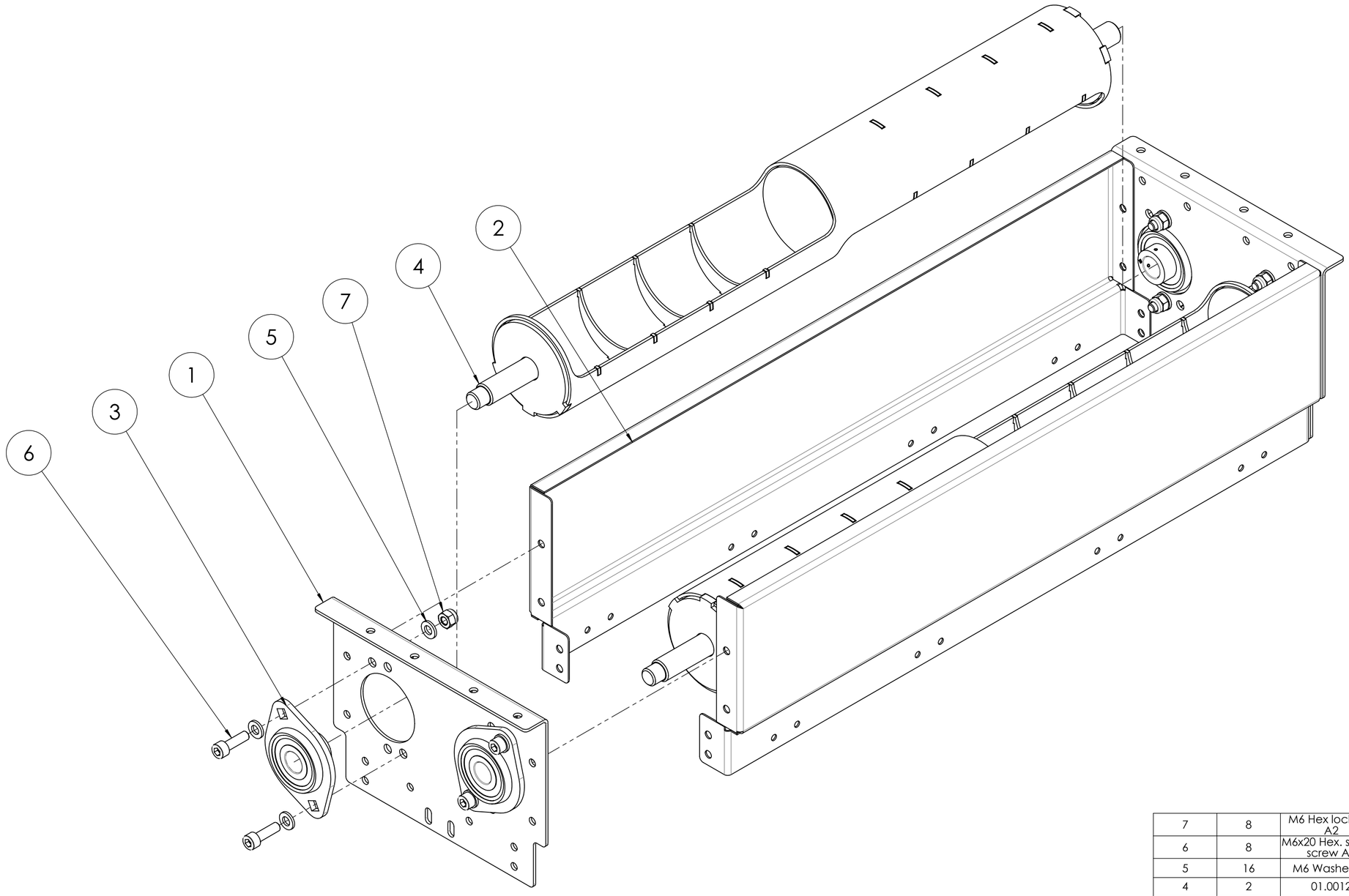




For information (1:2).

Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
				Material: AISI 304	
	Name	Signature	Date	Description:	
Drawn:	M. ten Cate		21-5-2019	**Bracket**	
Checked:				Drawing number: **01.0019**	Revision:
Class:	SSS	StudentNo.		Weight: 166.32 grams	SCALE: 1:2
					Format A3
					SHEET: 1 OF 1

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl



ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
7	8	M6 Hex lock nut A2	51730.060.001	
6	8	M6x20 Hex. socket screw A2	51050.060.020	
5	16	M6 Washer A2	51420.060.001	
4	2	01.0012	Rotator assembly	
3	4	INA RATY15-XL 106071	INA RATY15-XL 106071	
2	2	01.0015	Plate	AISI 304
1	2	01.0017	Plate	AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

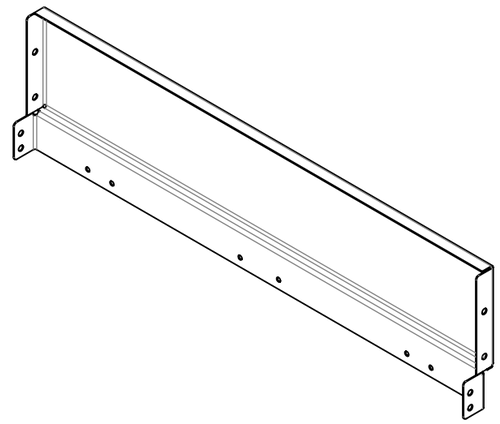
DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

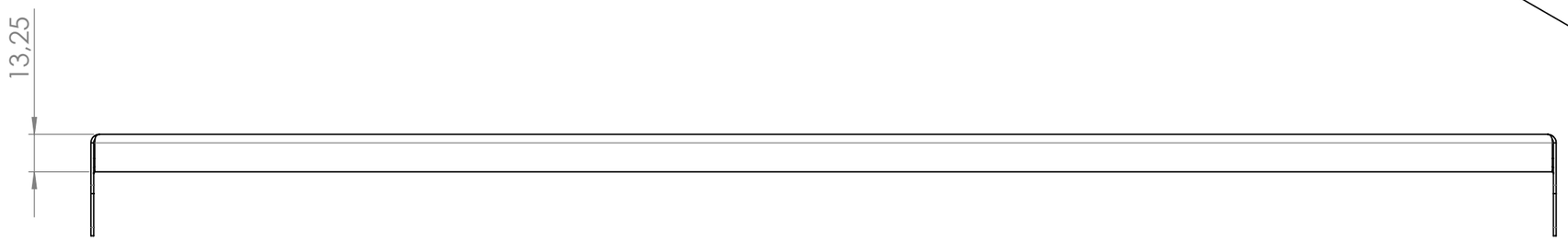
	Name	Signature	Date
Drawn:	M. ten Cate		27-5-2019
Checked:			
Class:	SSS	StudentNo.	

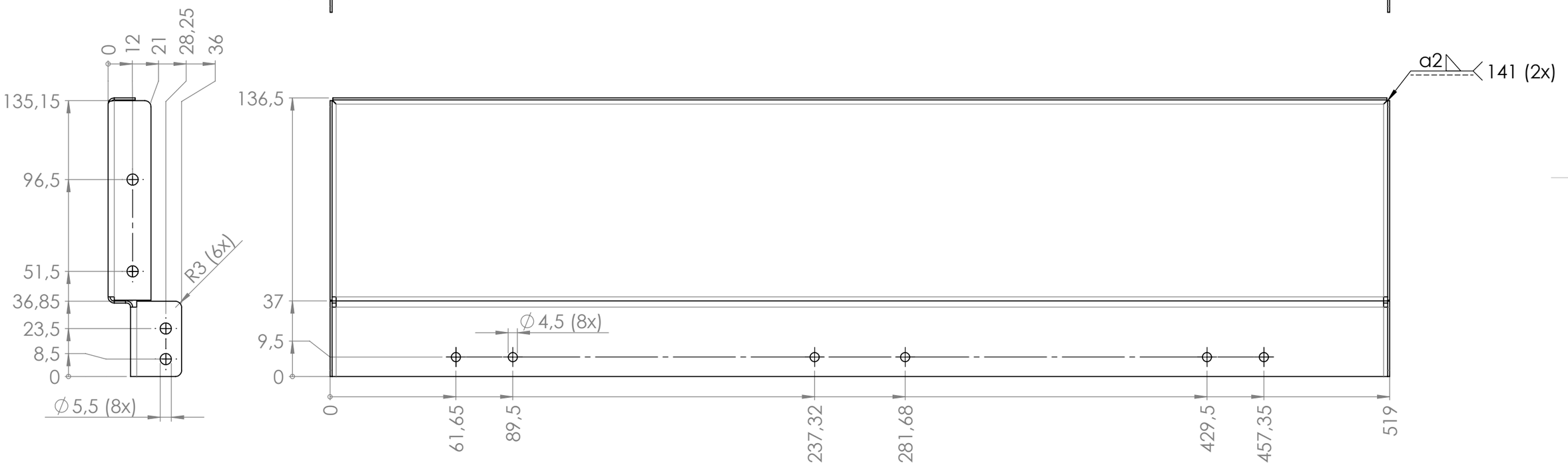
SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

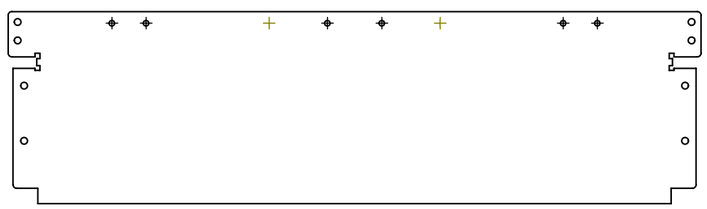
Finish:
Material:
Description: **Output assembly**

Drawing number: **01.0020**
Revision:
Format: A2
Weight: 5712.54
SCALE: 1:2
SHEET: 1 OF 1



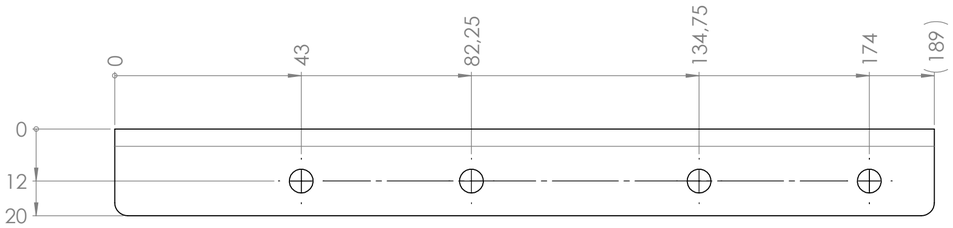


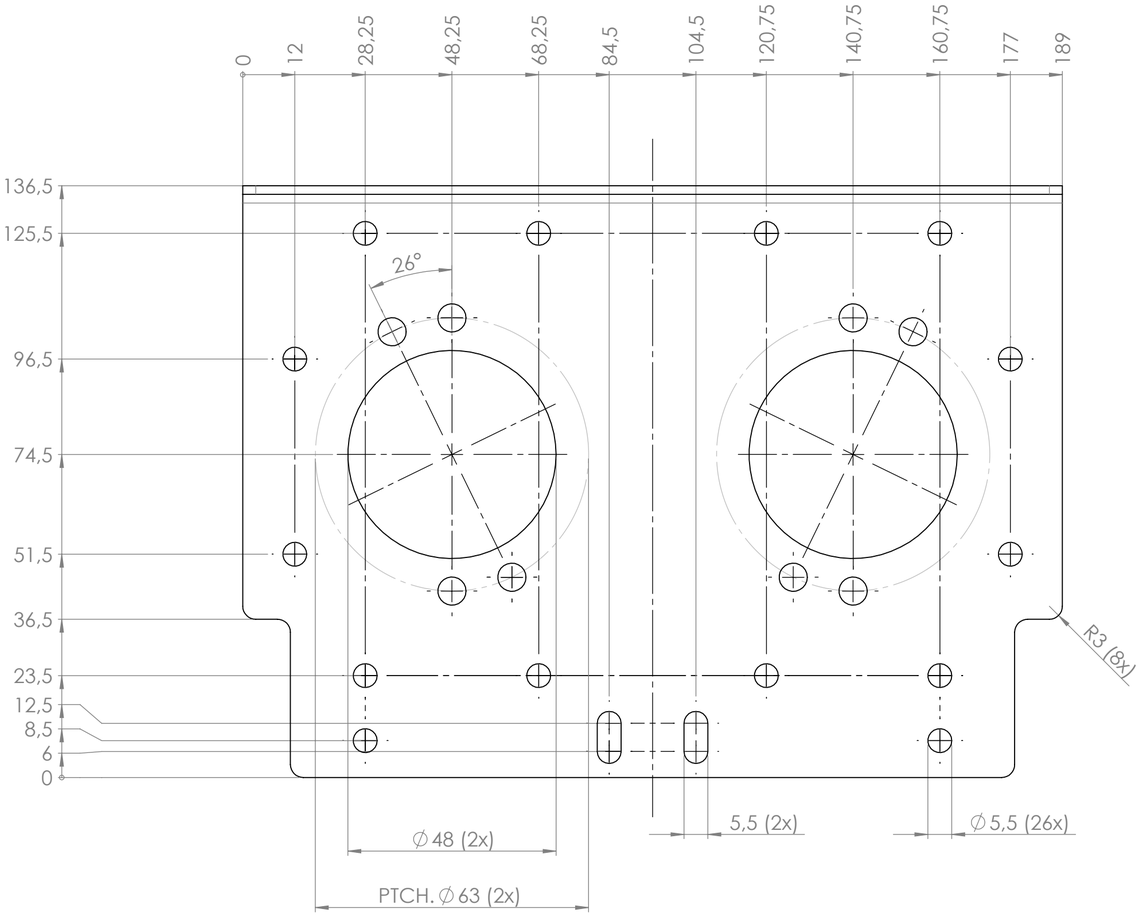


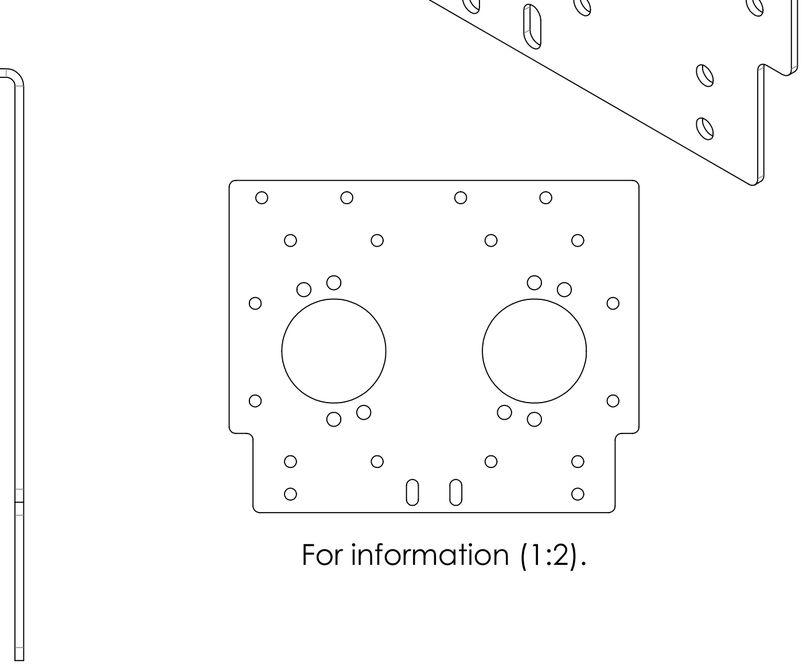


For information (1:5).

Am. Projection	DIMENSIONS IN MILLIMETERS			DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Soda blasting Material: AISI 304
	Name	Signature	Date	SAXION	Description: **Plate**
Drawn:	M. ten Cate		21-5-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **01.0015** / Revision: / Format A3
Checked:					
Class:	SSS	StudentNo.			Weight: 689.86 grams / SCALE: 1:2 / SHEET: 1 OF 1





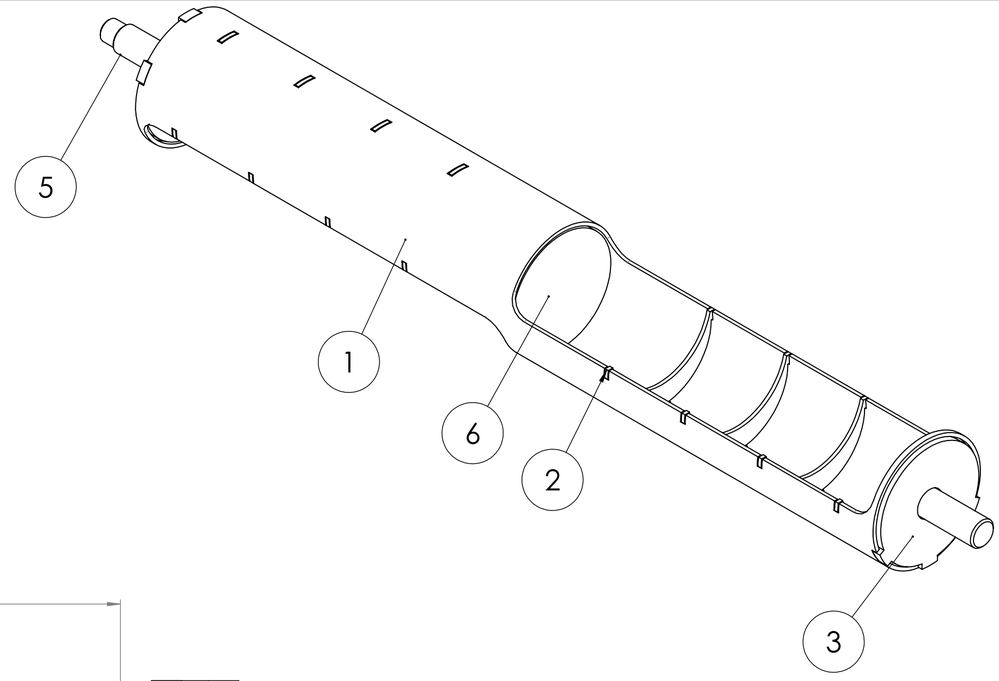


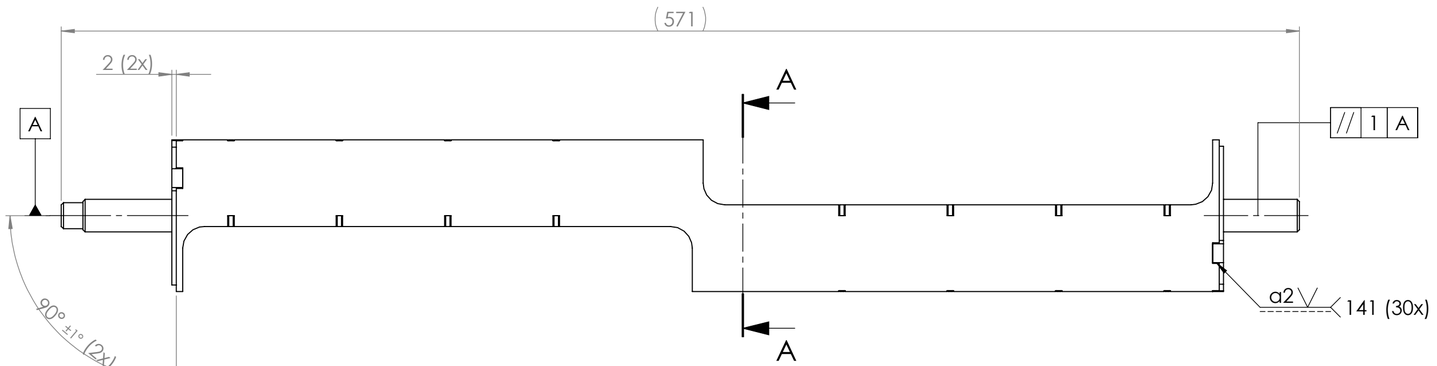
For information (1:2).

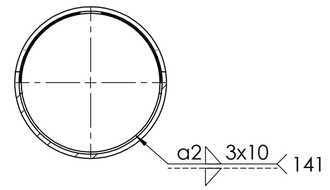
Am. Projection		DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:	
	Name	Signature	Date	Material: AISI 304	
Drawn:	M. ten Cate		21-5-2019	Description: **Plate**	
Checked:				Drawing number: **01.0017**	Revision:
Class:	SSS	StudentNo.		Weight: 379.44 grams	Format A2
				SCALE: 1:1	SHEET: 1 OF 1

SAXION

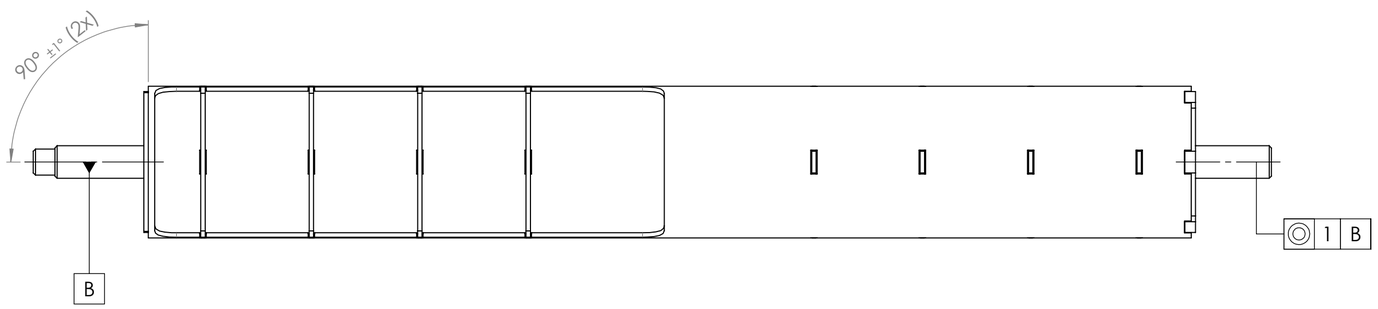
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl







SECTION A-A
SCALE 1 : 2



ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
6	1	01.0023	Plate	AISI 304
5	1	01.0013	Shaft	AISI 304
4	1	01.0010	Shaft	AISI 304
3	2	01.0009	Plate	AISI 304
2	8	01.0008	Plate	AISI 304
1	1	01.0007	Cylinder	AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

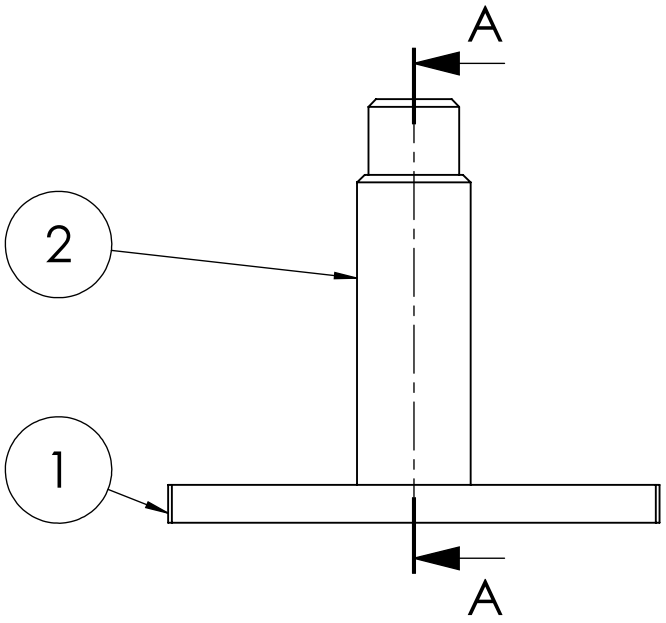
DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

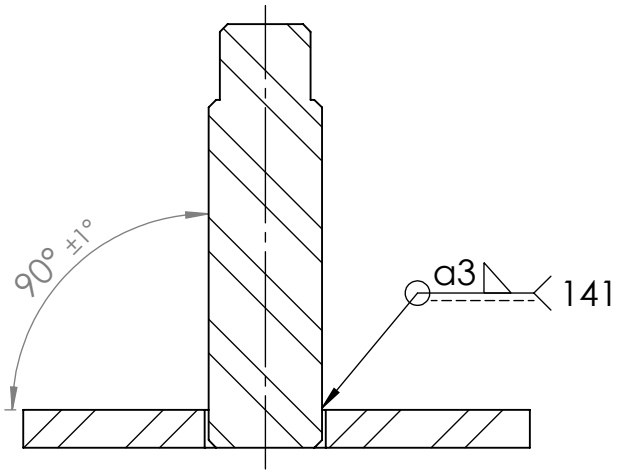
	Name	Signature	Date
Drawn:	S.Braakman		7-3-2019
Checked:			
Class:	SSS	StudentNo.	

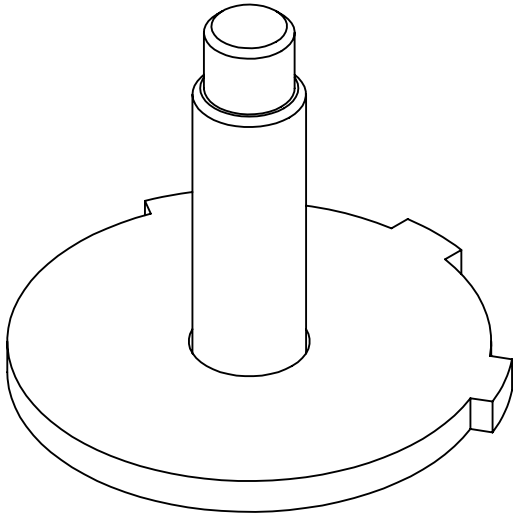
SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Finish: Soda blasting
Material:
Description:
Rotator assembly

Drawing number: **01.0012**
Revision:
Format: A2
Weight: 1520.45
SCALE: 1:5
SHEET: 1 OF 1







SECTION A-A

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
2	1	01.0013	Shaft	AISI 304
1	1	01.0009	Plate	AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material:

	Name	Signature	Date
Drawn:	S.Braakman		21-5-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:
Shaft assembly

Drawing number: **01.0014**

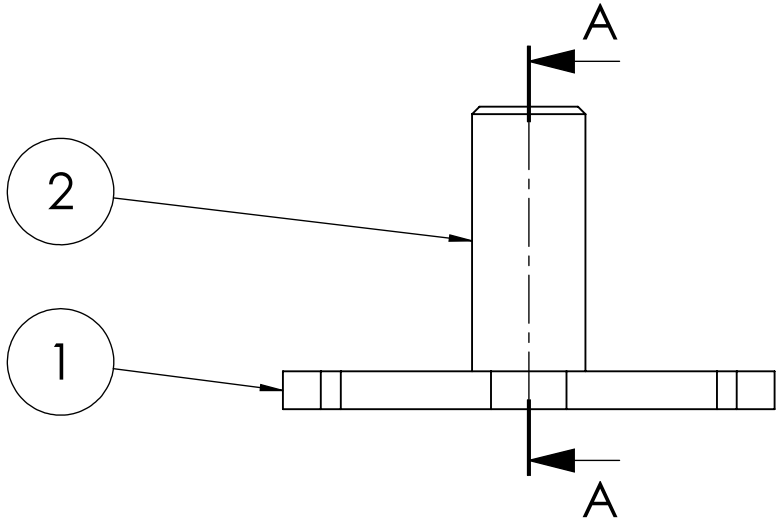
Revision:

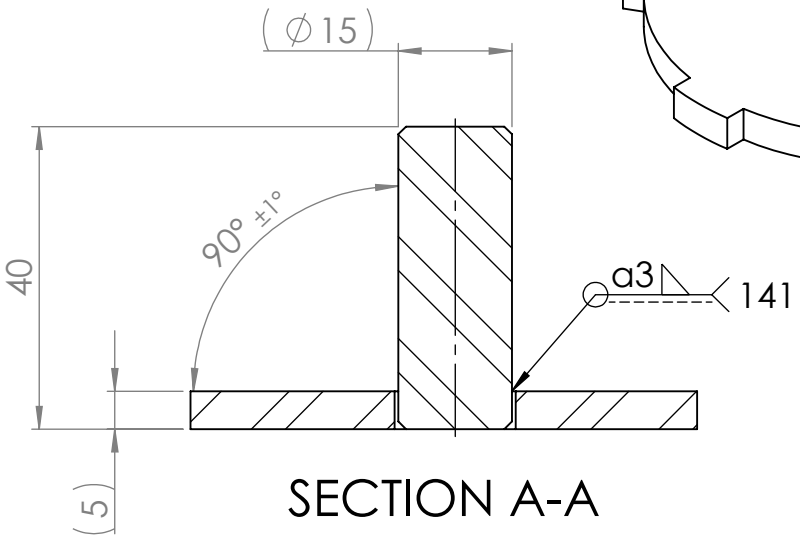
Format A4

Weight: 197.83

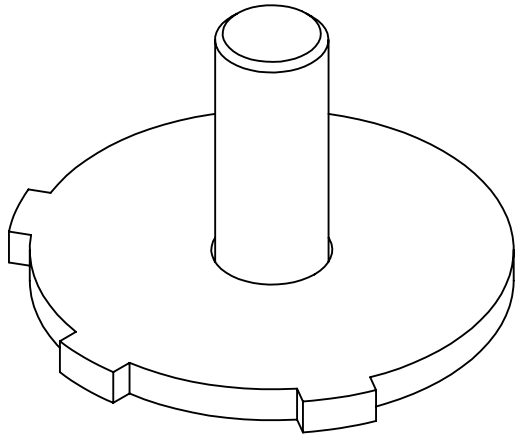
SCALE: 1:1

SHEET: 1 OF 1





SECTION A-A



ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
2	1	01.0010	Shaft	AISI 304
1	1	01.0009	Plate	AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material:

	Name	Signature	Date
Drawn:	S.Braakman		21-5-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:
Shaft assembly

Drawing number: **01.0011**

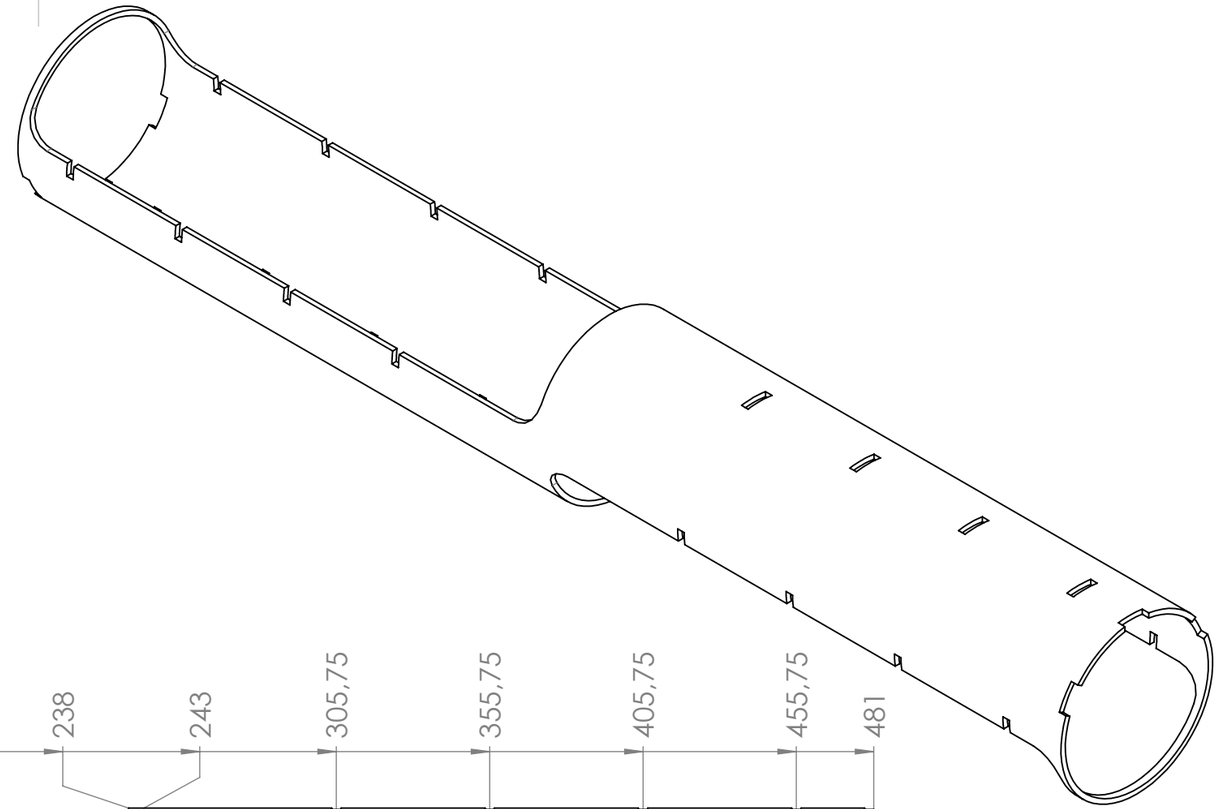
Revision:

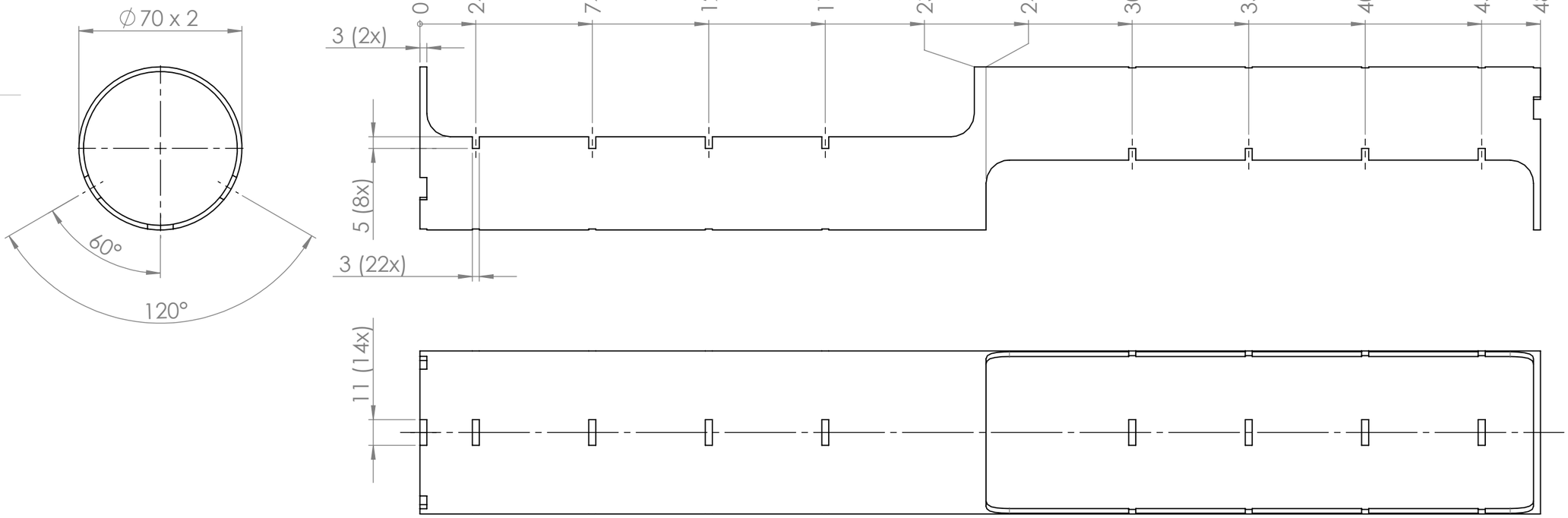
Format A4

Weight: 180.44

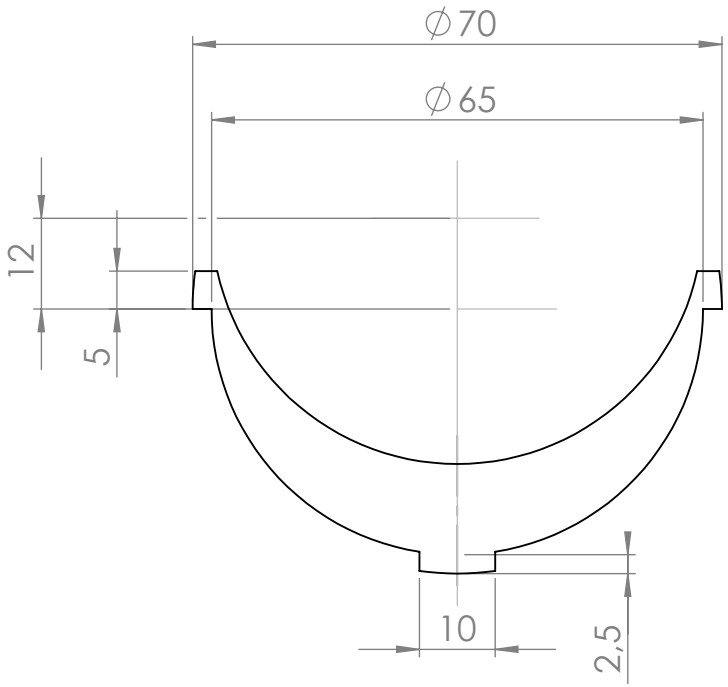
SCALE: 1:1

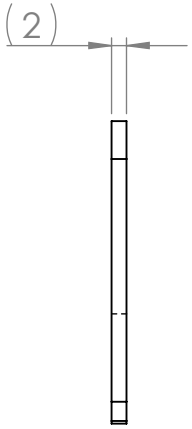
SHEET: 1 OF 1

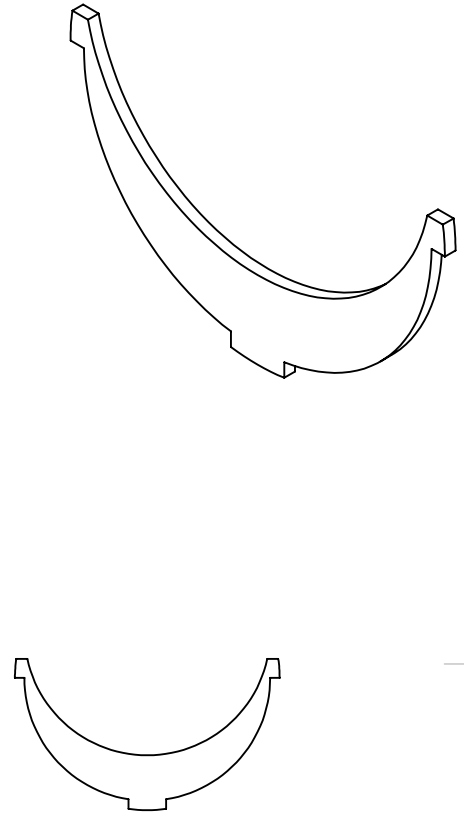




Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
				Material: AISI 304	
	Name / Signature / Date	SAXION		Description: **Cylinder**	
Drawn: S.Braakman 20-5-2019		Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl		Drawing number: **01.0007**	Revision: / Format A3
Checked:					
Class: SSS	StudentNo. 434439			Weight: 907.85 grams	SCALE: 1:2 / SHEET: 1 OF 1



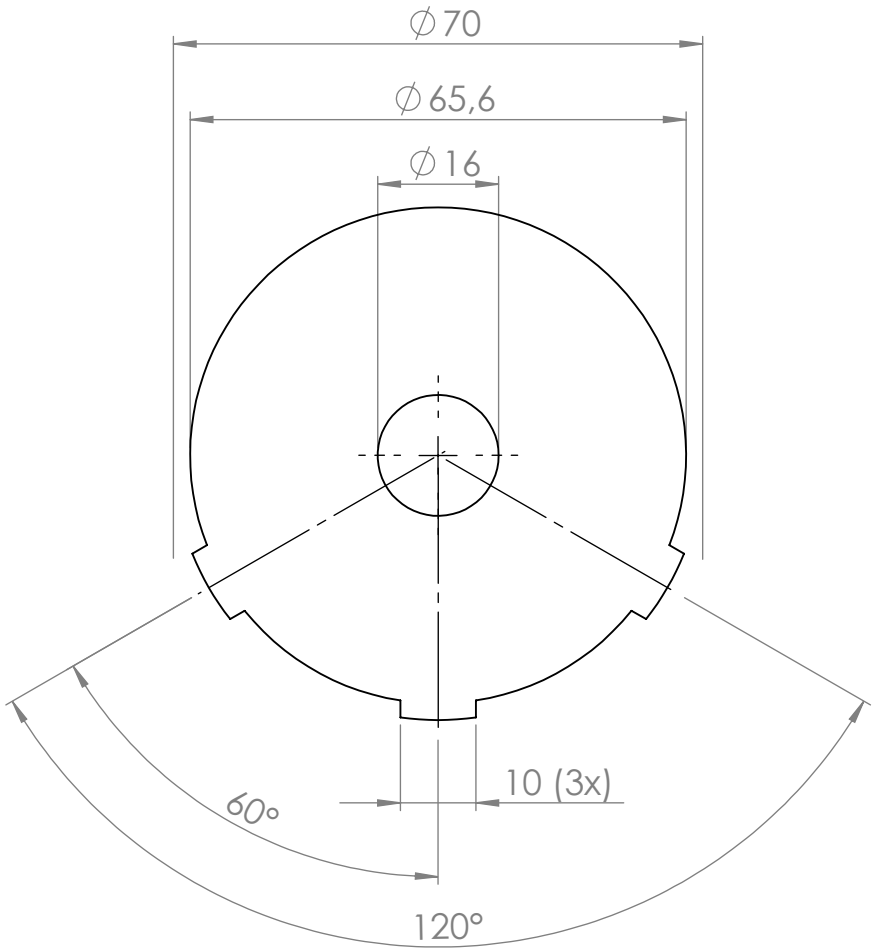


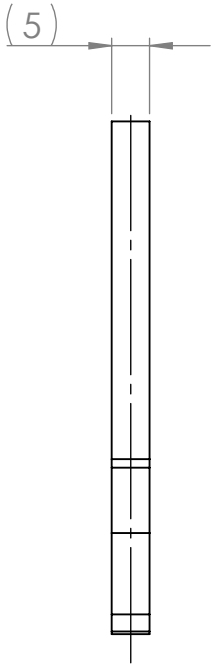


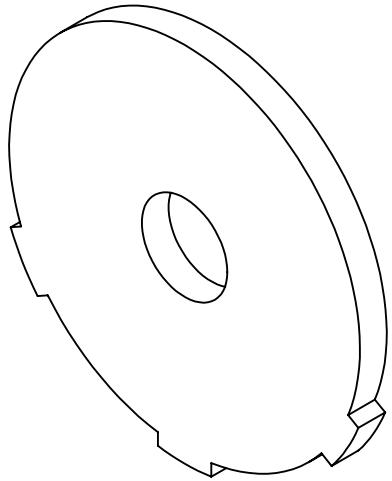
For information (1:2)

Am. Projection		DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:	
				Material: AISI 304	
	Name	Signature	Date	Description: **Plate**	
Drawn:	S.Braakman		20-5-2019		
Checked:				Drawing number: **01.0008**	Revision:
Class:	SSS	StudentNo.			Format A4
				Weight: 13.21 grams	SCALE: 1:1
					SHEET: 1 OF 1

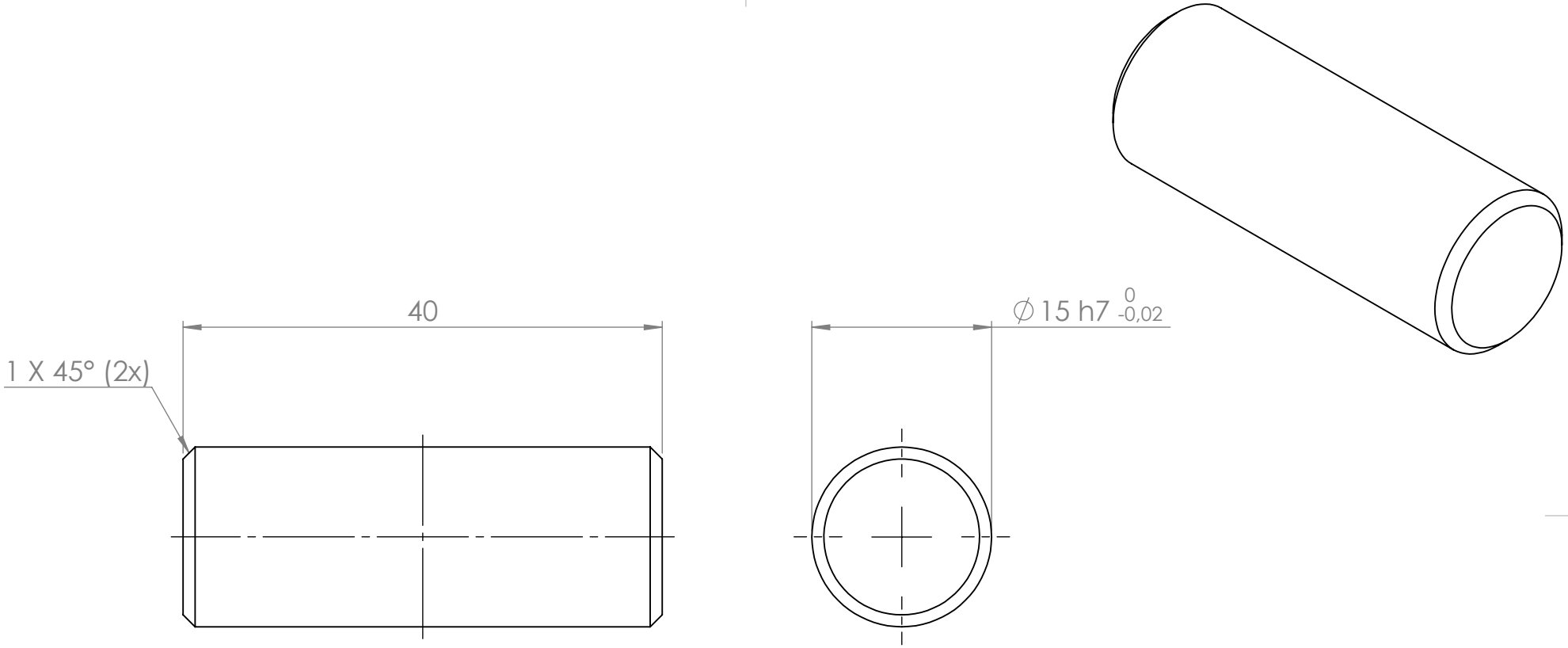
SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl







Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Material: AISI 304
	Name / Signature / Date	SAXION	Description: **Plate**
Drawn:	S.Braakman / 20-5-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **01.0009** / Revision: / Format A4
Checked:			Weight: 129.80 grams / SCALE: 1:1 / SHEET: 1 OF 1
Class:	SSS / StudentNo.		



Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
			Material: AISI 304

	Name	Signature	Date
Drawn:	S.Braakman		21-5-2019
Checked:			
Class:	SSS	StudentNo.	

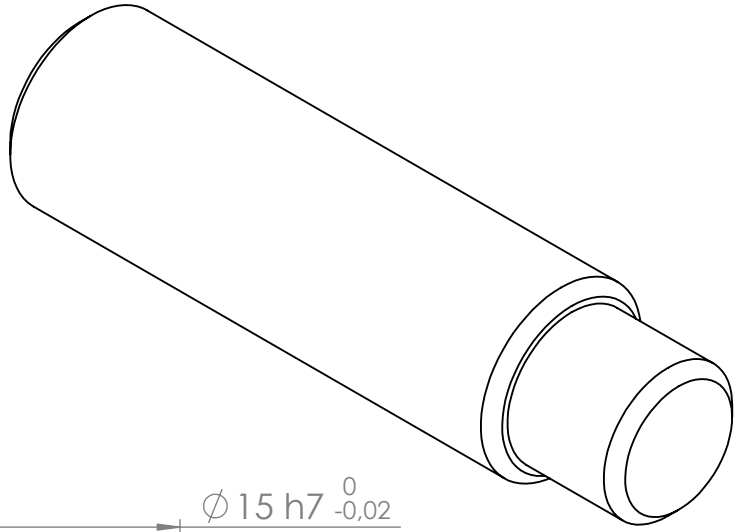
SAXION

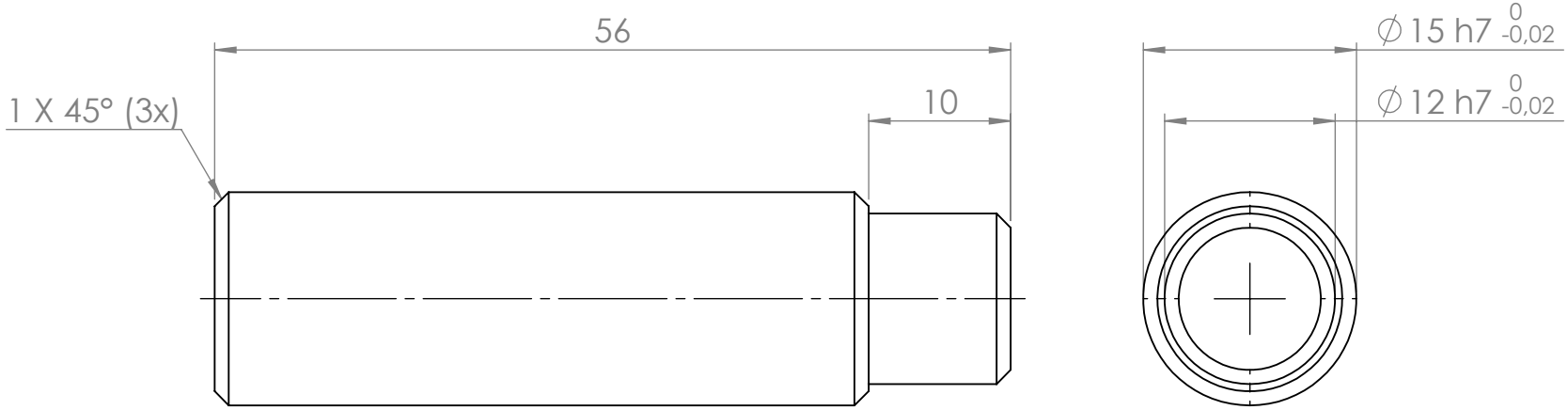
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:
Shaft

Drawing number:	Revision:	Format
01.0010		A4

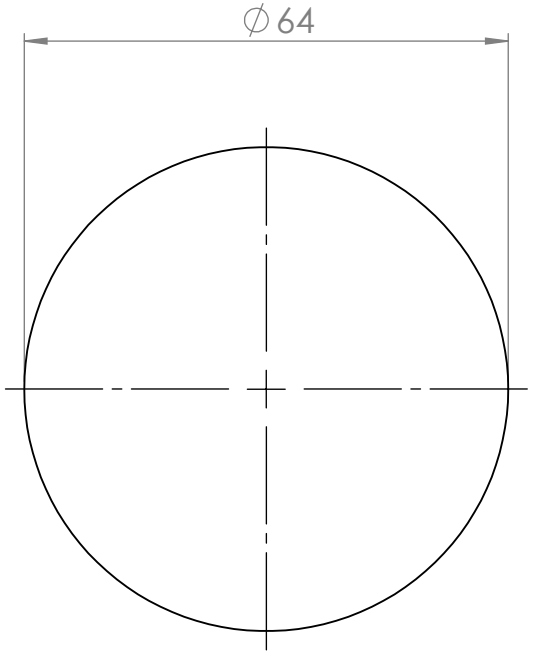
Weight: 56.19 grams	SCALE: 2:1	SHEET: 1 OF 1

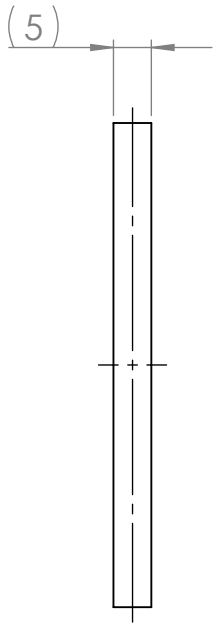


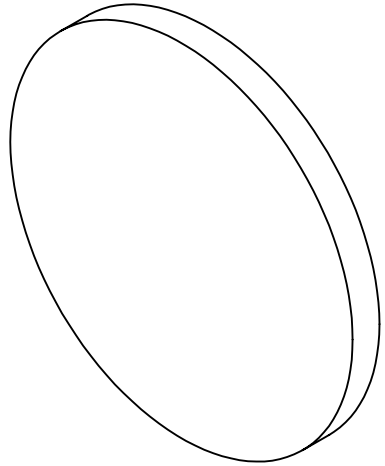


Am. Projection		DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:	
				Material: AISI 304	
	Name	Signature	Date	Description: **Shaft**	
Drawn:	S.Braakman		21-5-2019		
Checked:				Drawing number: **01.0013**	Revision:
Class:	SSS	StudentNo.			Format A4
				Weight: 73.58 grams	SCALE: 2:1
					SHEET: 1 OF 1

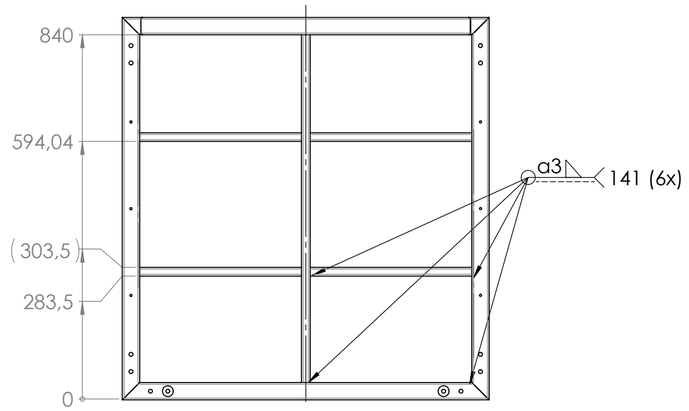
SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

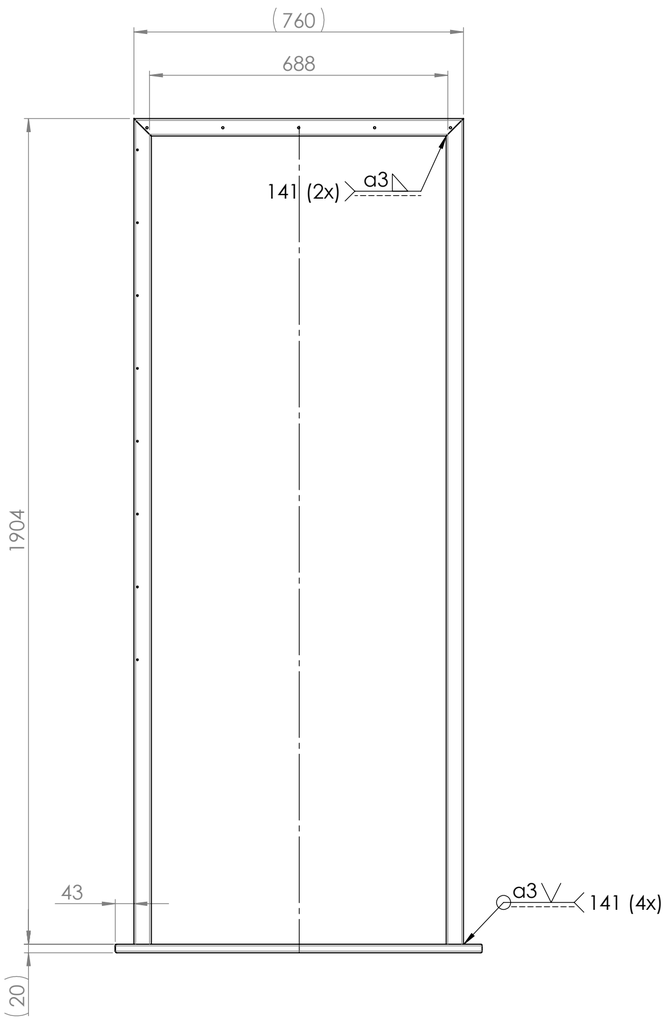


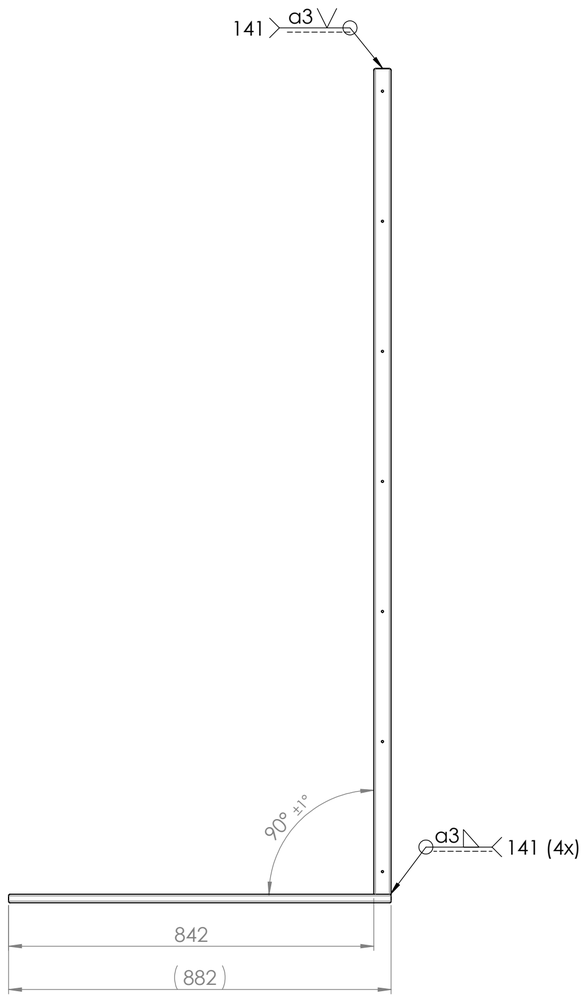


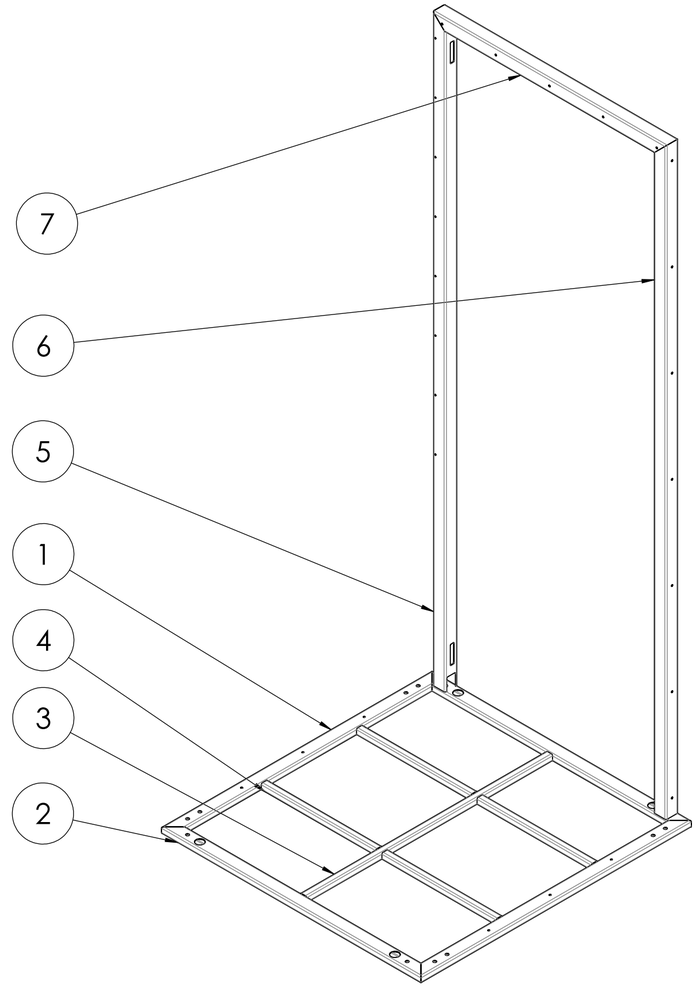


Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Material: AISI 304
	Name / Signature / Date	SAXION	Description: **Plate**
Drawn:	S.Braakman	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **01.0023** / Revision: / Format A4
Checked:			
Class:	SSS	StudentNo.	Weight: 128.68 grams / SCALE: 1:1 / SHEET: 1 OF 1









NOTE:
GRIND WELDS FLAT

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
7	1	02.0007	Tube 40x40x2	AISI 304
6	1	02.0008	Tube 40x40x2	AISI 304
5	1	02.0006	Tube 40x20x2	AISI 304
4	4	02.0005	Tube 20x20x2	AISI 304
3	1	02.0004	Tube 20x20x2	AISI 304
2	2	02.0003	Tube 40x20x2	AISI 304
1	2	02.0002	Tube 40x20x2	AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

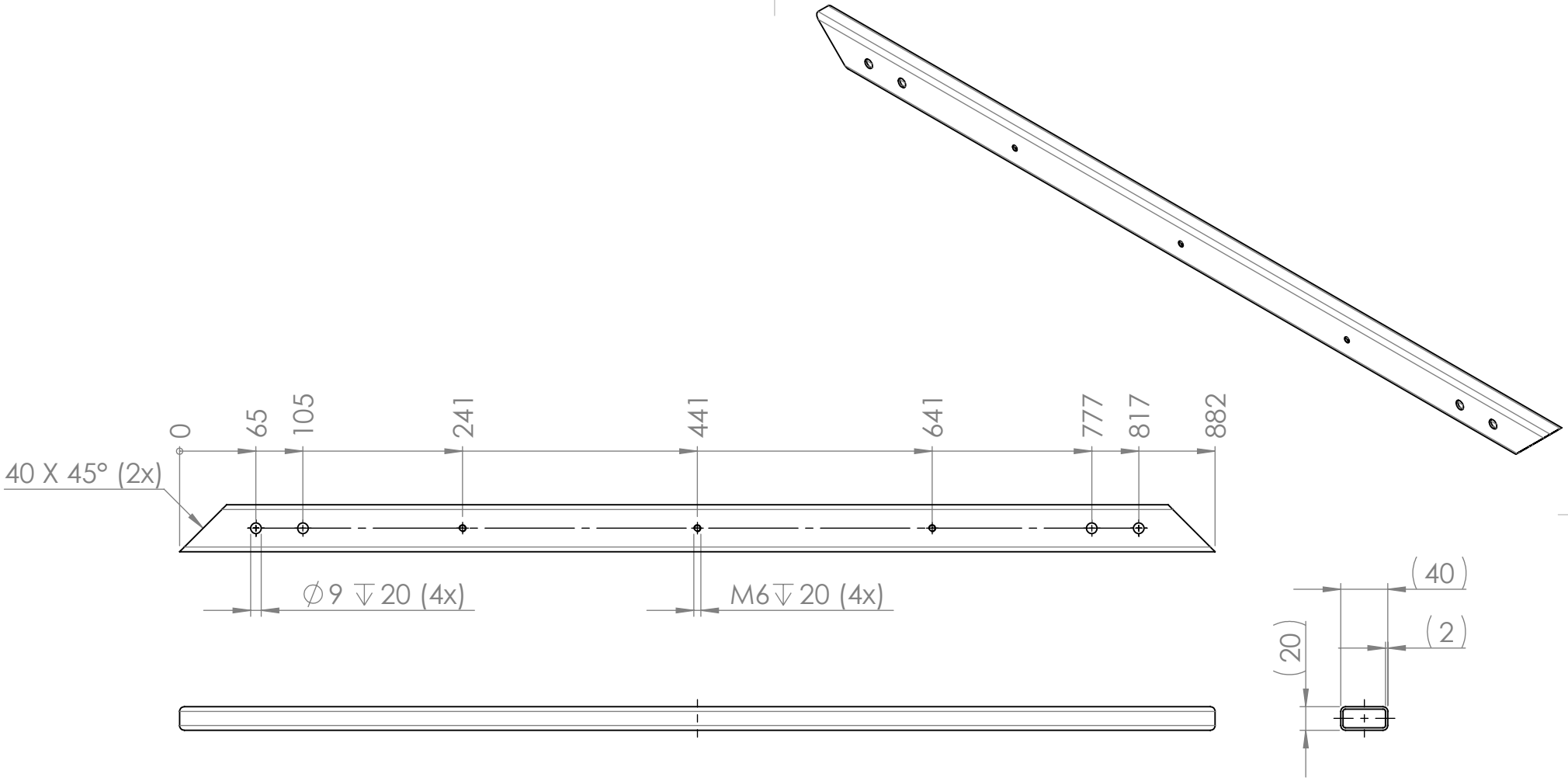
	Name	Signature	Date
Drawn:	S.Braakman		22-5-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

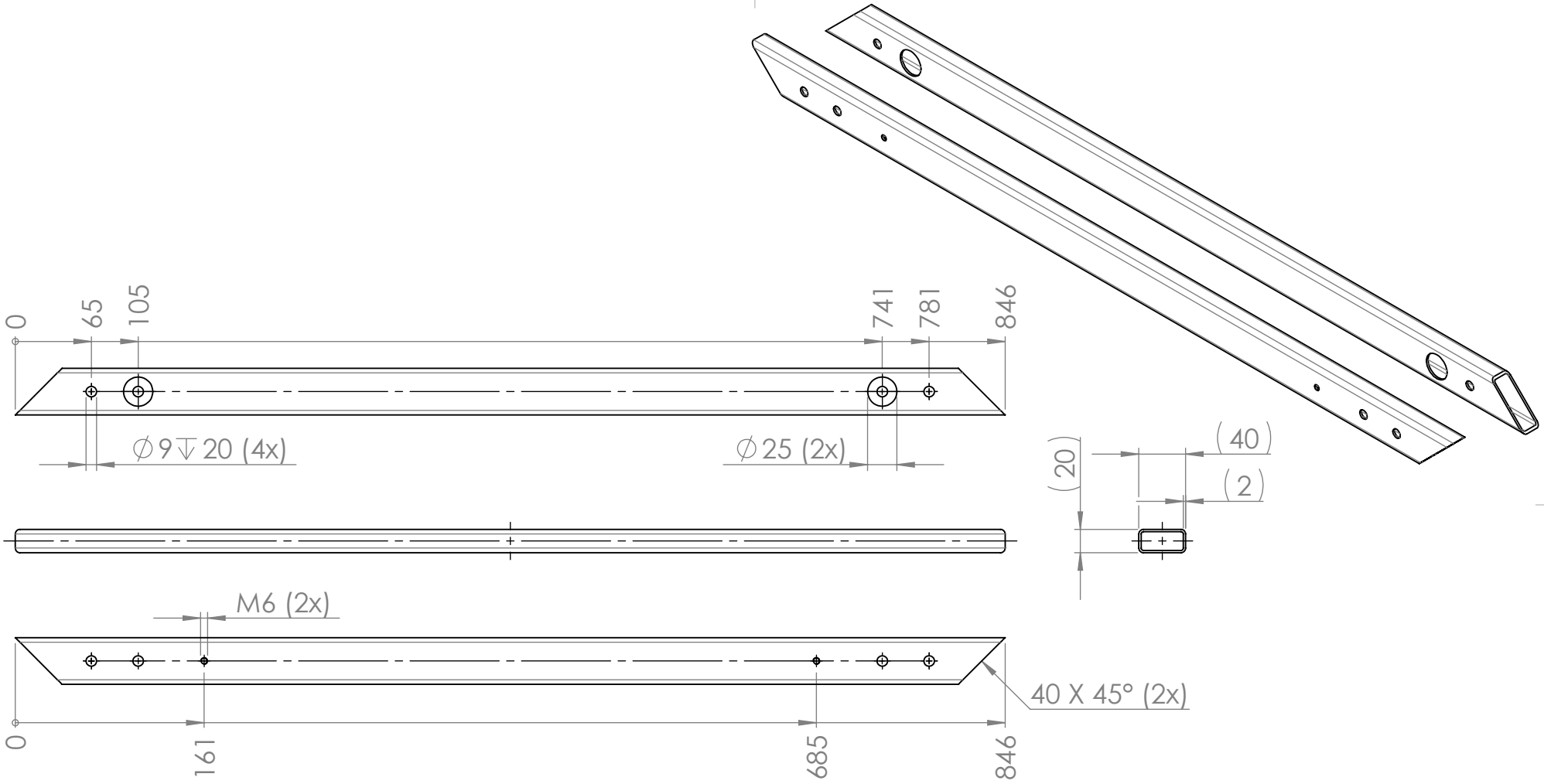
Finish: Soda blasting
Material: Material <not specified>
Description:
Frame assembly

Drawing number: **02.0001**
Revision:
Format: A2
Weight: 18496.80
SCALE: 1:10
SHEET: 1 OF 1

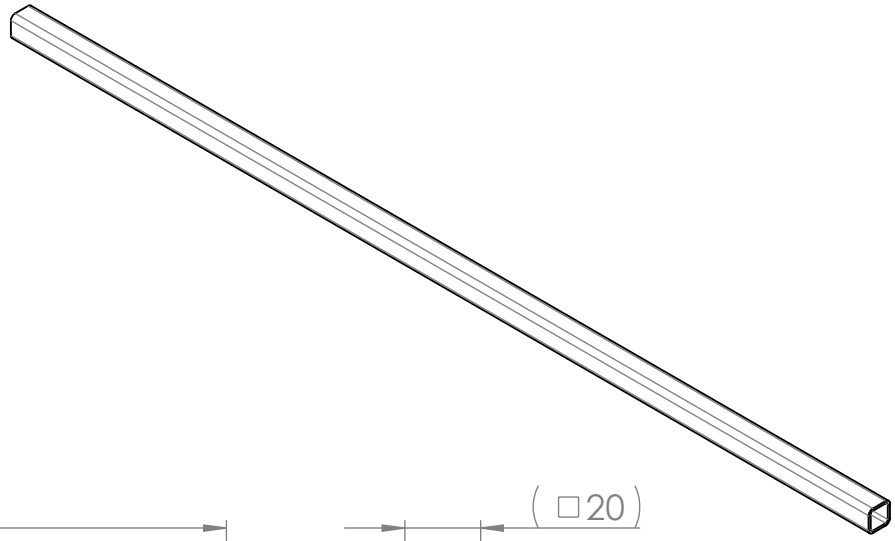


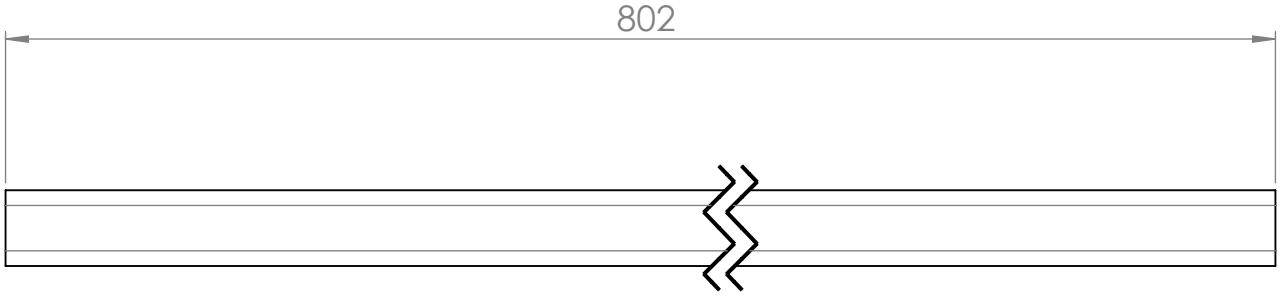
Am. Projection		DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:	
				Material: AISI 304	
	Name	Signature	Date	Description:	
Drawn:	S.Braakman		22-5-2019	**Tube 40x20x2**	
Checked:				Drawing number: **02.0002**	Revision: / Format: A4
Class:	SSS	StudentNo.		Weight: 1429.48 grams	SCALE: 1:5 / SHEET: 1 OF 1

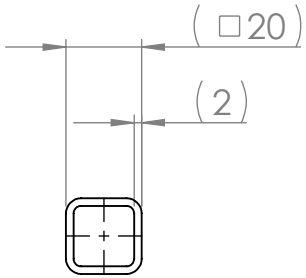
SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl



Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Material: AISI 304
	Name / Signature / Date	SAXION	Description: **Tube 40x20x2**
Drawn:	S.Braakman / 22-5-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **02.0003** / Revision: / Format A4
Checked:			Weight: 1355.52 grams / SCALE: 1:5 / SHEET: 1 OF 1
Class:	SSS / StudentNo.		







Am. Projection		DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:	
				Material: AISI 304	
	Name	Signature	Date	Description:	
Drawn:	S.Braakman		22-5-2019	**Tube 20x20x2**	
Checked:				Drawing number: **02.0004**	Revision:
Class:	SSS	StudentNo.			Format A4
				Weight: 857.81 grams	SCALE: 1:2
					SHEET: 1 OF 1

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
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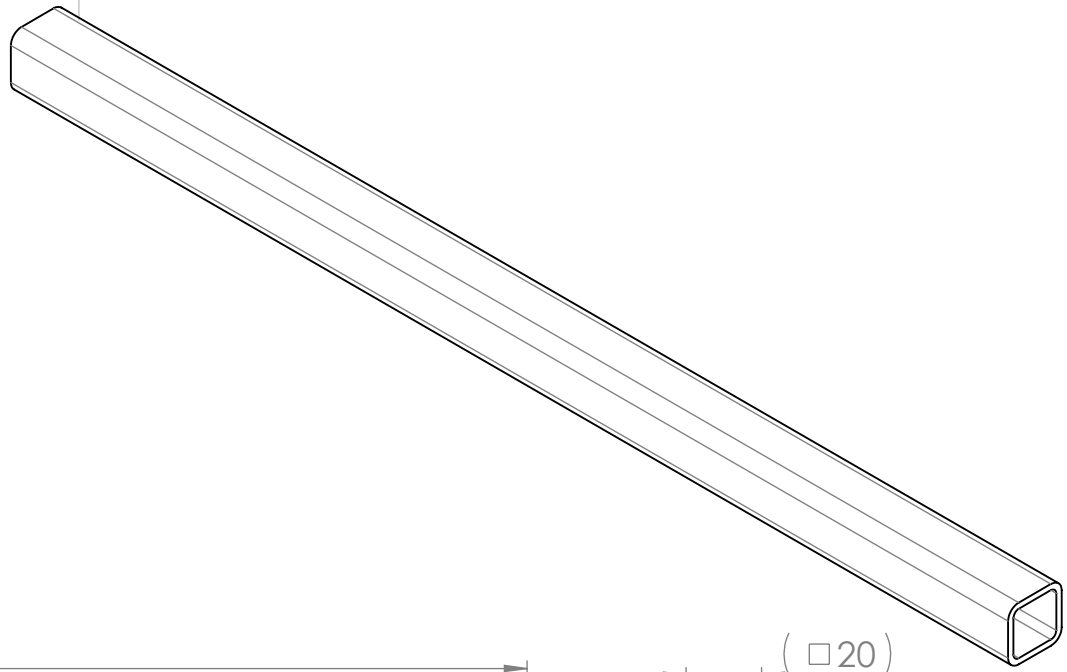
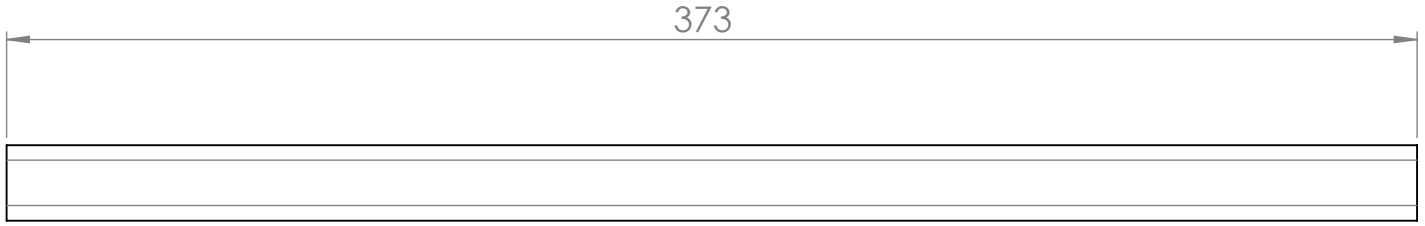
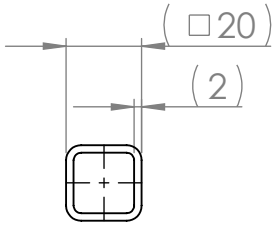
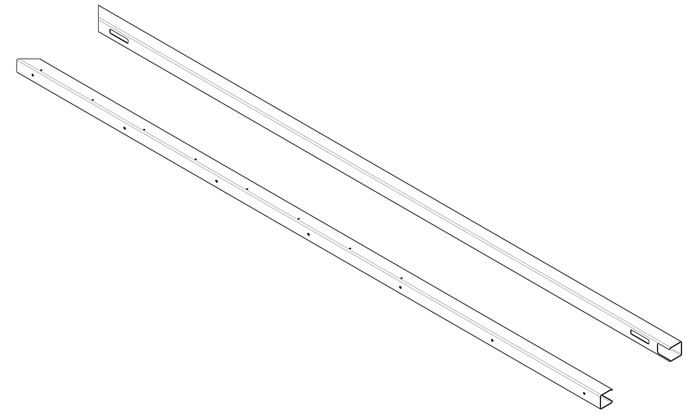


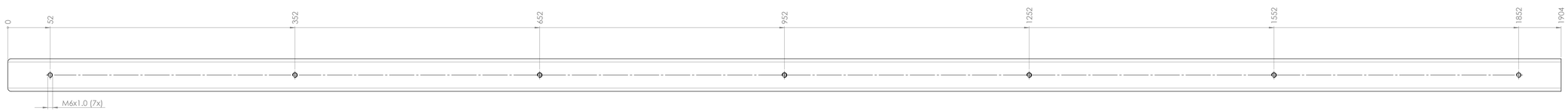


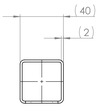


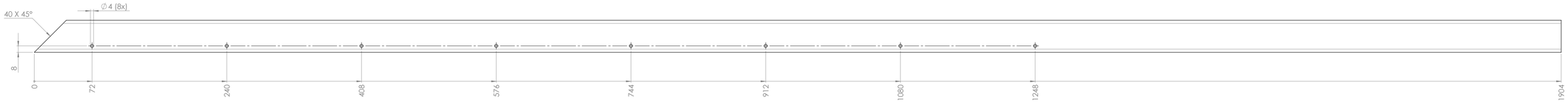
Am. Projection		DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:	
				Material: AISI 304	
	Name	Signature	Date	Description:	
Drawn:	S.Braakman		22-5-2019	**Tube 20x20x2**	
Checked:				Drawing number:	Revision: / Format
Class:	SSS	StudentNo.		**02.0005**	A4
				Weight: 398.96 grams	SCALE: 1:2 / SHEET: 1 OF 1

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl





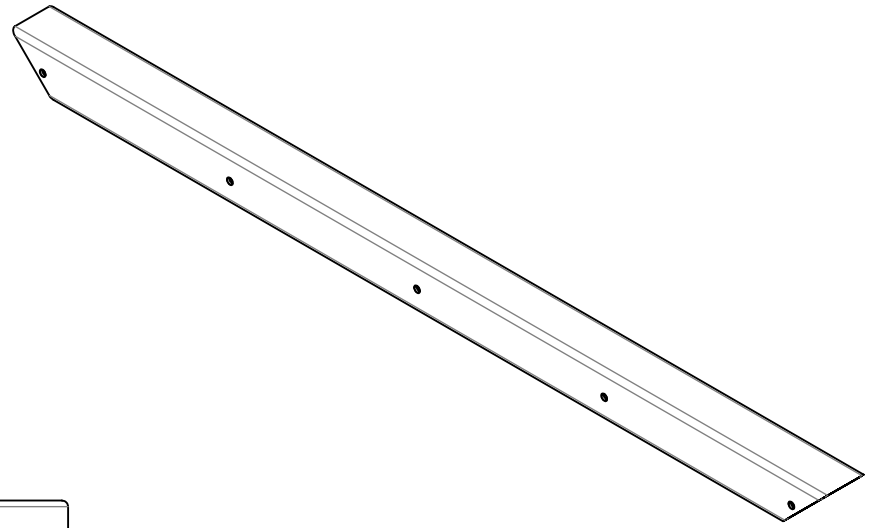


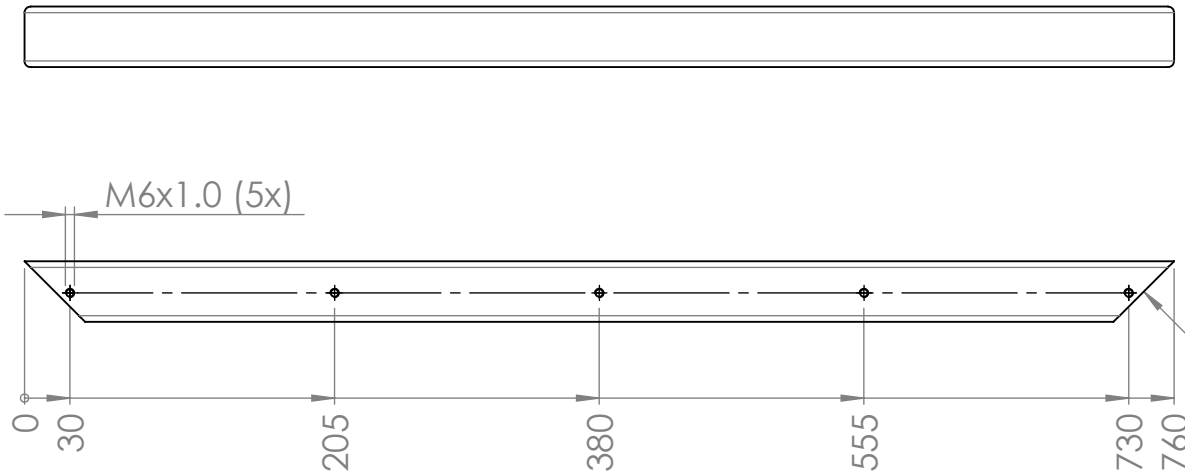


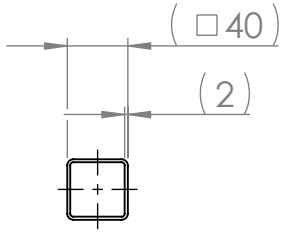
Arm. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
				Material: AISI 304	
	Name	Signature	Date	Description:	
Drawn:	S.Broekhuis		22-3-2019	**Tube 40x20x2**	
Checked:				Drawing number:	Revision: Format
Class:				**02.0006**	A0
				Weight: 4380.03 grams	SCALE: 1:2 SHEET 1 OF 1

SAXION

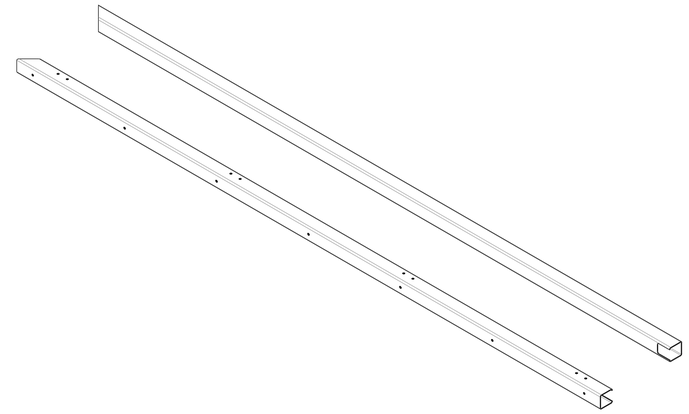
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75030 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

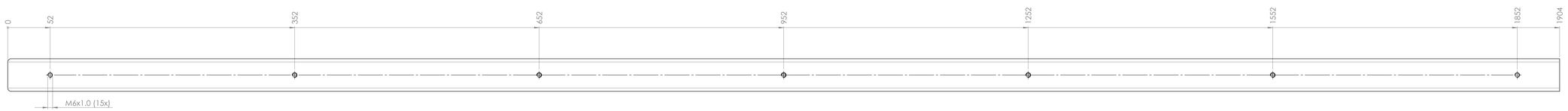






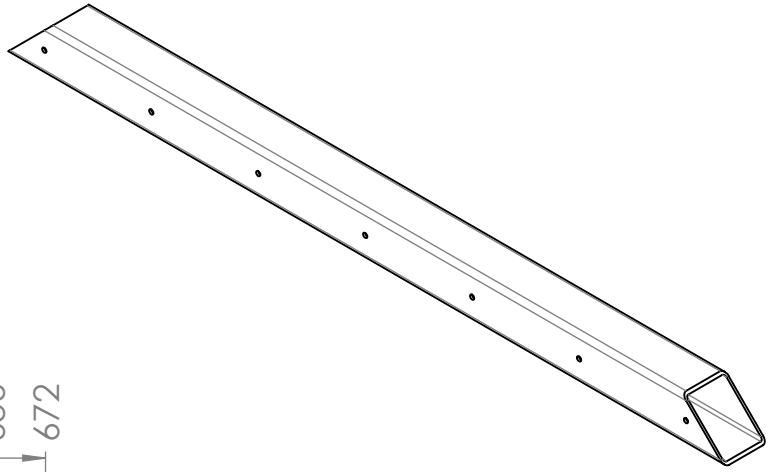
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Material: AISI 304
	Name / Signature / Date	SAXION	Description: **Tube 40x40x2**
Drawn:	S.Braakman / 22-5-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **02.0007** / Revision: / Format: A4
Checked:			
Class:	SSS	StudentNo.	Weight: 1690.16 grams / SCALE: 1:5 / SHEET: 1 OF 1

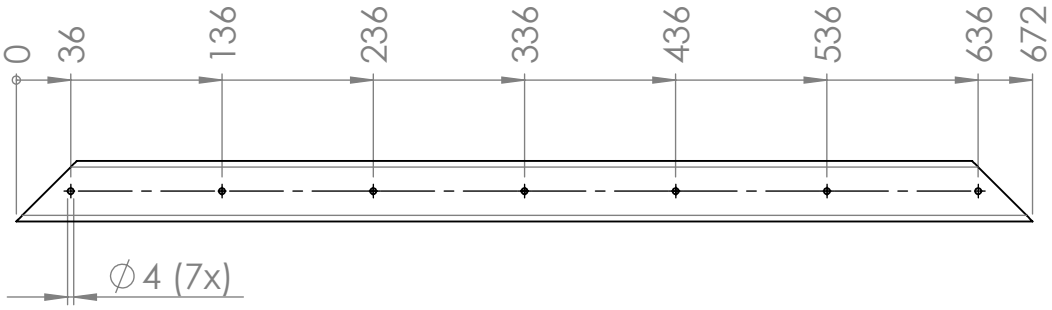


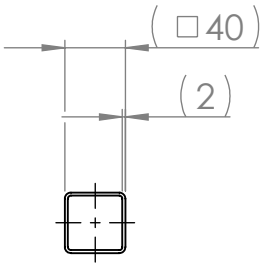


Arm. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
				Material: AISI 304	
	Name	Signature	Date	Description: **Tube 40x40x2**	
Drawn:	S.Broekhuis		23-3-2019		
Checked:				Drawing number: **02.0008**	Revision: A0
Class:		UNSPECIFIED		Weight: 4402.93 grams	Format: A0
					SCALE: 1:2 SHEET 1 OF 1

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 70300 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

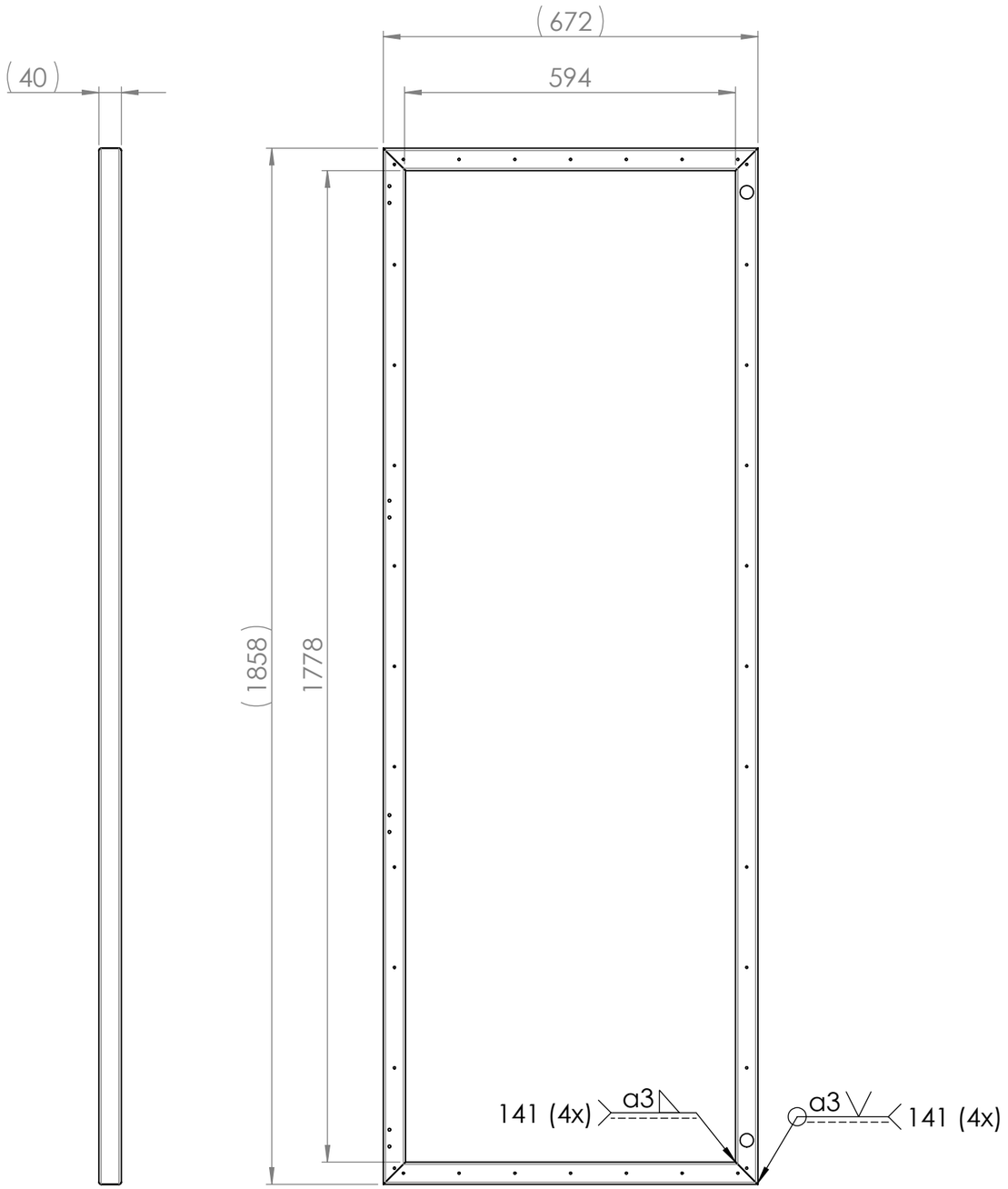


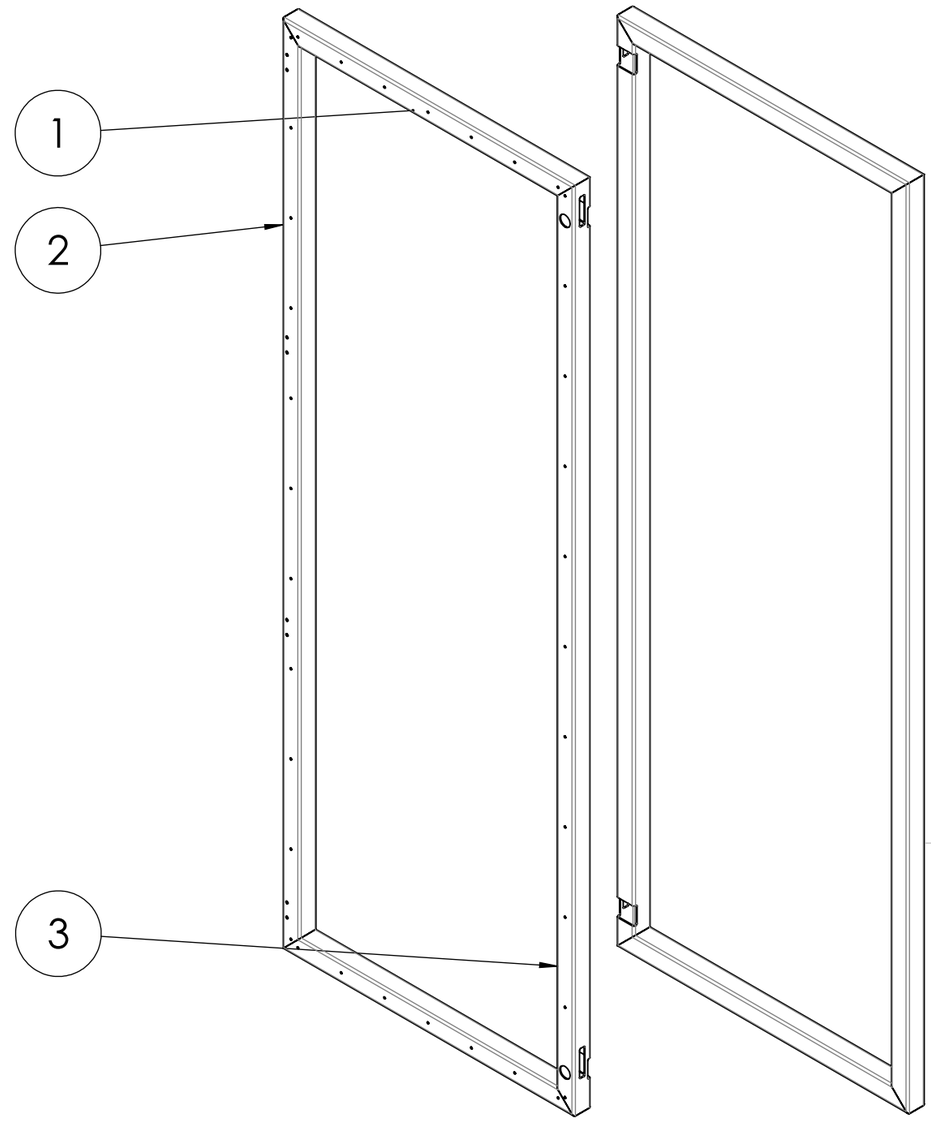




Am. Projection		DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:	
				Material: AISI 304	
	Name	Signature	Date	Description: **Tube 40x40x2**	
Drawn:	S.Braakman		22-5-2019		
Checked:				Drawing number: **02.0009**	Revision: / Format: A4
Class:	SSS	StudentNo.		Weight: 1483.56 grams	SCALE: 1:5 / SHEET: 1 OF 1

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl





ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
3	1	02.0012	Tube 40x40x2	AISI 304
2	1	02.0010	Tube 40x40x2	AISI 304
1	2	02.0009	Tube 40x40x2	AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish: Soda blasting

Material:

	Name	Signature	Date
Drawn:	S.Braakman		23-5-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:
Door assembly

Drawing number: **02.0011**

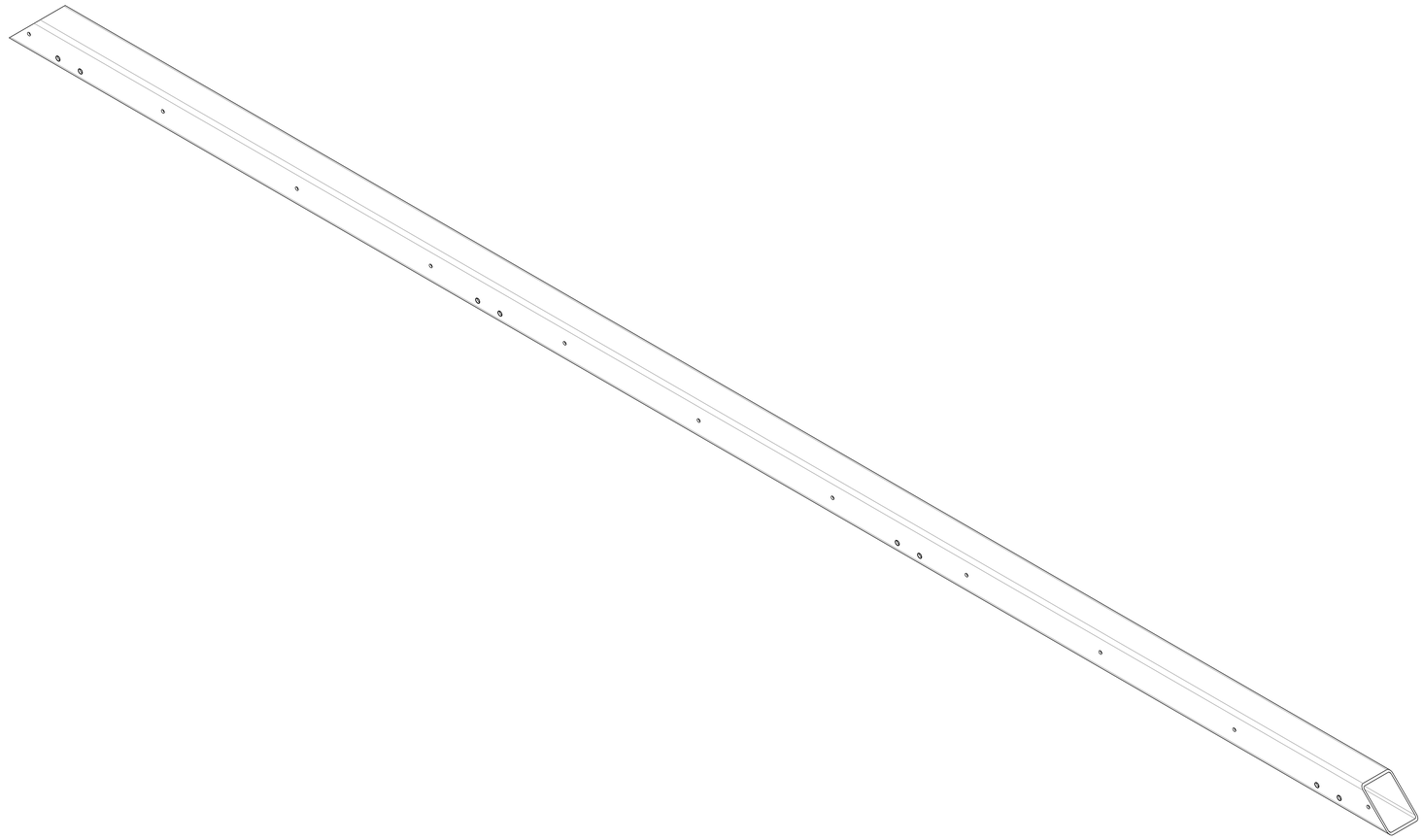
Revision:

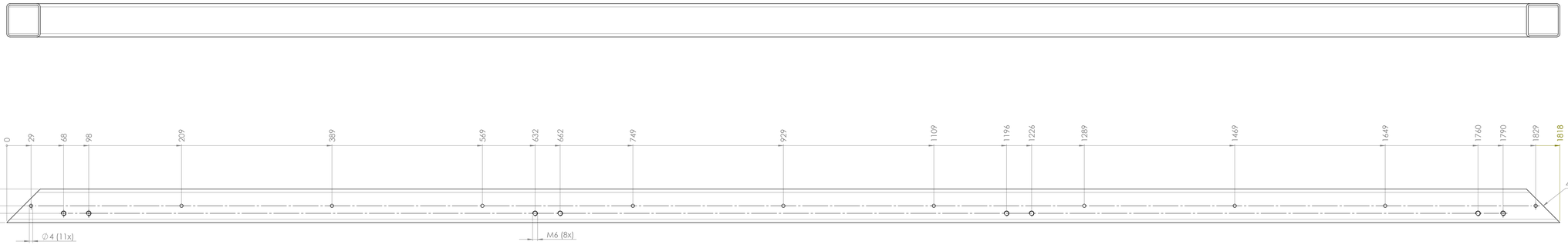
Format A3

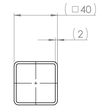
Weight: 11403.27

SCALE: 1:10

SHEET: 1 OF 1

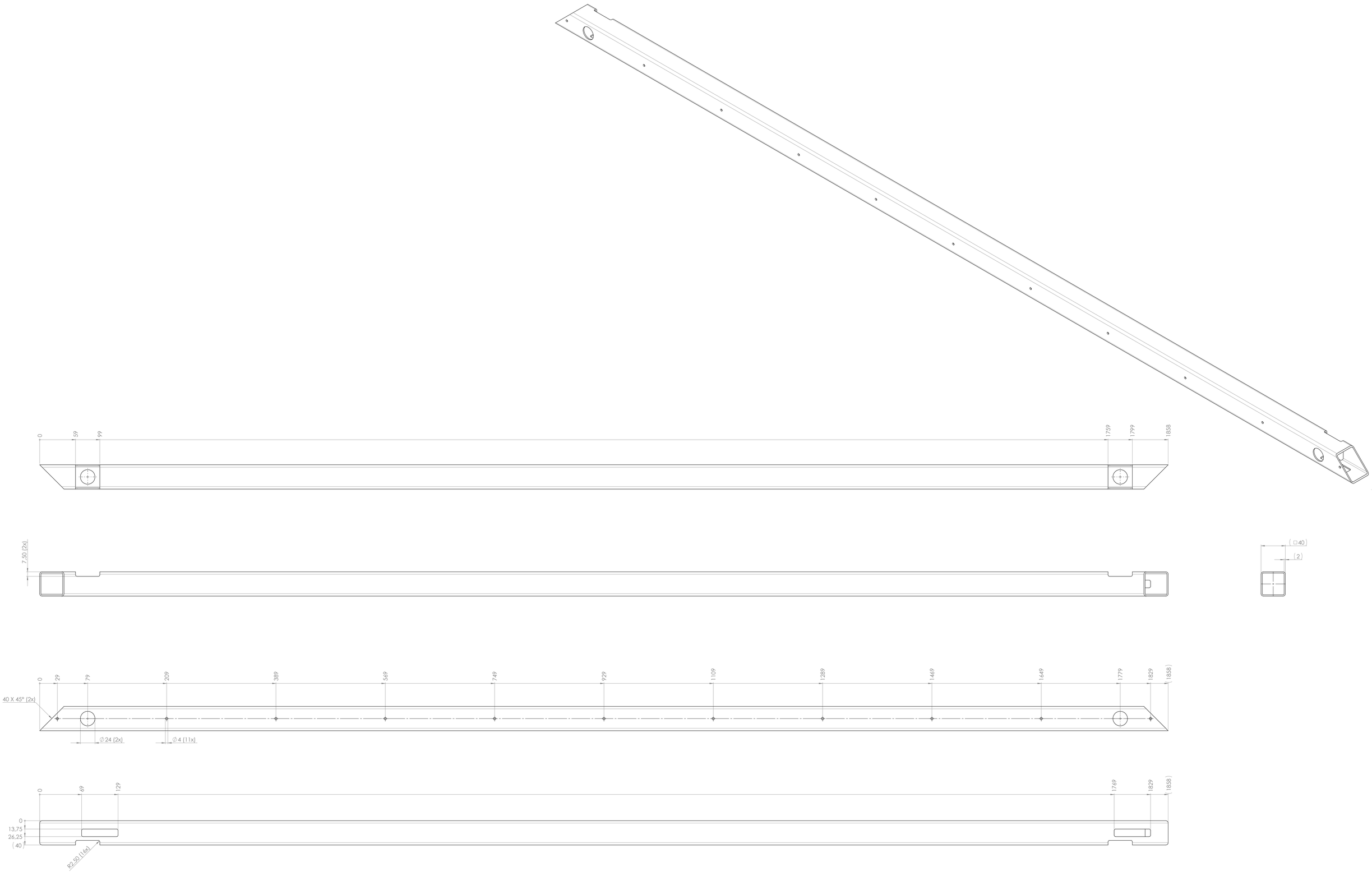






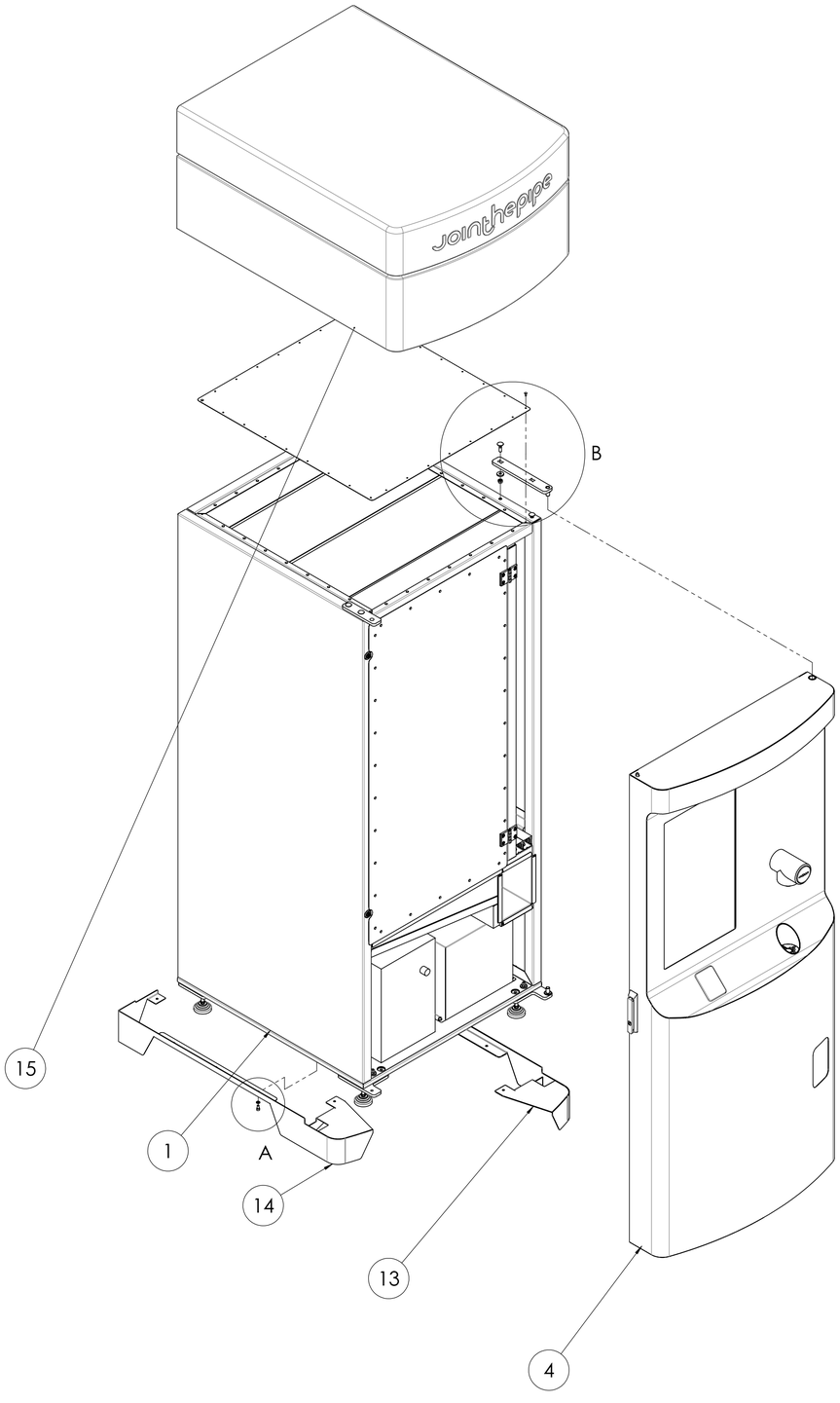
SOLIDWORKS Educational Product. For Instructional Use Only.

Arm. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
			Material: AISI 304
Drawn: S.Broekhoff 22-3-2019	SAXION Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 70300 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Description: **Tube 40x40x2**	
Checked:		Drawing number: **02.0010**	Revision: Format A0
Class:	DO_NOT_PRINT	Weight: 4266.89 grams	SCALE: 1:2 SHEET 1 OF 1

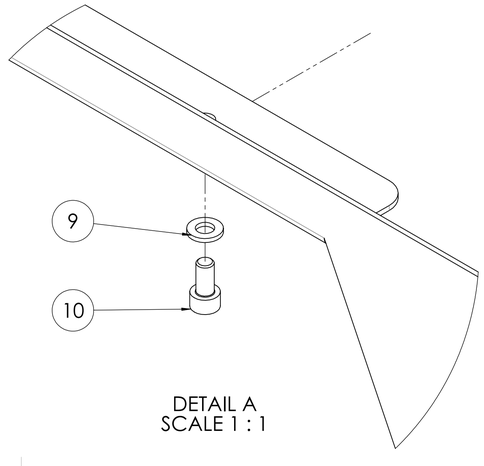


SOLIDWORKS Educational Product. For Instructional Use Only.

Arm. Projection			DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
	Name	Signature	Date		Material: AISI 304
Drawn:	S.Broekhof		25-3-2019	SAXION	Description: **Tube 40x40x2**
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75030 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **02.0012**
Class:		Unidentified			Revision:
					Format: A0
					Weight: 4169.27 grams
					SCALE: 1:2
					SHEET 1 OF 1



DETAIL B
SCALE 1 : 2



DETAIL A
SCALE 1 : 1

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
15	1	Cap Saxion Green	Cap Saxion	LD-P
14	1	03.0069	Decorative base assembly (L)	Material <not specified>
13	1	03.0072	Decorative plate assembly (L)	
12	2	PIR.0014		Material <not specified>
11	2	PIR.0013		Material <not specified>
10	10	M6x12 Hex. socket screw A2	51050.060.012	
9	10	M6 Washer A2	51420.060.001	
8	32	Rivet R3.8 x10 A2	34180.040.010	
7	2	M8 Hex lock nut A2	51718.080.001	
6	2	M8 Washer A2	51420.080.001	
5	2	Locking bolt M8x30 A2 DIN603	55500.080.030	Steel
4	1	04.0001	Door assembly	Material <not specified>
3	1	03.0032	Top plate	1.0037 (S235JR)
2	1	04.0210	Hinge assembly	Material <not specified>
1	1	03.0064	Sub ass. back + cooling door	

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material: Material <not specified>

	Name	Signature	Date
Drawn:	S. Braakman		18-6-2019
Checked:			
Class:	SSS	StudentNo.	

Description:

Bottle dispenser assembly

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Drawing number: **03.0001**

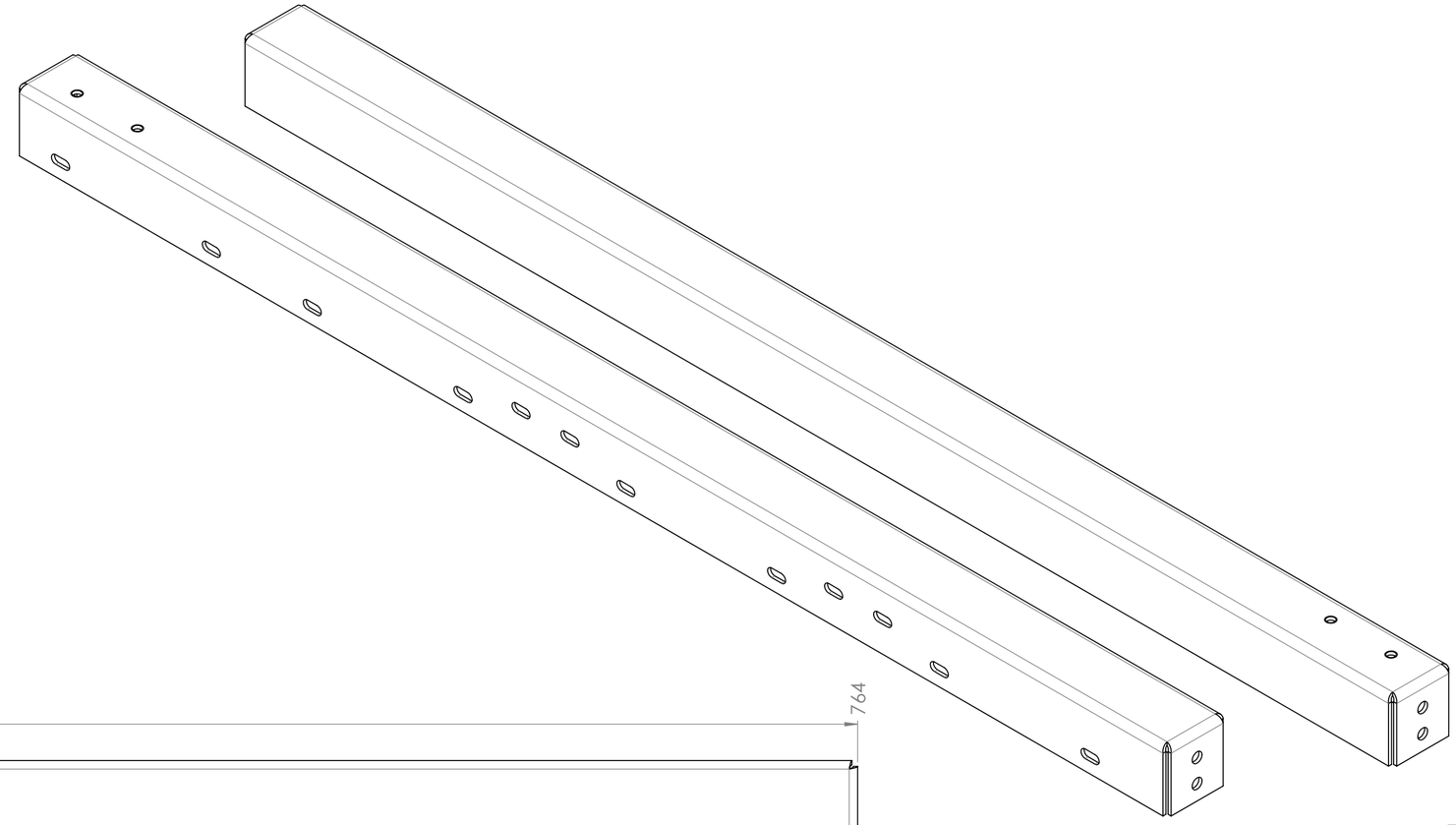
Revision:

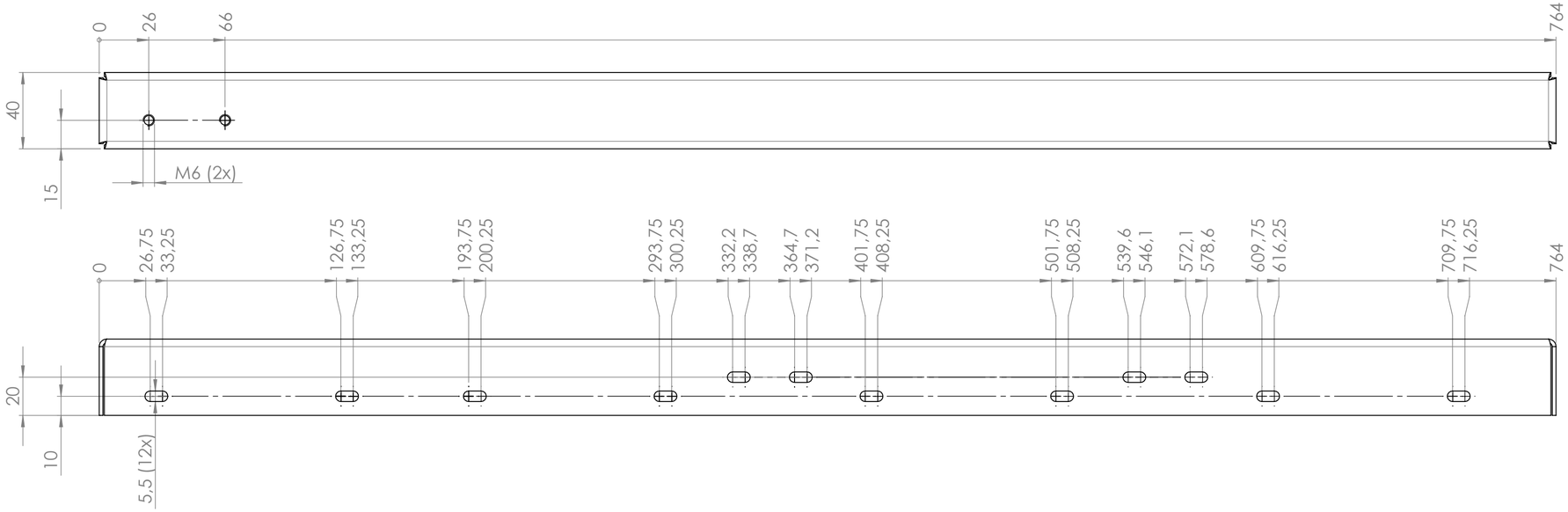
Format: A1

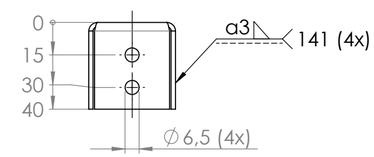
Weight: 0,00

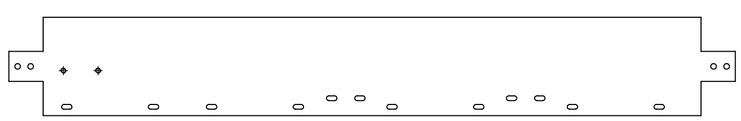
SCALE: 1:20

SHEET: 1 OF 1



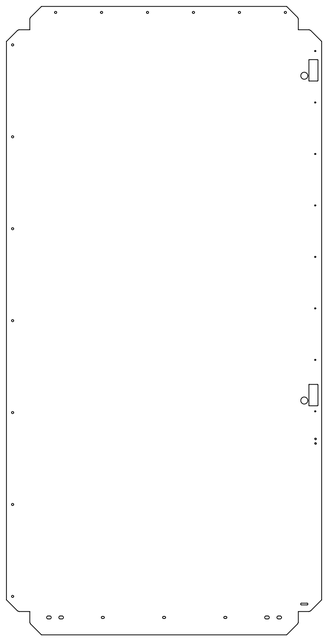




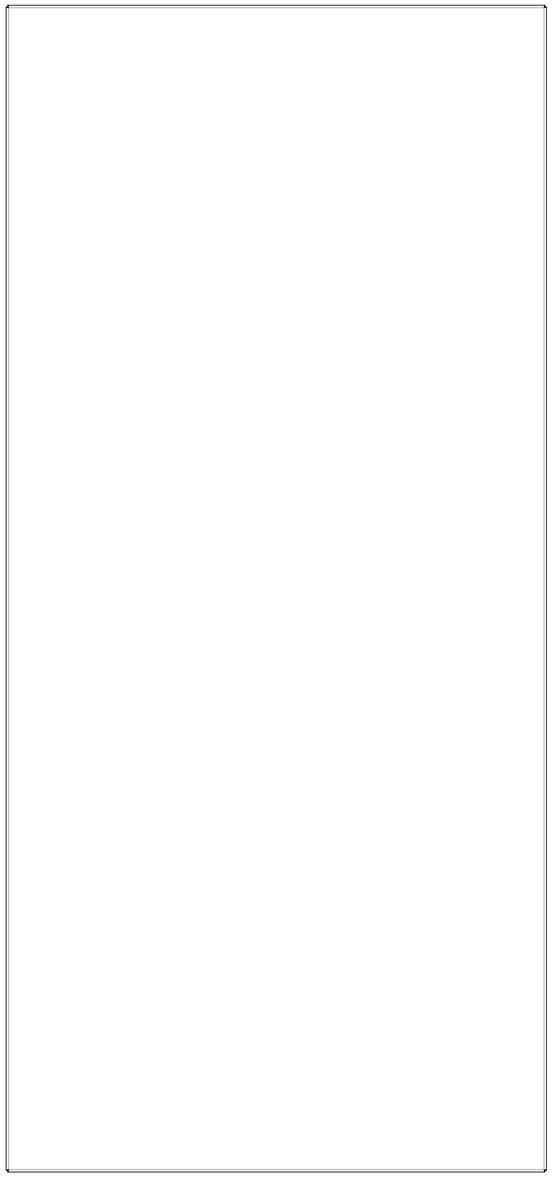


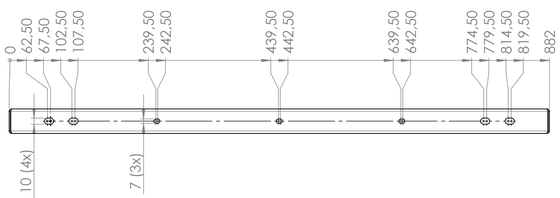
For information (1:5).

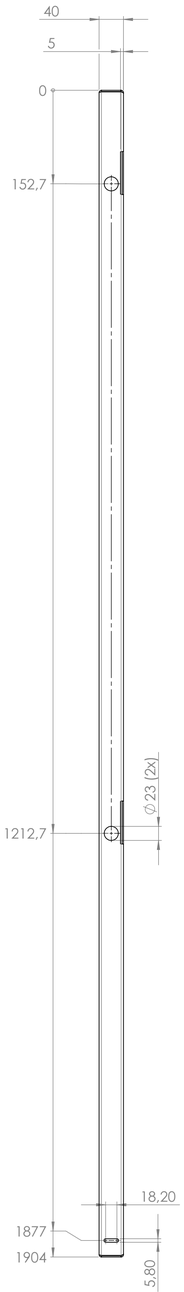
Am. Projection	DIMENSIONS IN MILLIMETERS			DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Soda blasting
	Name	Signature	Date		Material: AISI 304
Drawn:	S.Braakman		23-5-2019	SAXION	Description: **Plate**
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0002** / Revision: / Format: A2
Class:	SSS	StudentNo.			Weight: 1405.84 grams / SCALE: 1:2 / SHEET: 1 OF 1

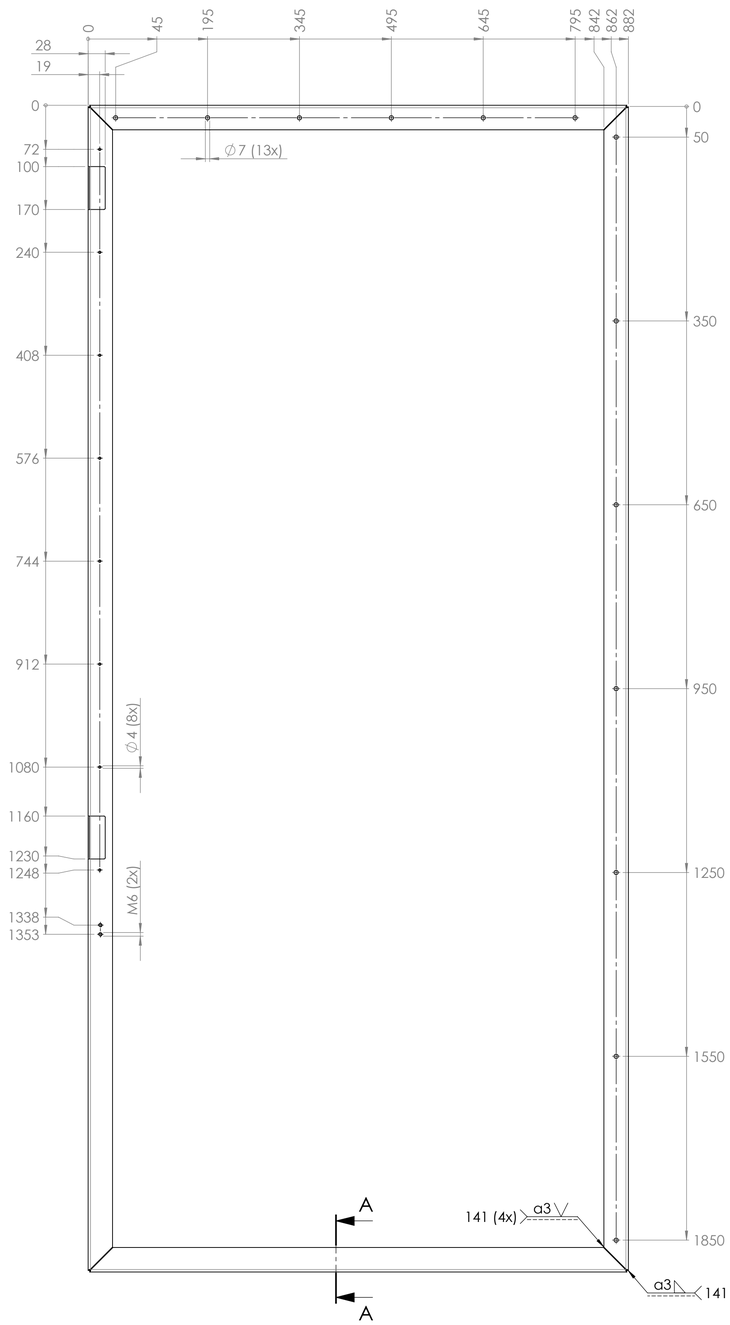


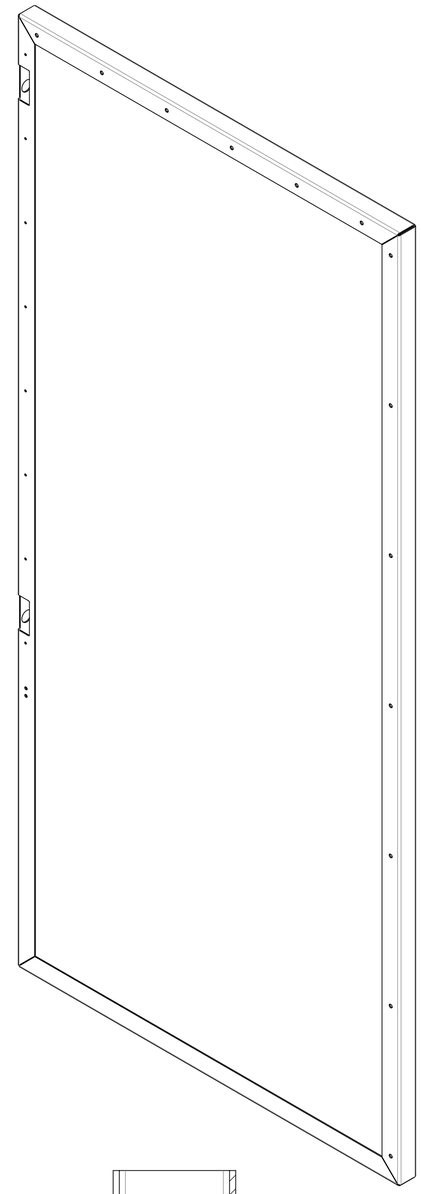
For information (1:10).

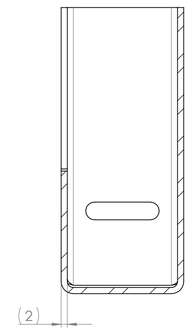










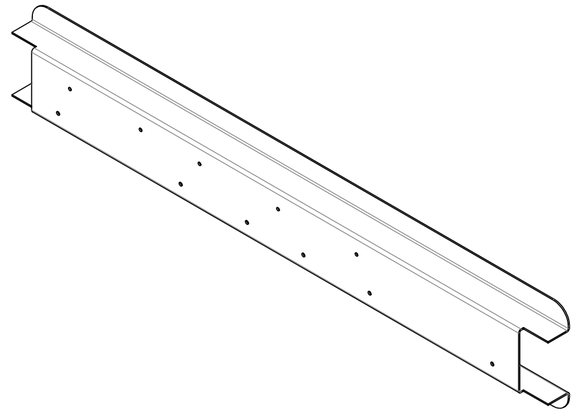


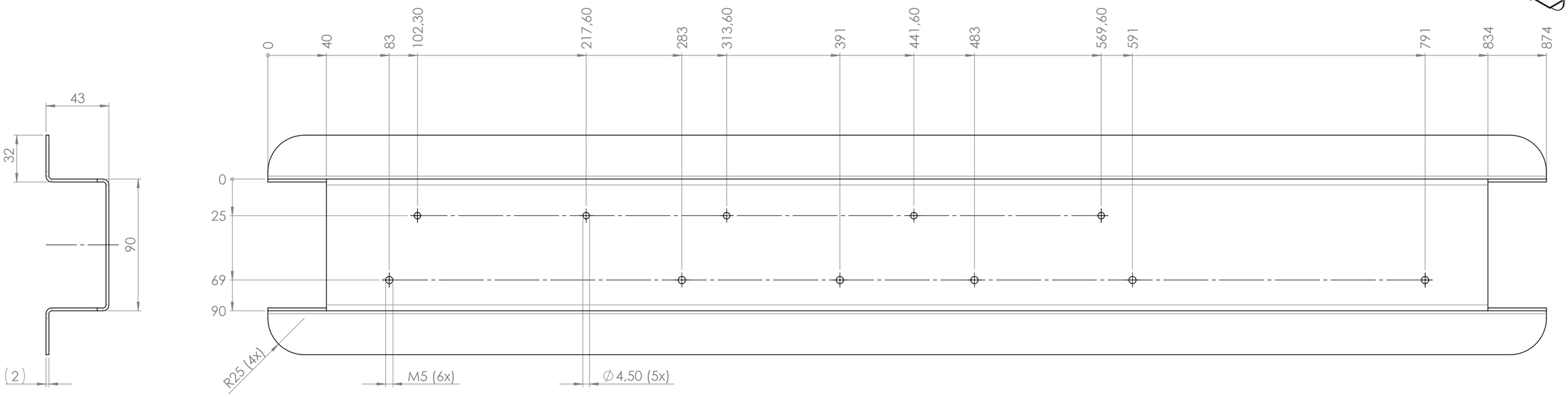
SECTION A-A
SCALE 1 : 1

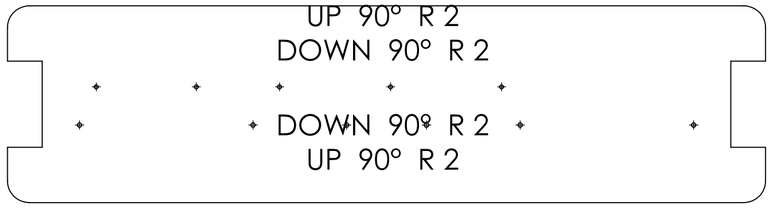
NOTE: GRIND WELDS FLAT.

Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
				Material: AISI 304	
	Name	Signature	Date	Description:	
Drawn:	S.Braakman		23-5-2019	**Panel**	
Checked:				Drawing number: **03.0003**	Revision:
Class:	SSS	Studentno.			Format: A1
Weight: 33191.41 grams				SCALE: 1:5	SHEET: 1 OF 1

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

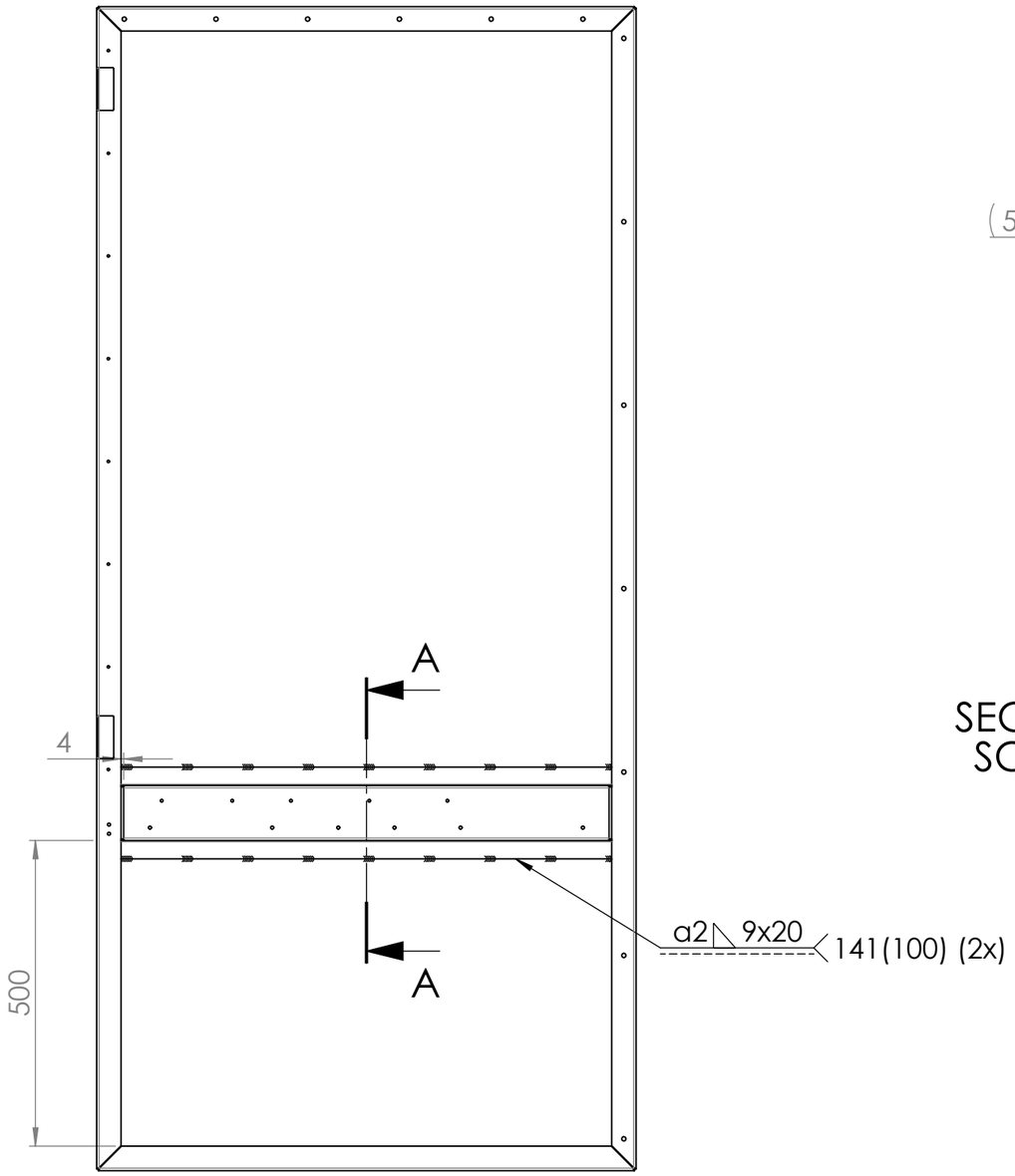


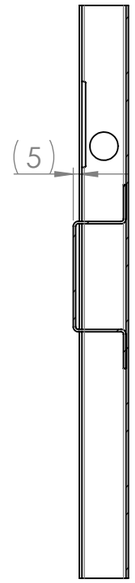




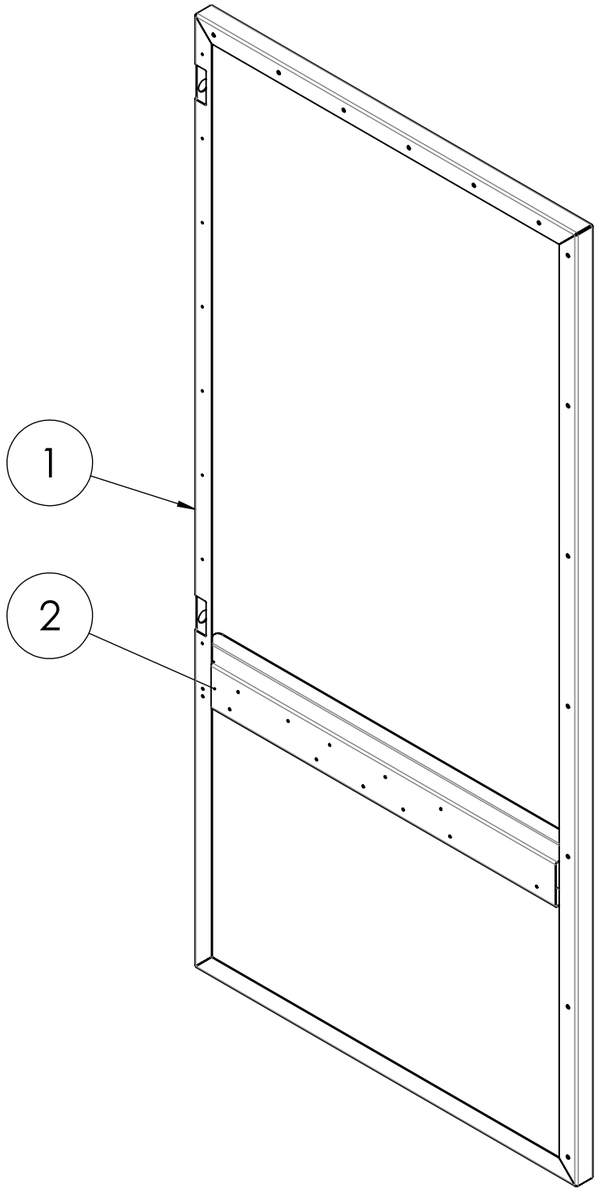
For information (1:5).

Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
	Name	Signature	Date	SAXION	Material: AISI 304
Drawn:	M. ten Cate		27-5-2019		Description: **Plate**
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0004** / Revision: / Format A2
Class:	SSS	StudentNo.			Weight: 3033.26 grams / SCALE: 1:2 / SHEET: 1 OF 1





SECTION A-A
SCALE 1 : 5



ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
2	1	03.0004	Plate	AISI 304
1	1	03.0003	Panel	AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish: Soda blasting

Material:

	Name	Signature	Date
Drawn:	S.Braakman		27-5-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:
Side panel assembly

Drawing number: **03.0006**

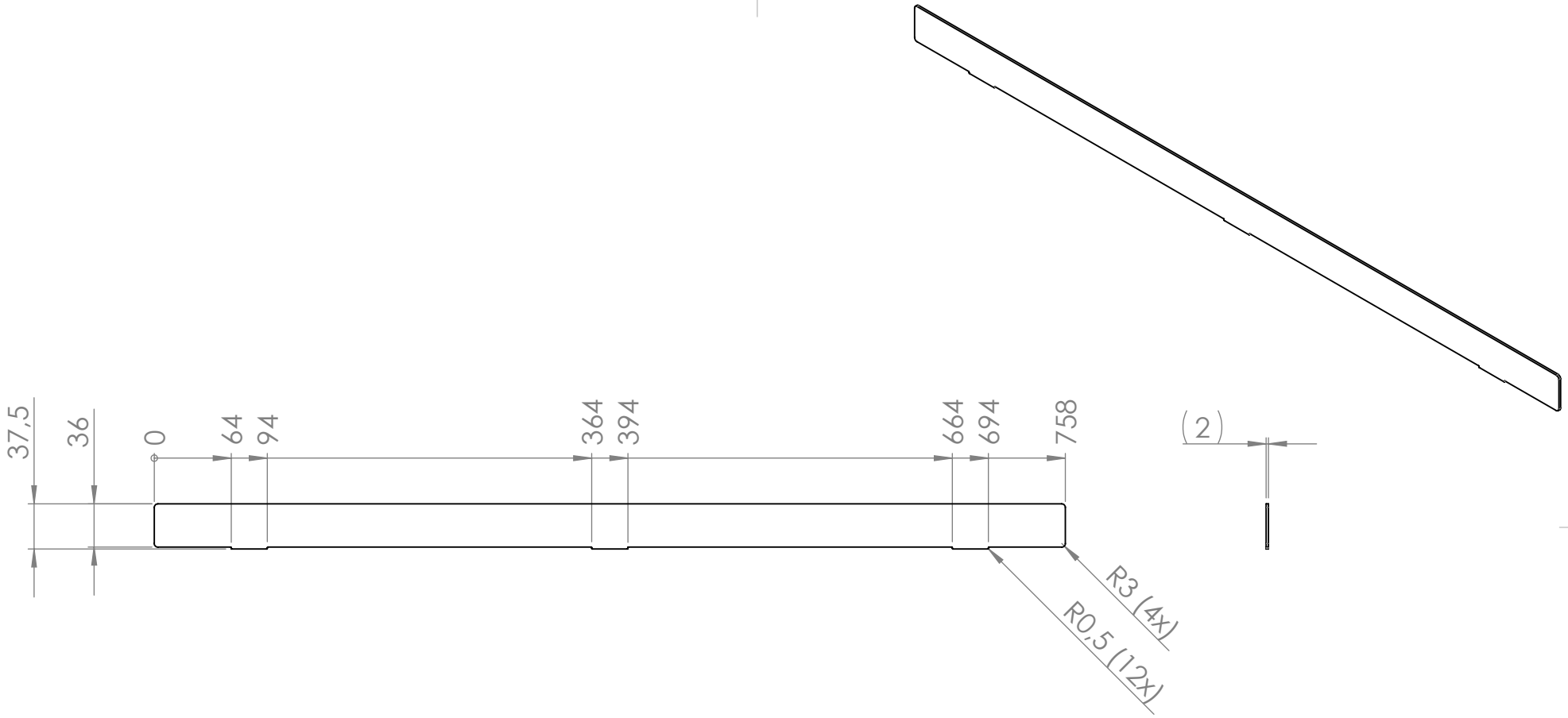
Revision:

Format: A3

Weight: 36224.67

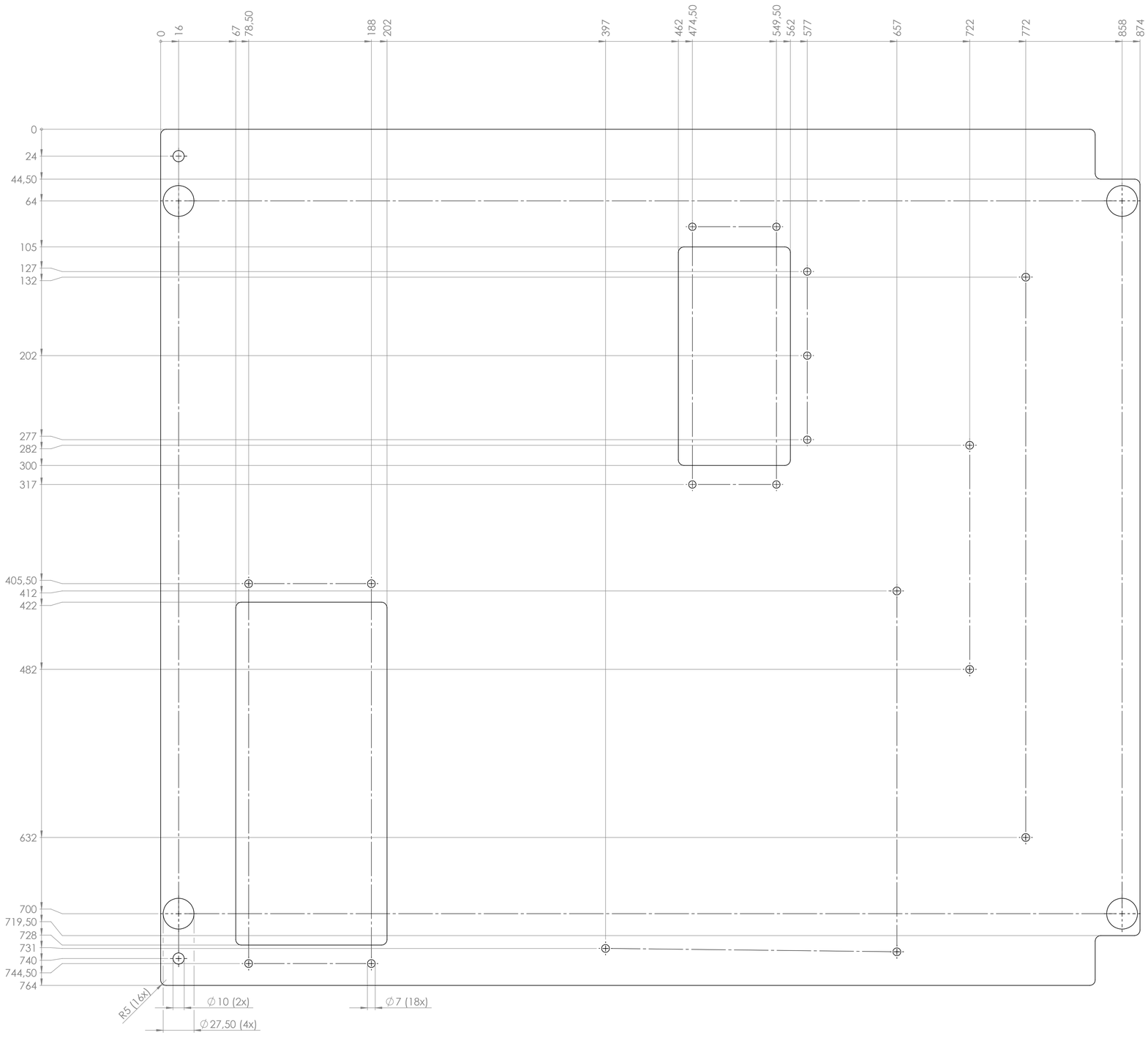
SCALE: 1:10

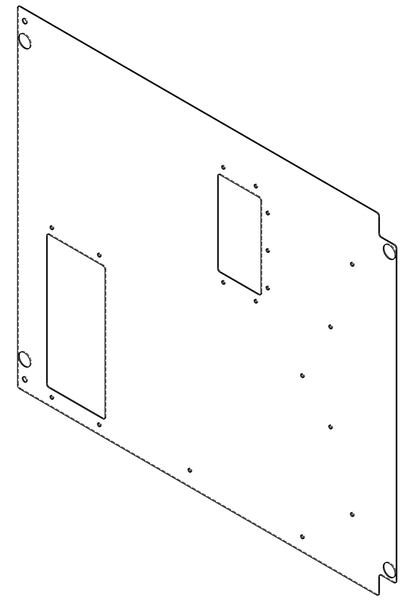
SHEET: 1 OF 1



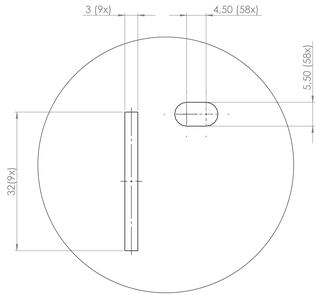
Am. Projection		DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:	
				Material: AISI 304	
	Name	Signature	Date	Description:	
Drawn:	S.Braakman		23-5-2019	**Plate**	
Checked:				Drawing number: **03.0007**	Revision:
Class:	SSS	StudentNo.		Weight: 438.64 grams	SCALE: 1:5
				Format A4	SHEET: 1 OF 1

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

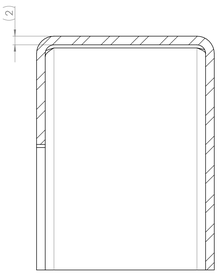




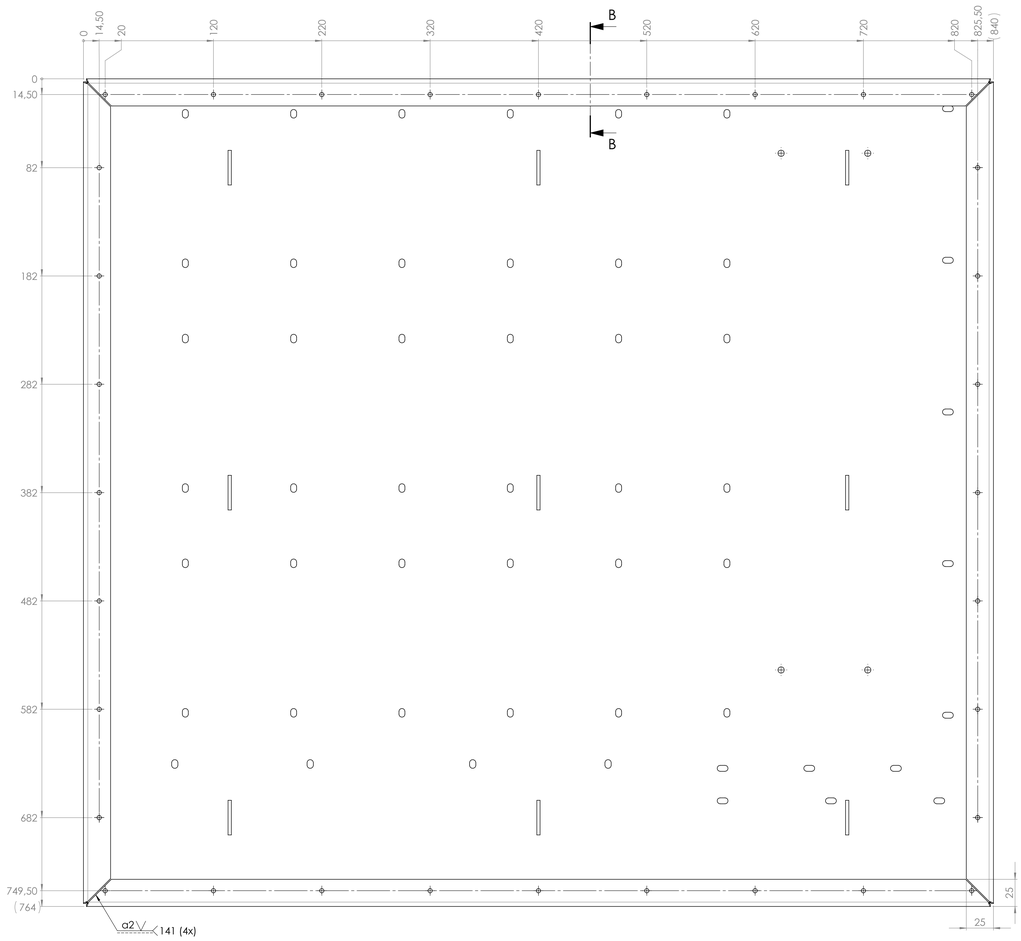
Am. Projection			DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
	Name	Signature	Date		Material: AISI 304
Drawn:	S.Broekman		23-5-2019	SAXION	Description: **Base plate**
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0008** / Revision: / Format: A1
Class:	SSS	StudentNo.			Weight: 9603.07 grams / SCALE: 1:2 / SHEET: 1 OF 1

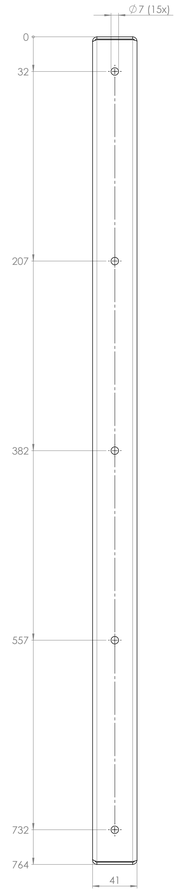


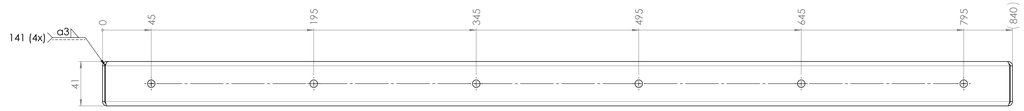
DETAIL A
SCALE 2 : 1

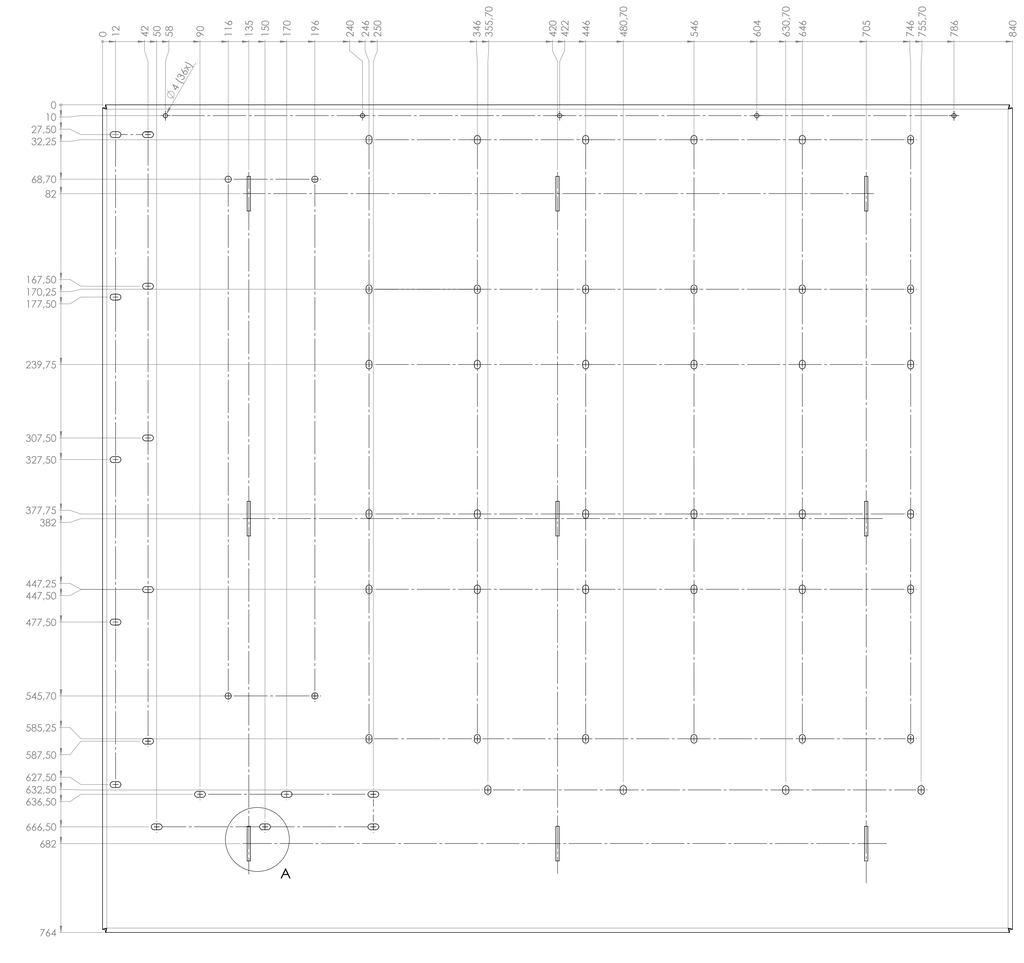


SECTION B-B
SCALE 2 : 1







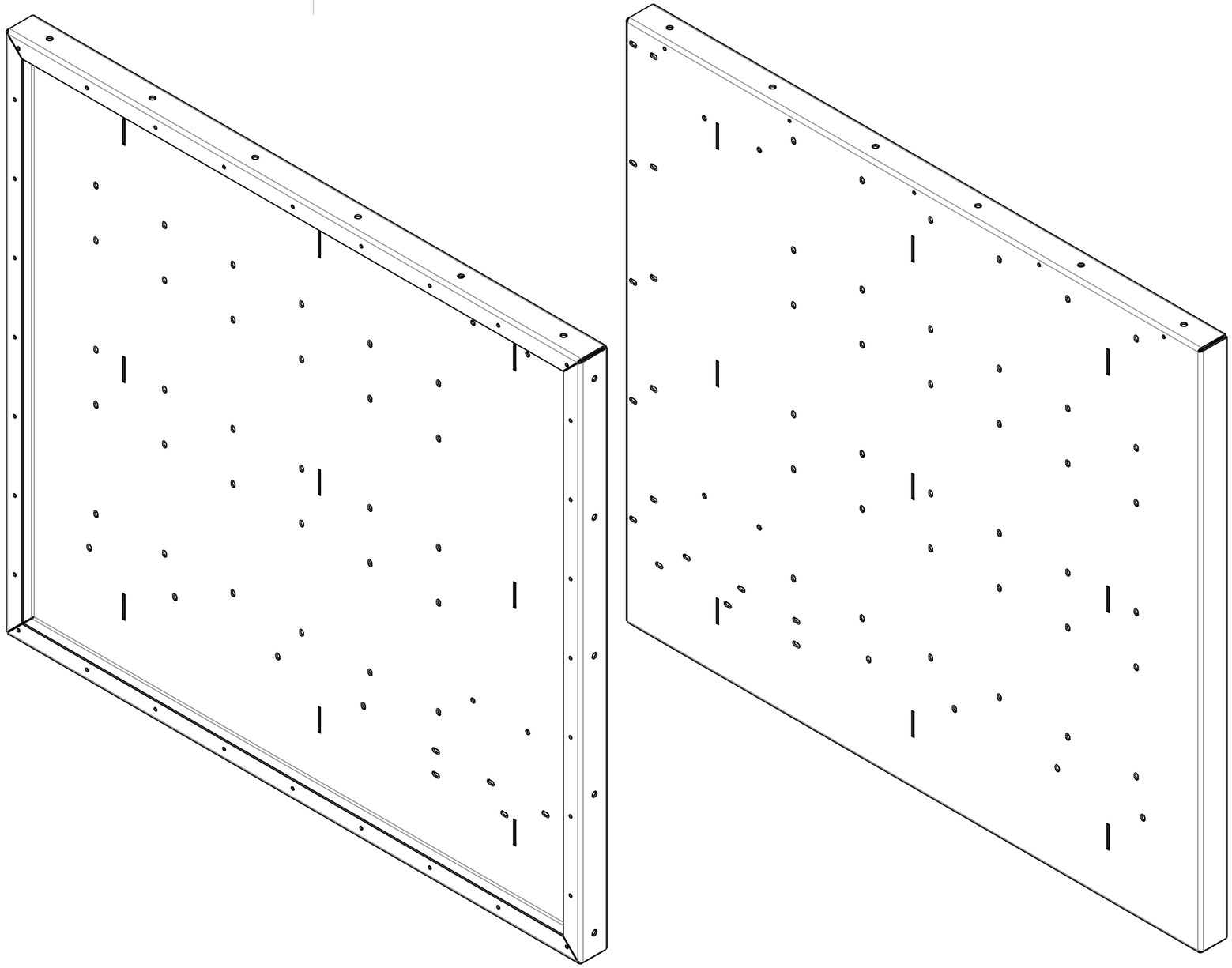


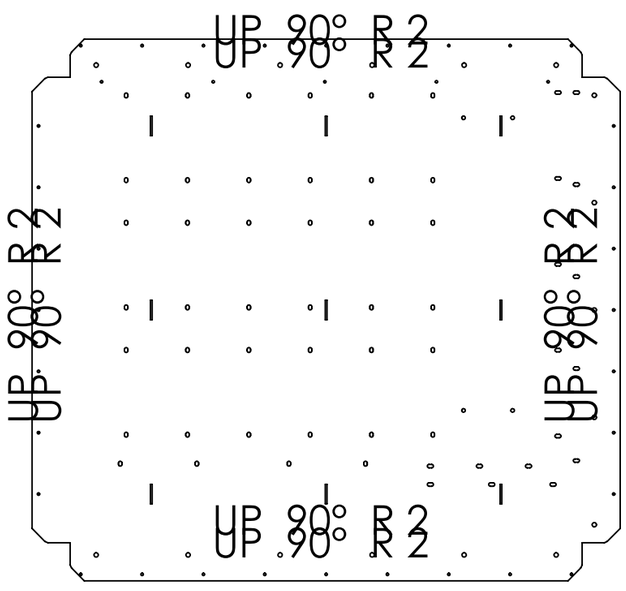
Isometric view and flat pattern: see other sheet.

NOTE: GRIND WELDS FLAT.

Arm. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
	Name	Signature	Date	Material: AISI 304	
Drawn:	Ir. Ten Cate		27-5-2019	Description: **Top plate**	
Checked:				Drawing number: **03.0009**	Revision: / Format: A0
Class:		Student Proj.		Weight: 13192.09 grams	SCALE: 1:2 / SHEET: 1 OF 2

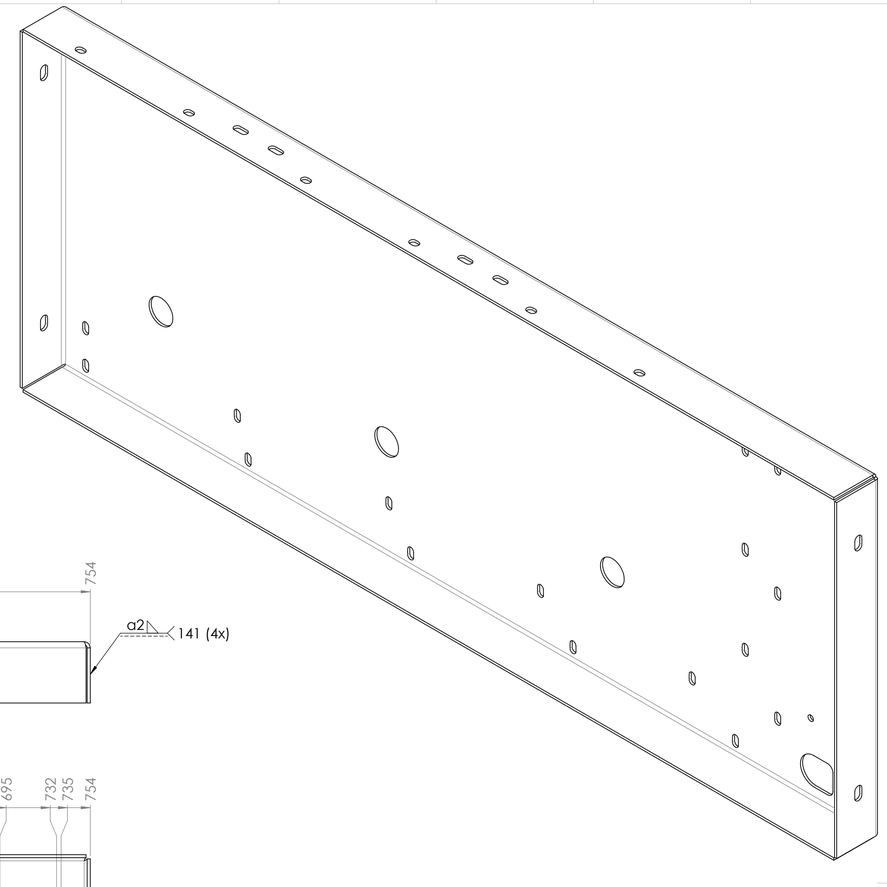
SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 70000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

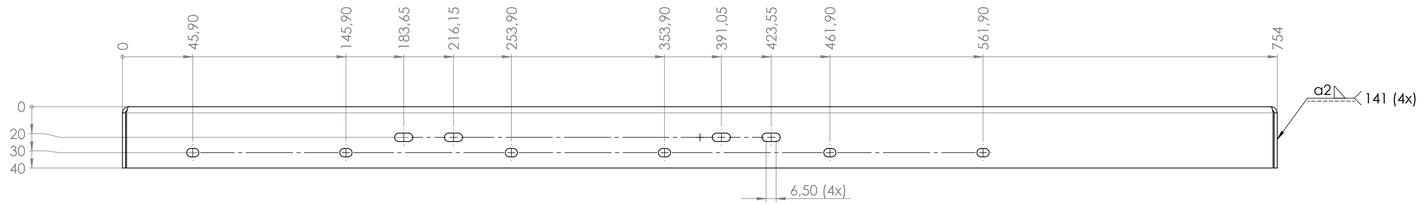


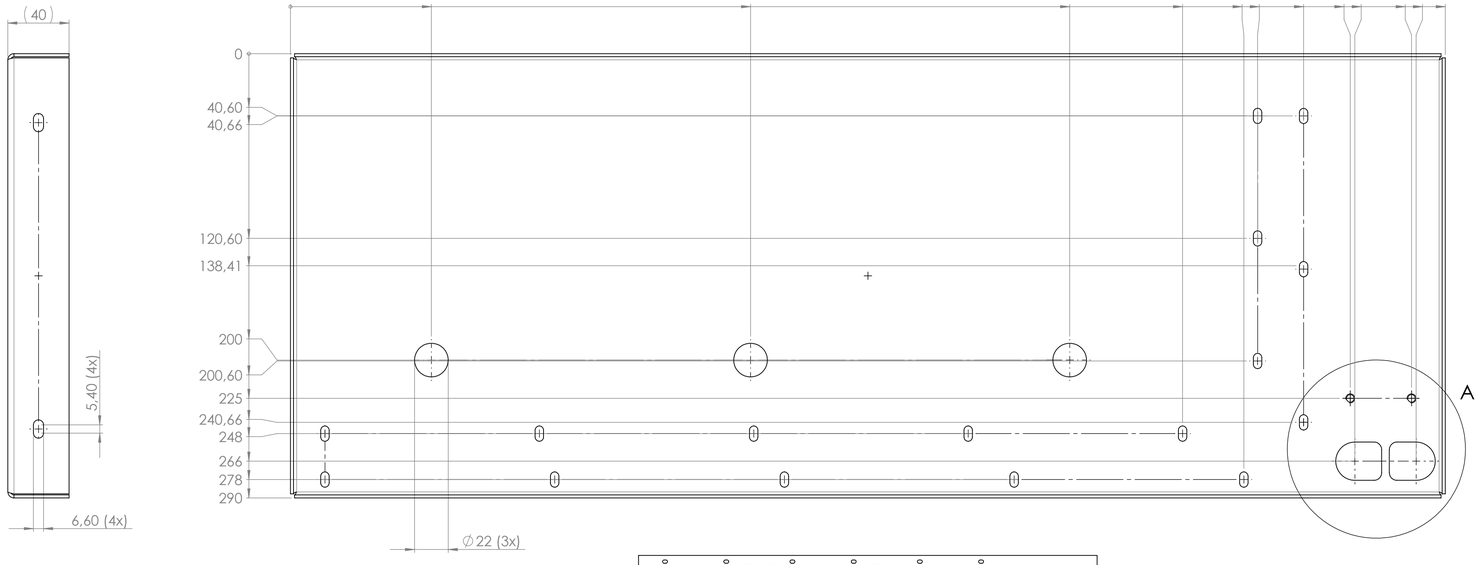


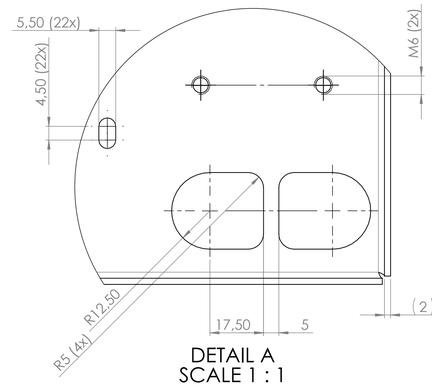
For information (1:10).

Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK			Finish:	
					Material: AISI 304	
	Name	Signature	Date	SAXION	Description:	
Drawn:	M. ten Cate		27-5-2019		**Top plate**	
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0009**	Revision: / Format: A3
Class:	SSS	StudentNo.			Weight: 13192.09 grams	SCALE: 1:5 / SHEET: 2 OF 2

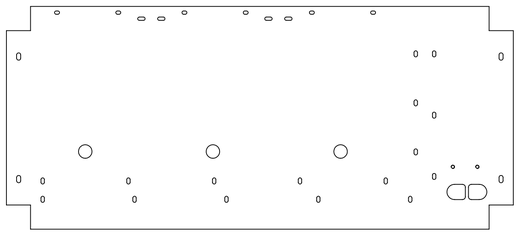








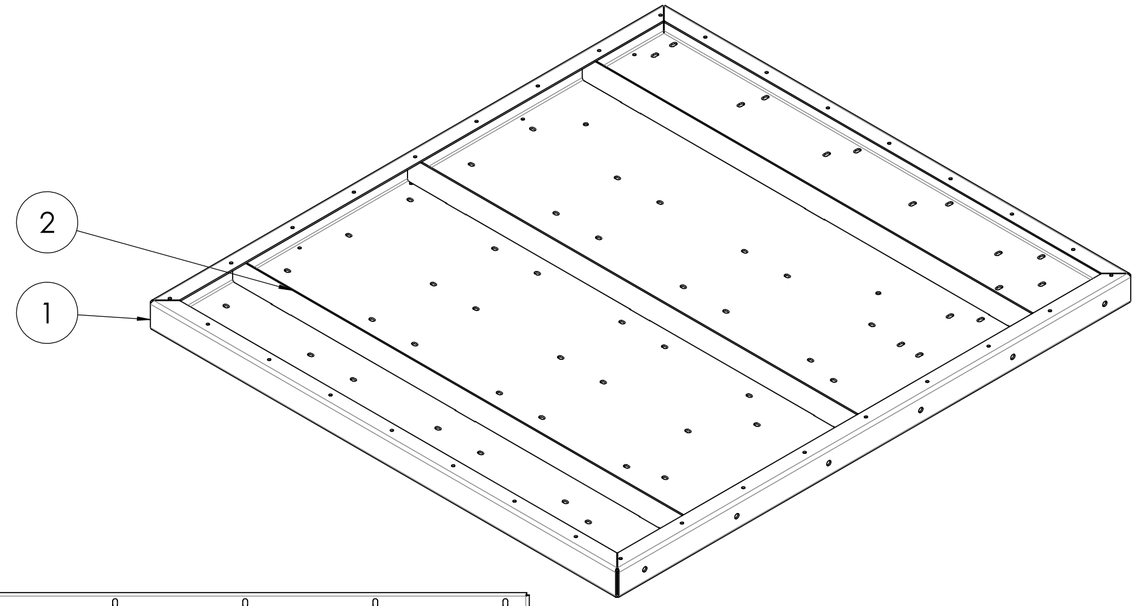
DETAIL A
SCALE 1 : 1

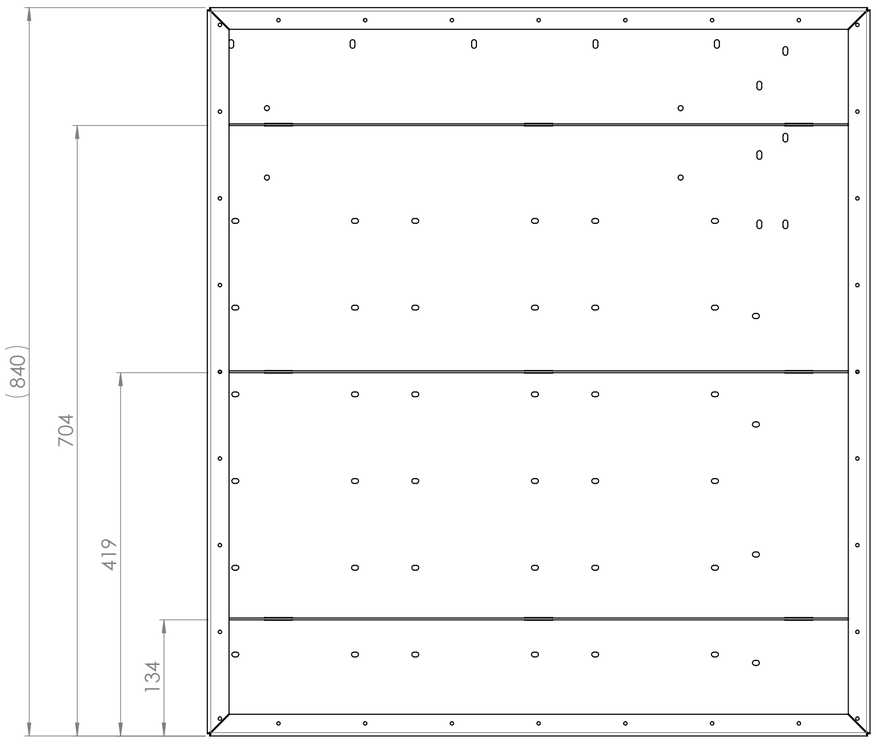


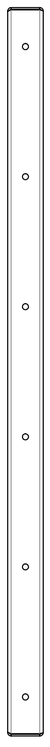
For information (1:5).

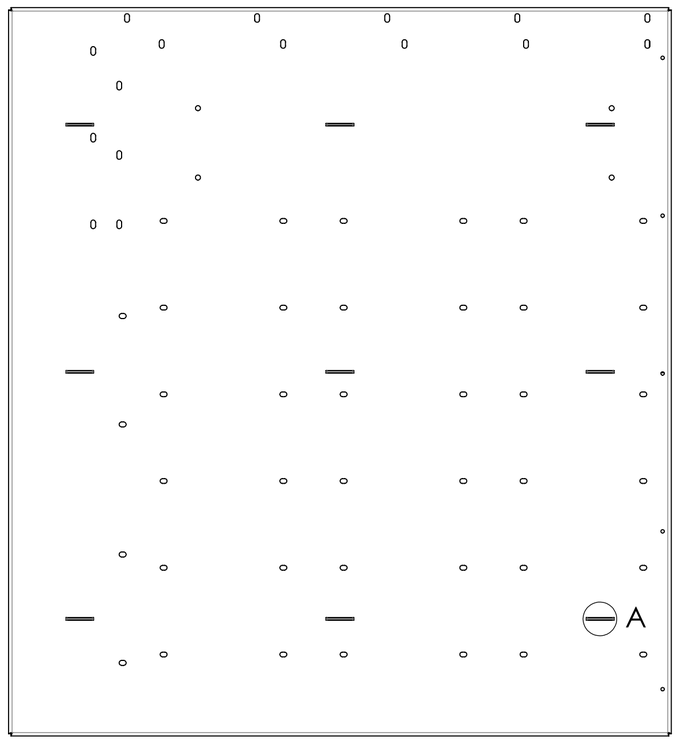
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
	Name	Signature	Date	Material: AISI 304	
Drawn:	S.Braakman		27-5-2019	Description: **Plate**	
Checked:				Drawing number: **03.0010**	Revision: / Format: A1
Class:	SSS	StudentNo.		Weight: 4646.85 grams	SCALE: 1:2 / SHEET: 1 OF 1

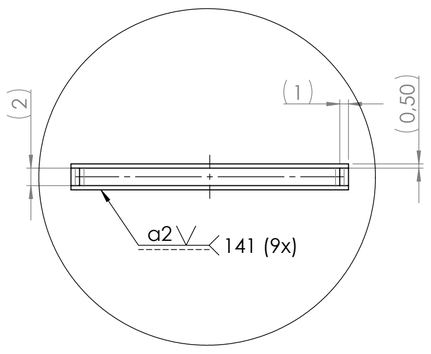
SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl











DETAIL A
SCALE 2 : 1

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
2	3	03.0007	Plate	AISI 304
1	1	03.0009	Top plate	AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish: Soda blasting

Material: Material <not specified>

	Name	Signature	Date
Drawn:	S.Braakman		27-5-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:
Top plate assembly

Drawing number: **03.0011**

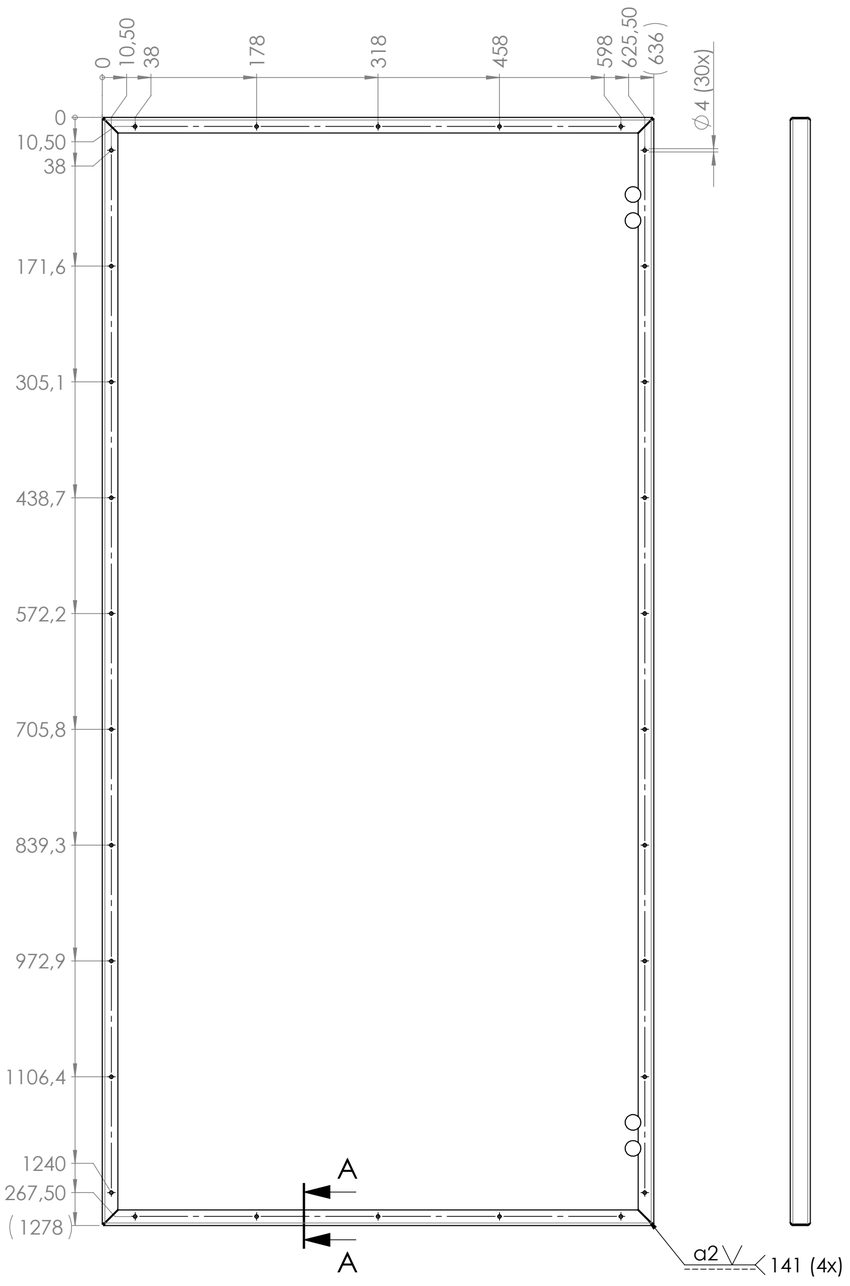
Revision:

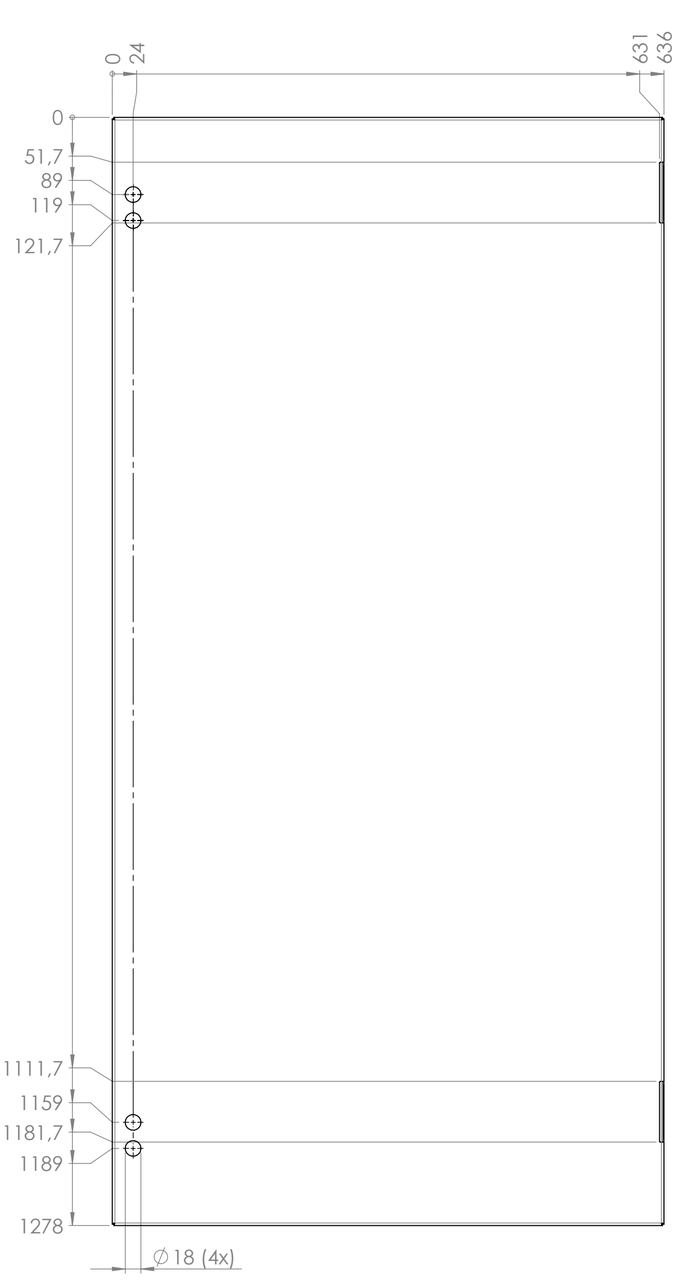
Format: A2

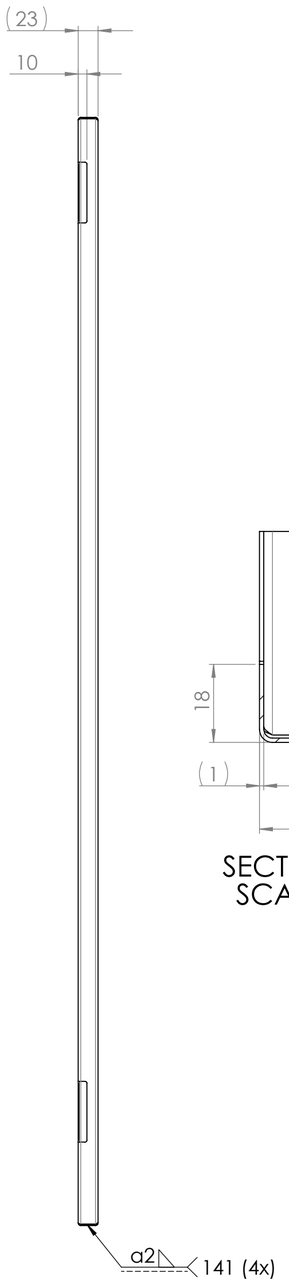
Weight: 14508.02

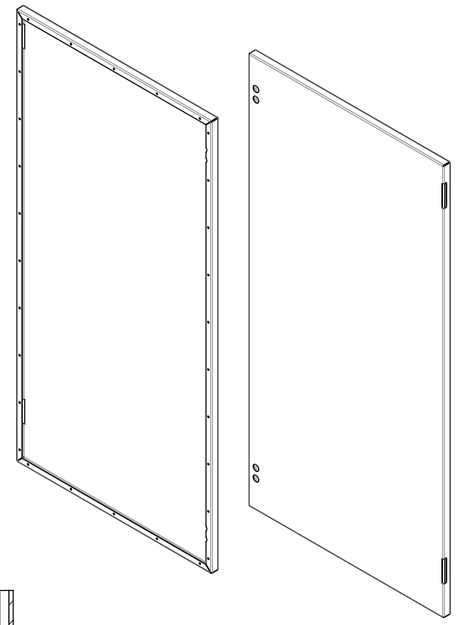
SCALE: 1:5

SHEET: 1 OF 1

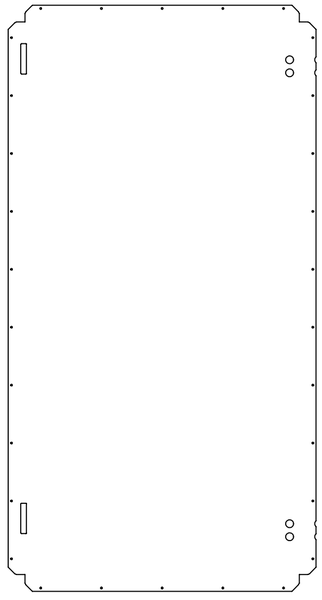






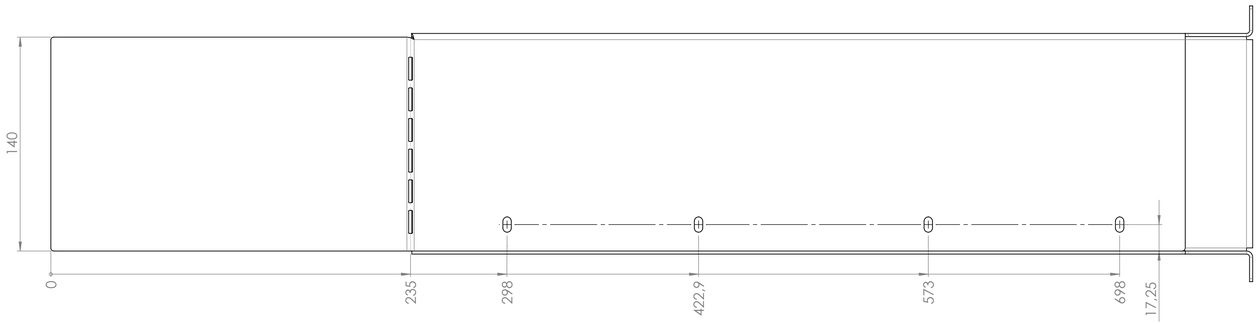


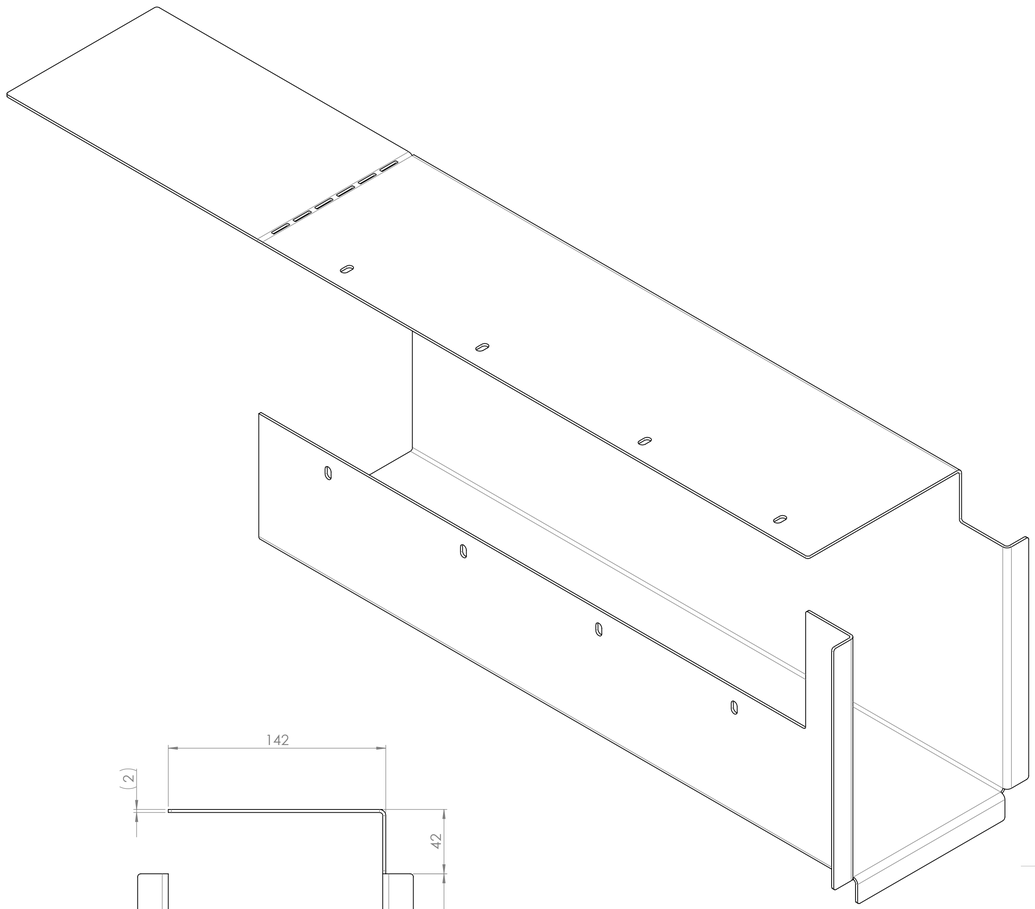
SECTION A-A
SCALE 1 : 1

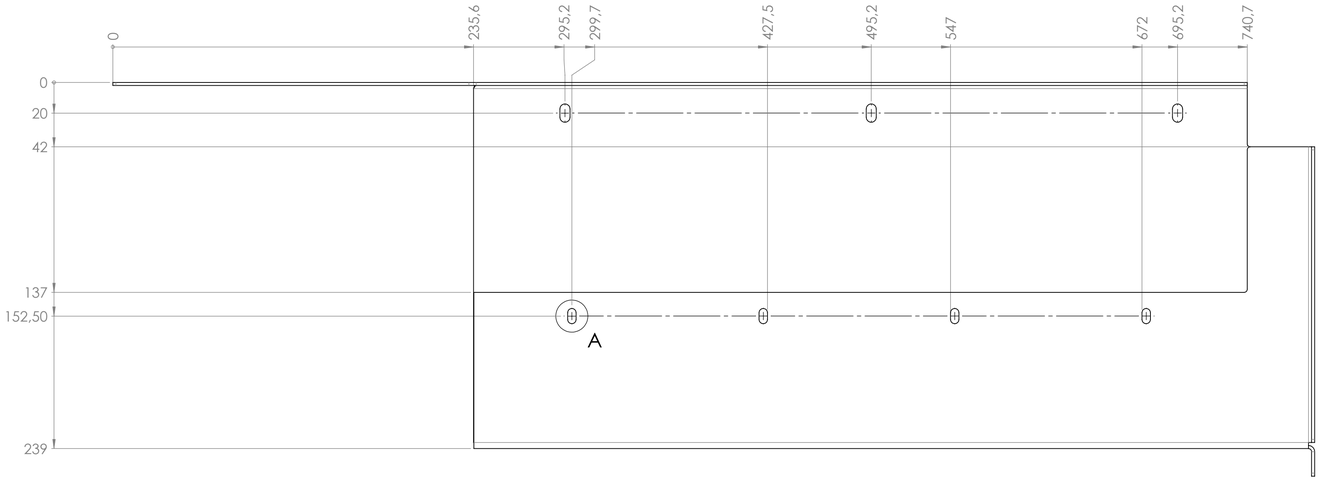


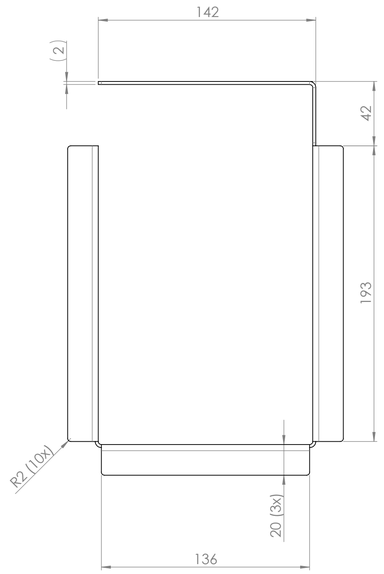
For information (1:10).

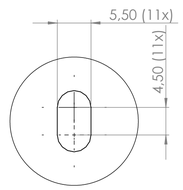
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish: Soda blasting	
	Name / Signature / Date			Material: AISI 304	
Drawn: S.Braakman 27-5-2019		SAXION		Description: **Door**	
Checked:		Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl		Drawing number: **03.0016**	Revision: / Format A2
Class: SSS StudentNo.				Weight: 7590.37 grams	SCALE: 1:5 / SHEET: 1 OF 1



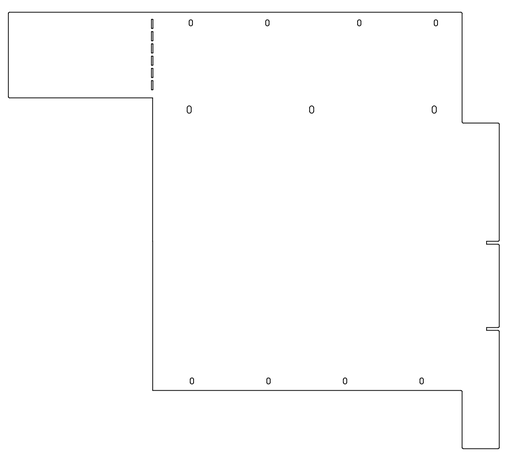








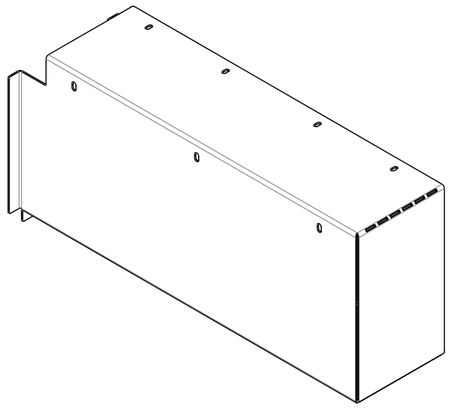
DETAIL A
SCALE 2 : 1



For information (1:5).

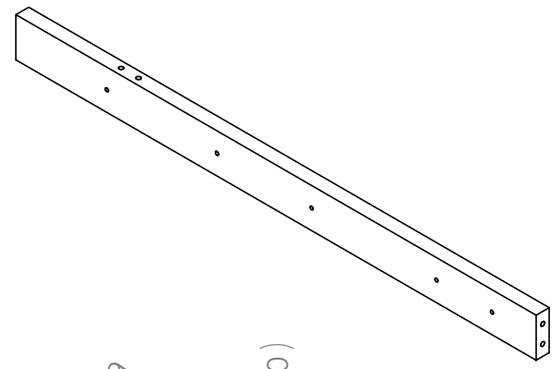
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
	Name	Signature	Date	Material: AISI 304	
Drawn: M. ten Cate			29-5-2019	Description: **Output**	
Checked:				Drawing number: **03.0017**	Revision:
Class: SS5	StudentNo.			Weight: 6013.47 grams	SCALE: 1:2
					Format: A1
					SHEET: 1 OF 2

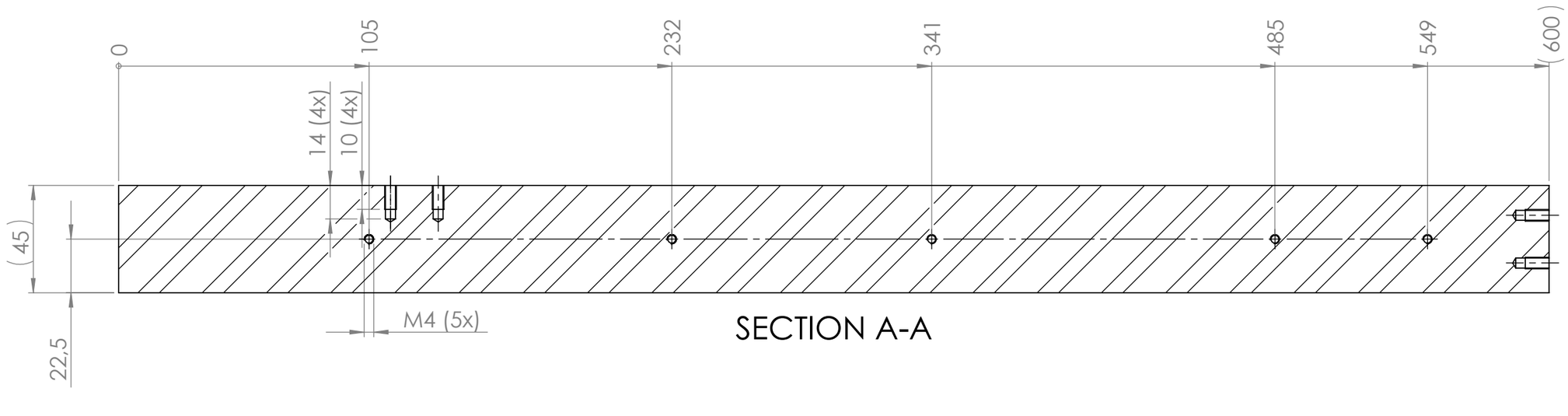
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl



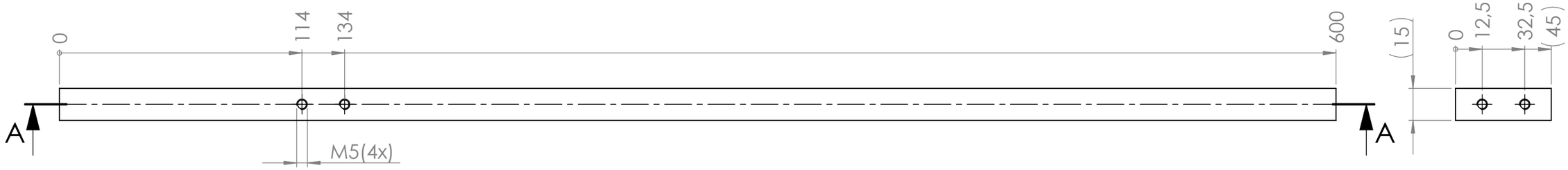
Grind welds flat.

Am. Projection	DIMENSIONS IN MILLIMETERS			DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Soda blasting
					Material: AISI 304
	Name	Signature	Date	SAXION	Description: **Output**
Drawn:	M. ten Cate		29-5-2019		
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0017** / Revision: / Format: A2
Class:	SSS	StudentNo.			Weight: 6013.48 grams / SCALE: 1:2 / SHEET: 2 OF 2





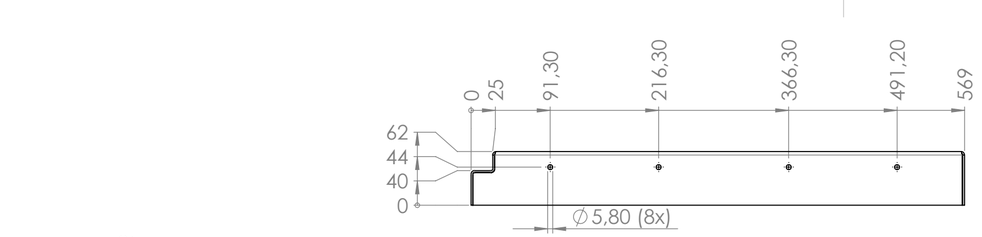
SECTION A-A

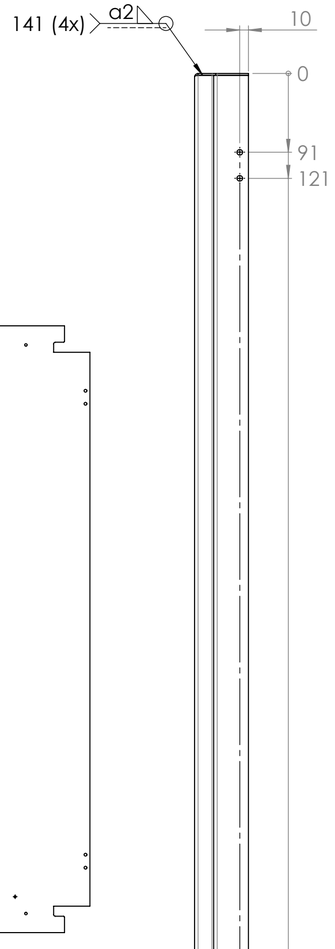


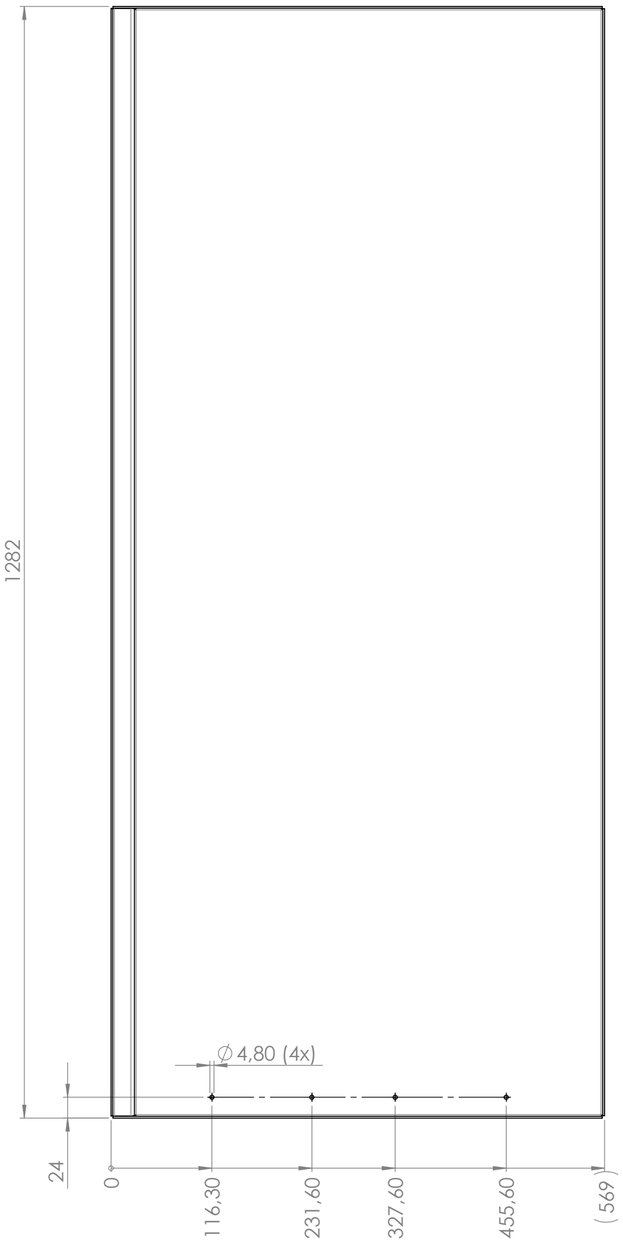
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:		
				Material: AISI 304		
	Name	Signature	Date	Description: **Bracket**		
Drawn:	S. Braakman		3-6-2019			
Checked:				Drawing number: **03.0018**	Revision:	Format A3
Class:	SSS	StudentNo.		Weight: 3228.47 grams	SCALE: 1:2	SHEET: 1 OF 1

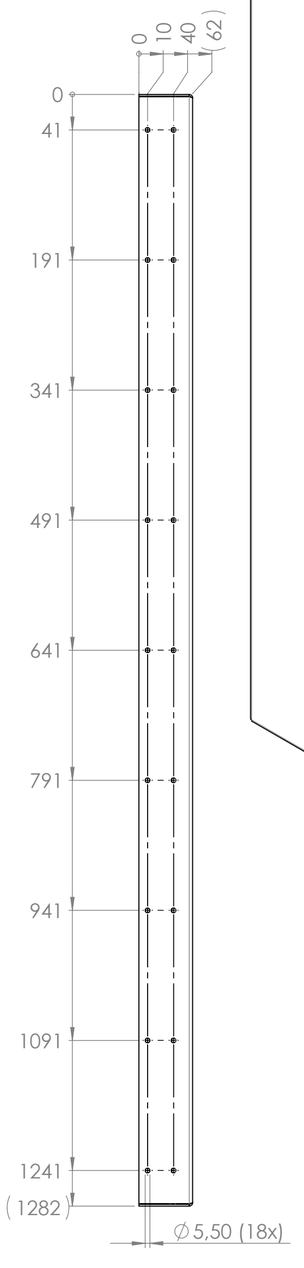
SAXION

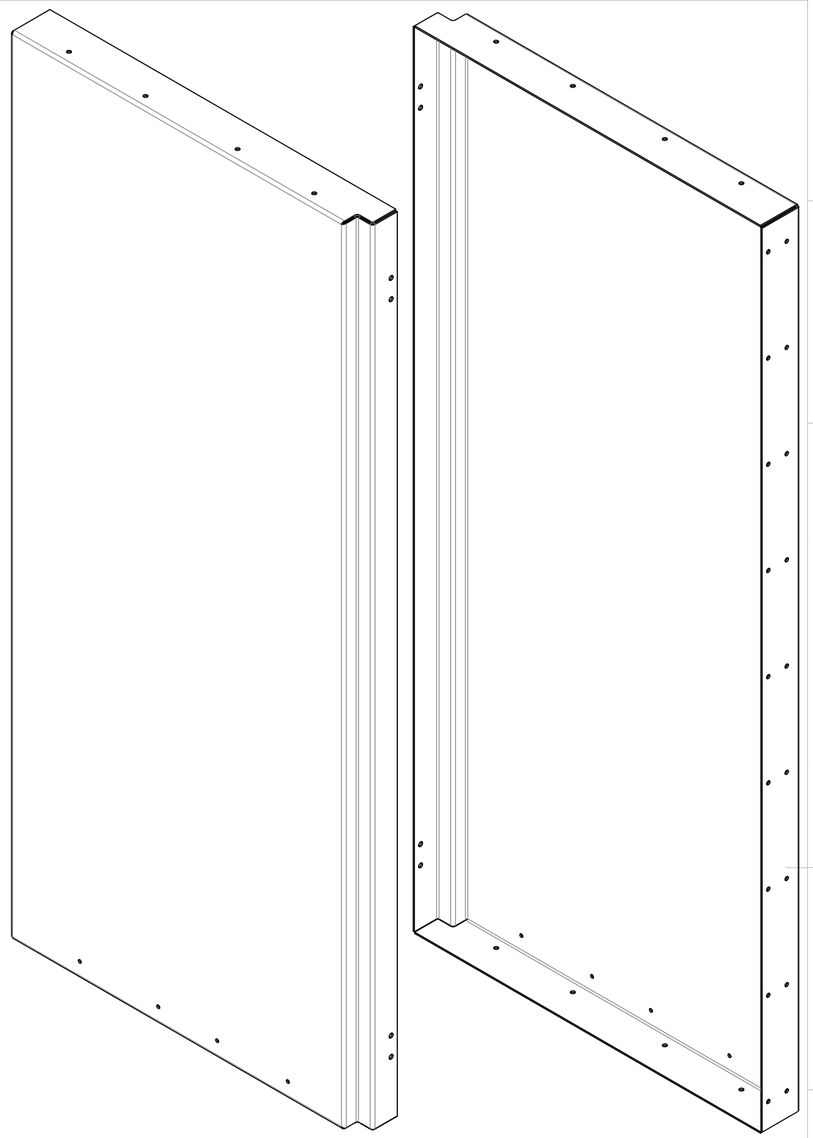
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

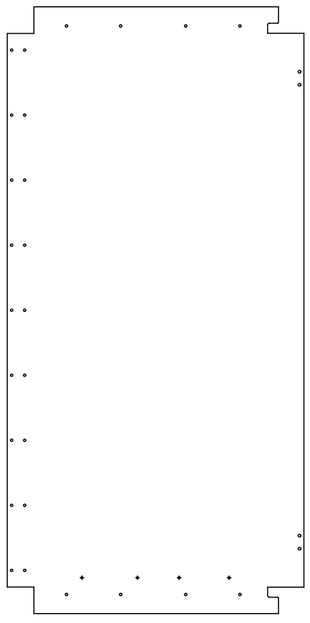






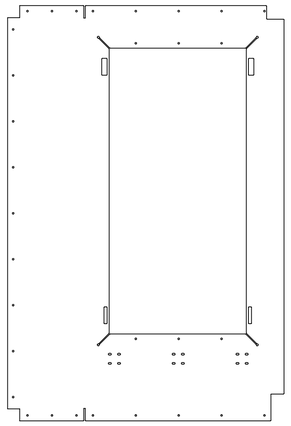




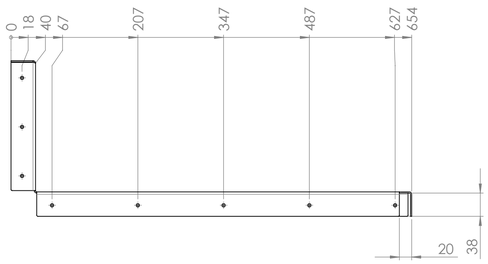


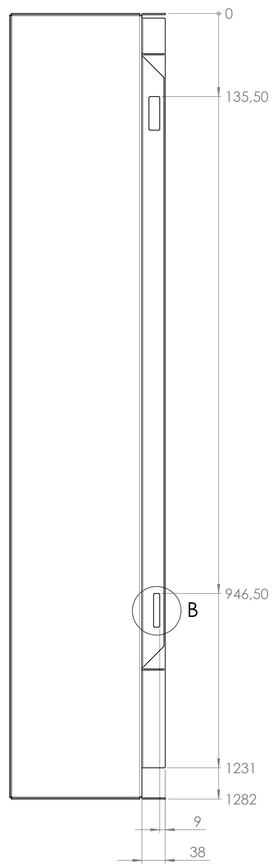
For information (1:10).

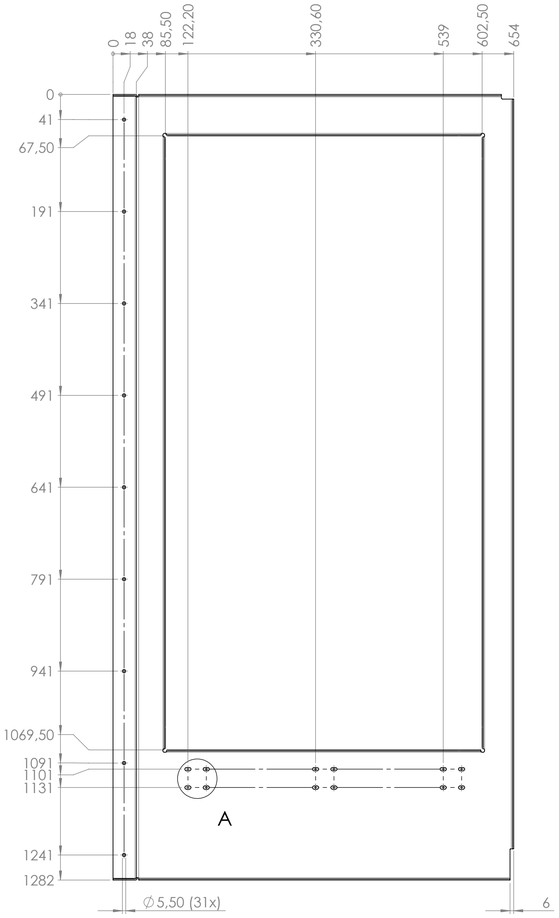
Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Soda blasting
	Name	Signature	Date		Material: AISI 304
Drawn:	M. ten Cate		3-6-2019	SAXION	Description: **Plate**
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0019** / Revision: / Format A2
Class:	SSS	StudentNo.			Weight: 15044.06 grams / SCALE: 1:5 / SHEET: 1 OF 1

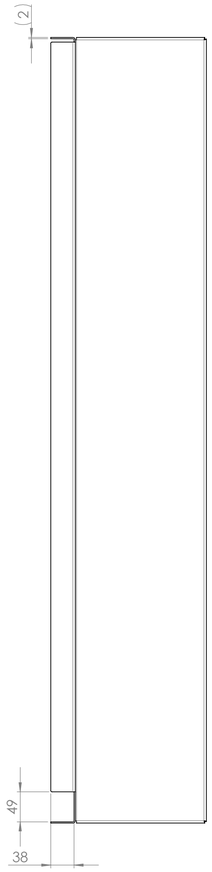


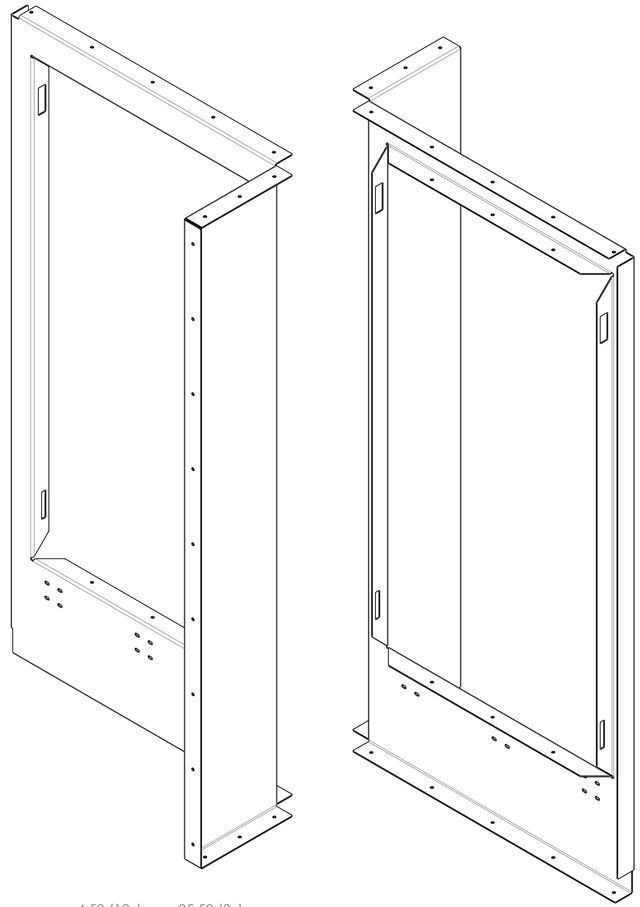
For information (1:10).

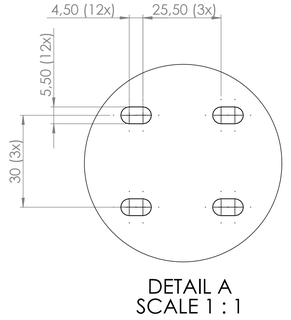




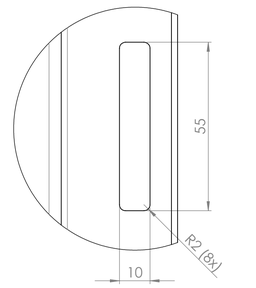








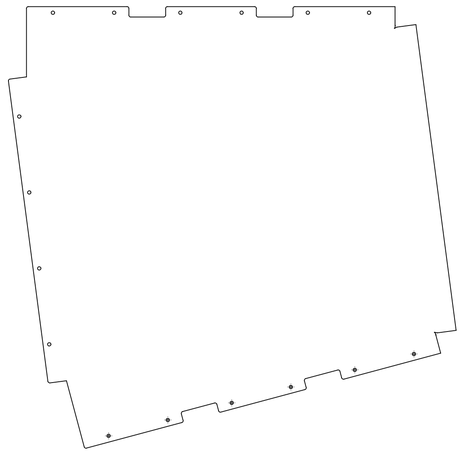
DETAIL A
SCALE 1 : 1



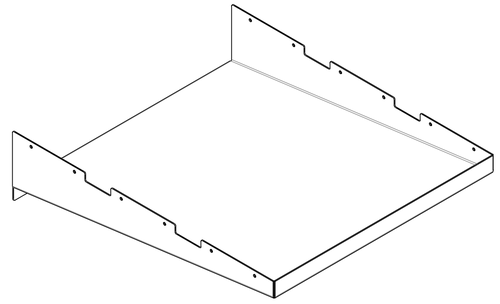
DETAIL B
SCALE 1 : 1

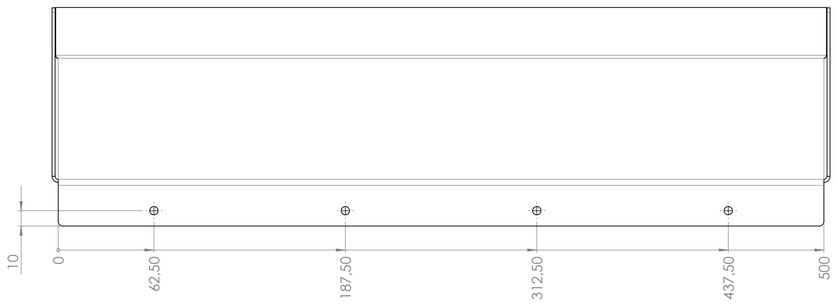
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish: Soda blasting	
	Name	Signature	Date	Material: AISI 304	
Drawn: M. ten Cate			3-6-2019	Description: **Plate**	
Checked:				Drawing number: **03.0021**	Revision: / Format A1
Class: SS5	StudentNo.			Weight: 12649.11 grams	SCALE: 1:5 / SHEET: 1 OF 1

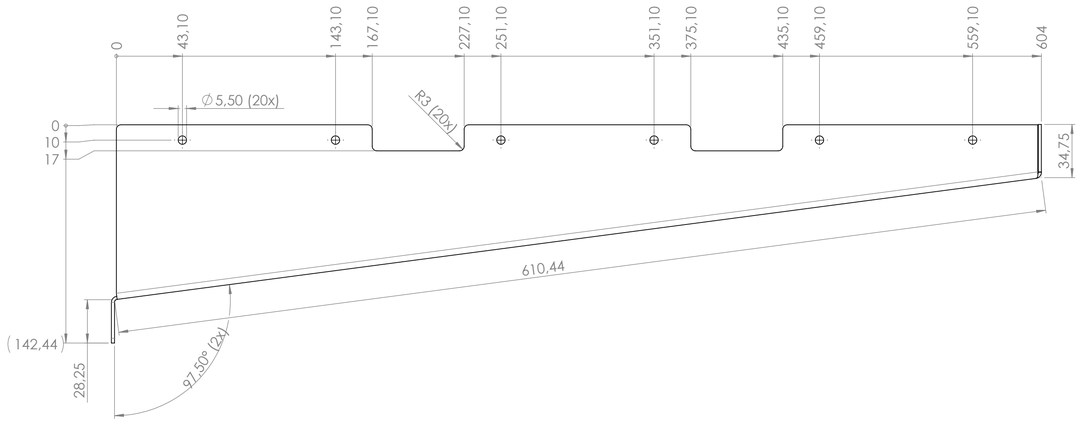
SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl



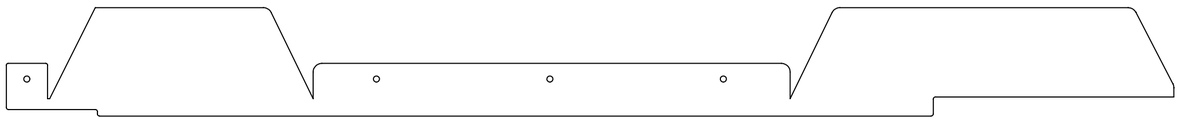
For information (1:5).



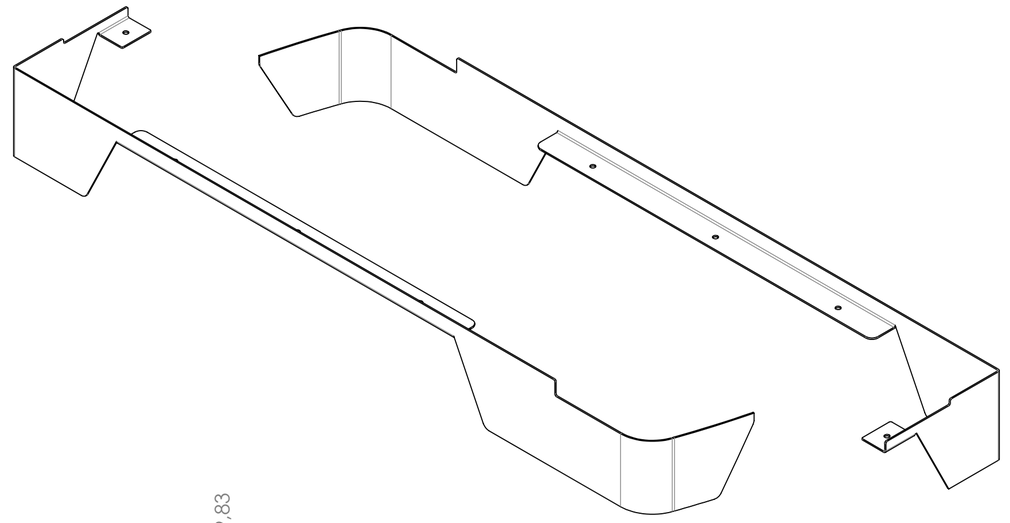


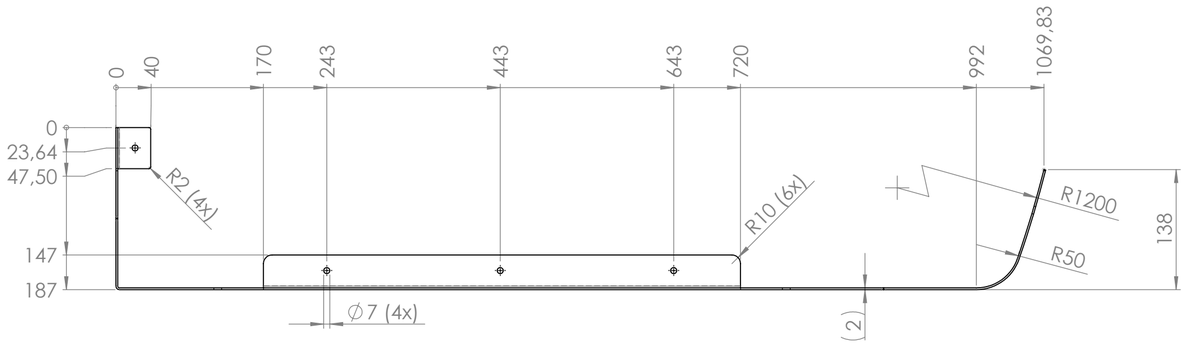


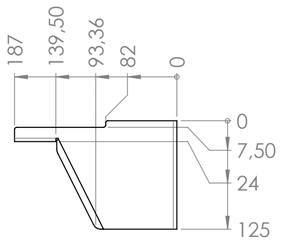
Am. Projection			DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Soda blasting
	Name	Signature	Date		Material: AISI 304
Drawn:	S.Braakman		3-6-2019	SAXION	Description: **Output plate**
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0022** / Revision: / Format: A1
Class:	SSS	Student No.			Weight: 6749.40 grams / SCALE: 1:2 / SHEET: 1 OF 1



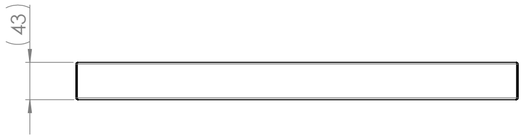
For information (1:5).

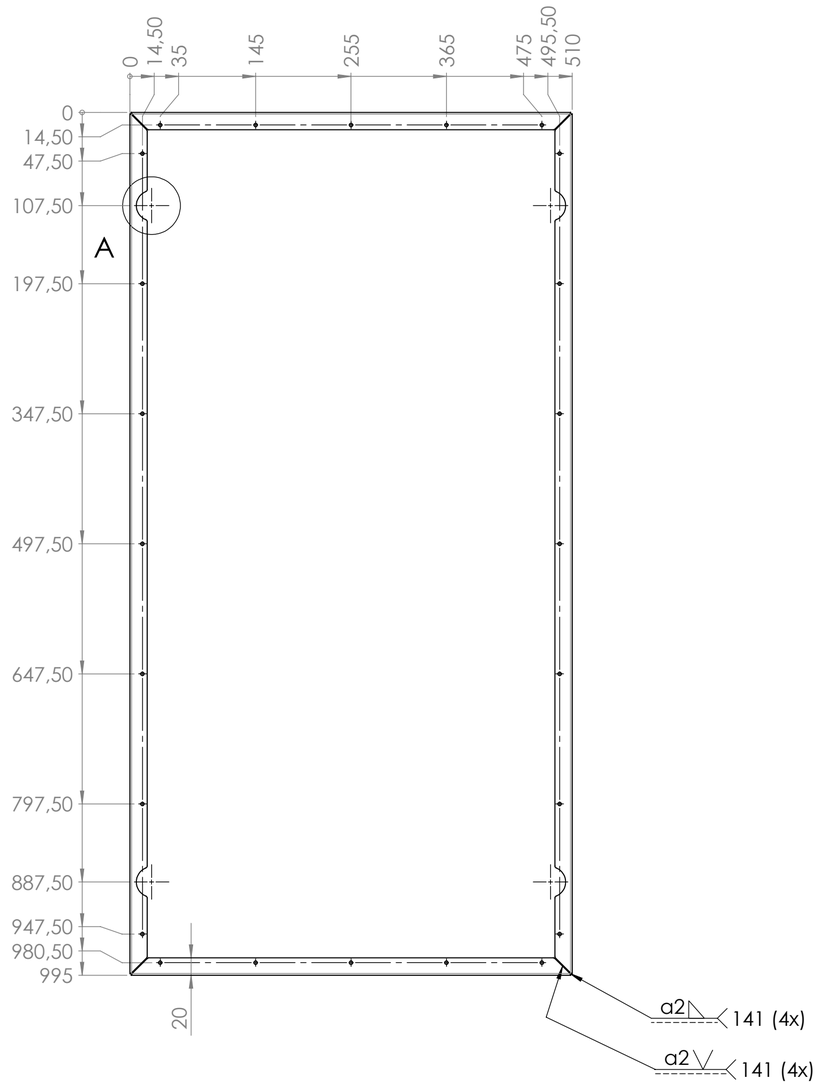


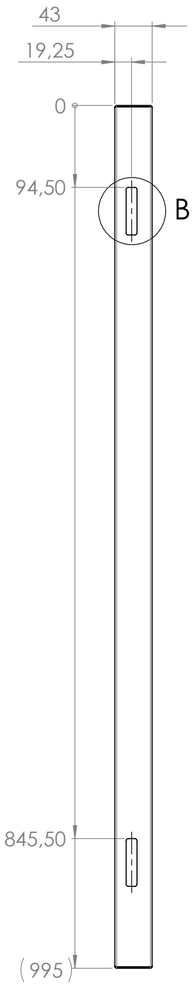


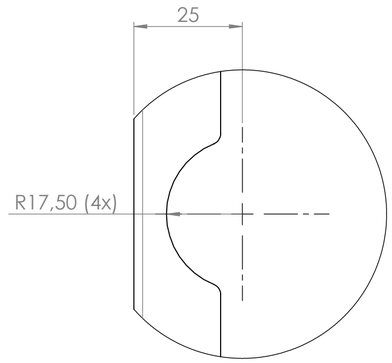


Am. Projection	DIMENSIONS IN MILLIMETERS			DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
	Name	Signature	Date		Material: 1.0037 (S235JR)
Drawn:	S.Braakman		5-6-2019	SAXION	Description: **Decorative base plate (L)**
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0025** / Revision: / Format A2
Class:	SSS	StudentNo.			Weight: 1751.47 grams / SCALE: 1:5 / SHEET: 1 OF 1

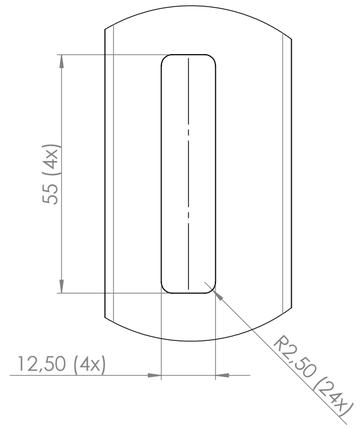




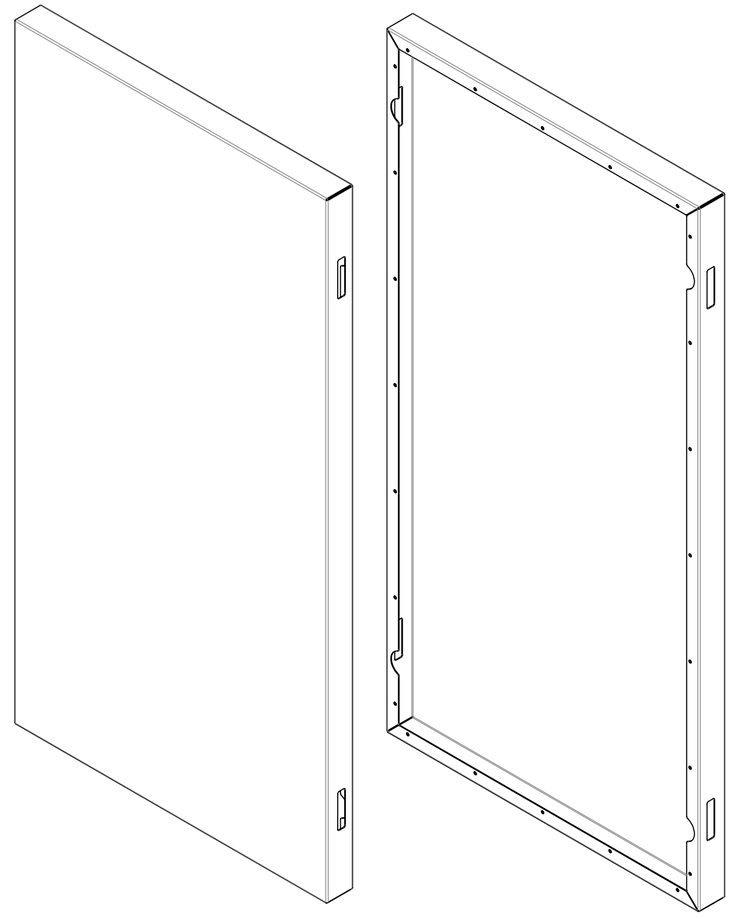


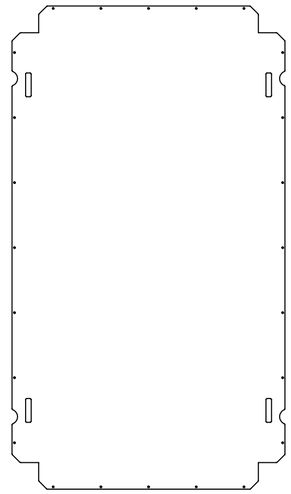


DETAIL A
SCALE 1 : 1



DETAIL B
SCALE 1 : 1

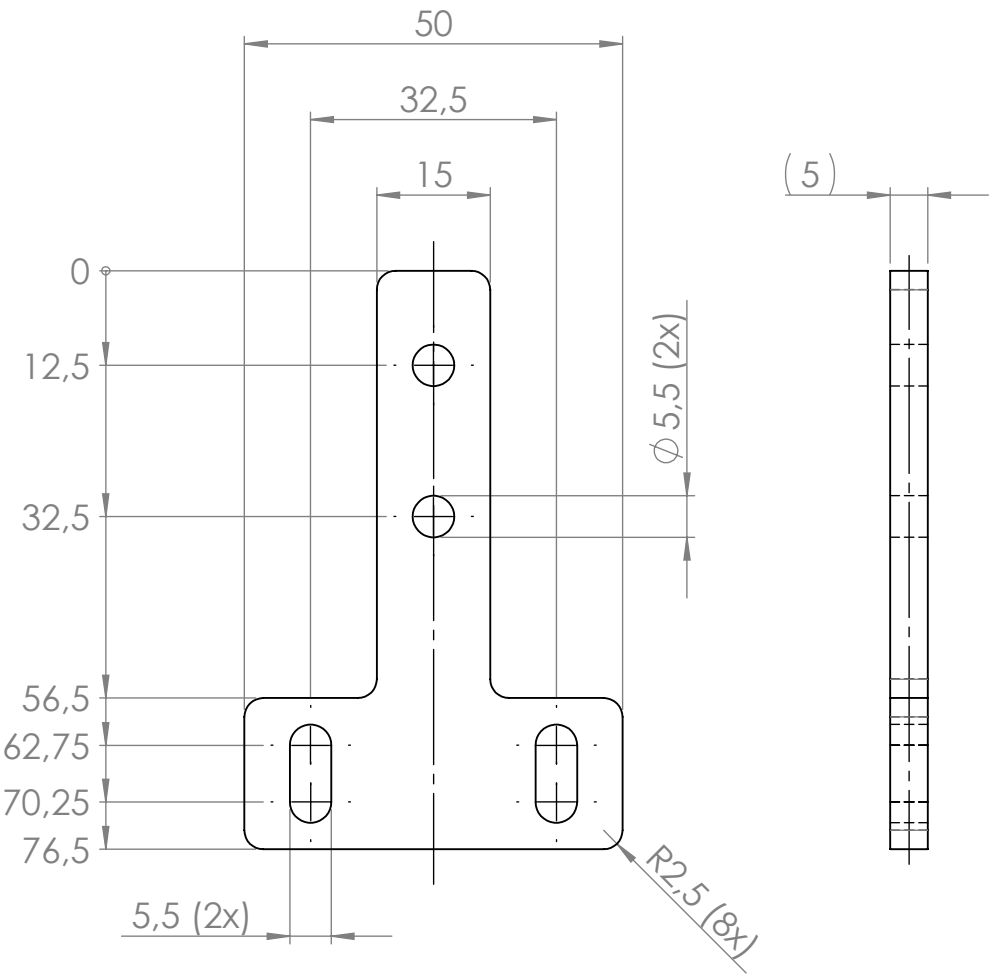


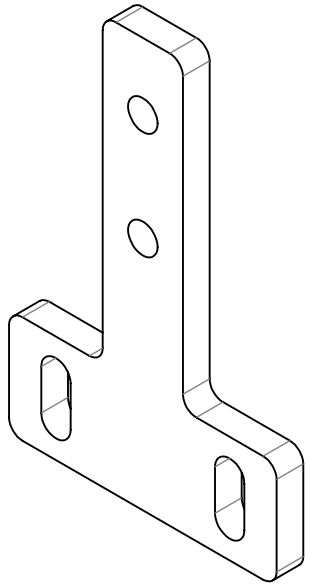


For information (1:10).

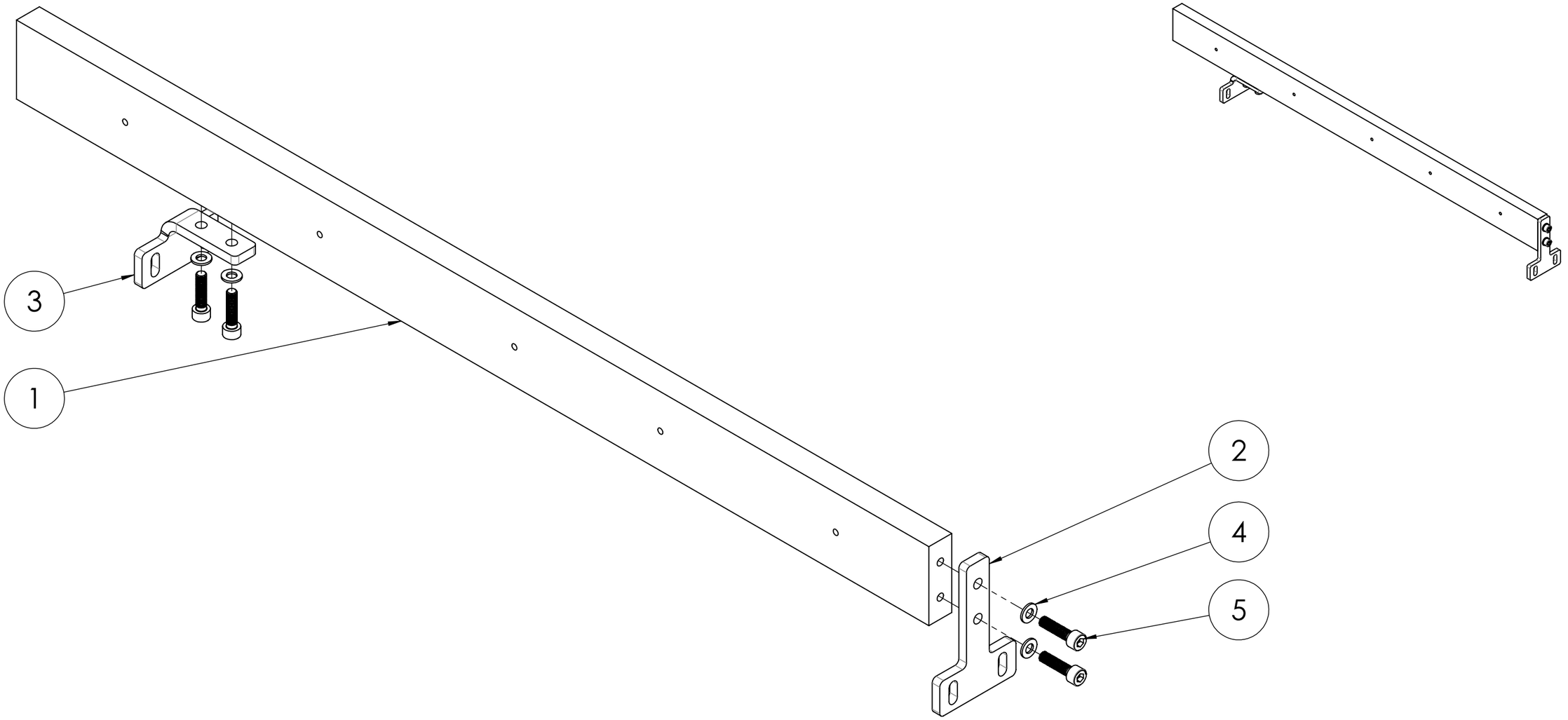
GRIND WELDS FLAT.

Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Soda blasting
	Name	Signature	Date		Material: AISI 304
Drawn:	S.Braakman		5-6-2019	SAXION	Description: **Back panel**
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0026** / Revision: / Format A2
Class:	SSS	StudentNo.			Weight: 5444.44 grams / SCALE: 1:5 / SHEET: 1 OF 1





Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Material: AISI 304
	Name / Signature / Date	SAXION	Description: **Bracket**
Drawn:	M. ten Cate / 5-6-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0028** / Revision: / Format A4
Checked:			
Class:	SSS / StudentNo.		Weight: 66.58 grams / SCALE: 1:1 / SHEET: 1 OF 1



ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
5	4	M5 x 20 Hex. socket screw A2	51050.050.020	
4	4	M5 Washer A2	51420.050.001	
3	1	03.0035	Bracket	AISI 304
2	1	03.0028	Bracket	AISI 304
1	1	03.0018	Bracket	AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

	Name	Signature	Date
Drawn:	M. ten Cate		5-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Finish:

Material:

Description:

Bracket assembly

Drawing number: **03.0029**

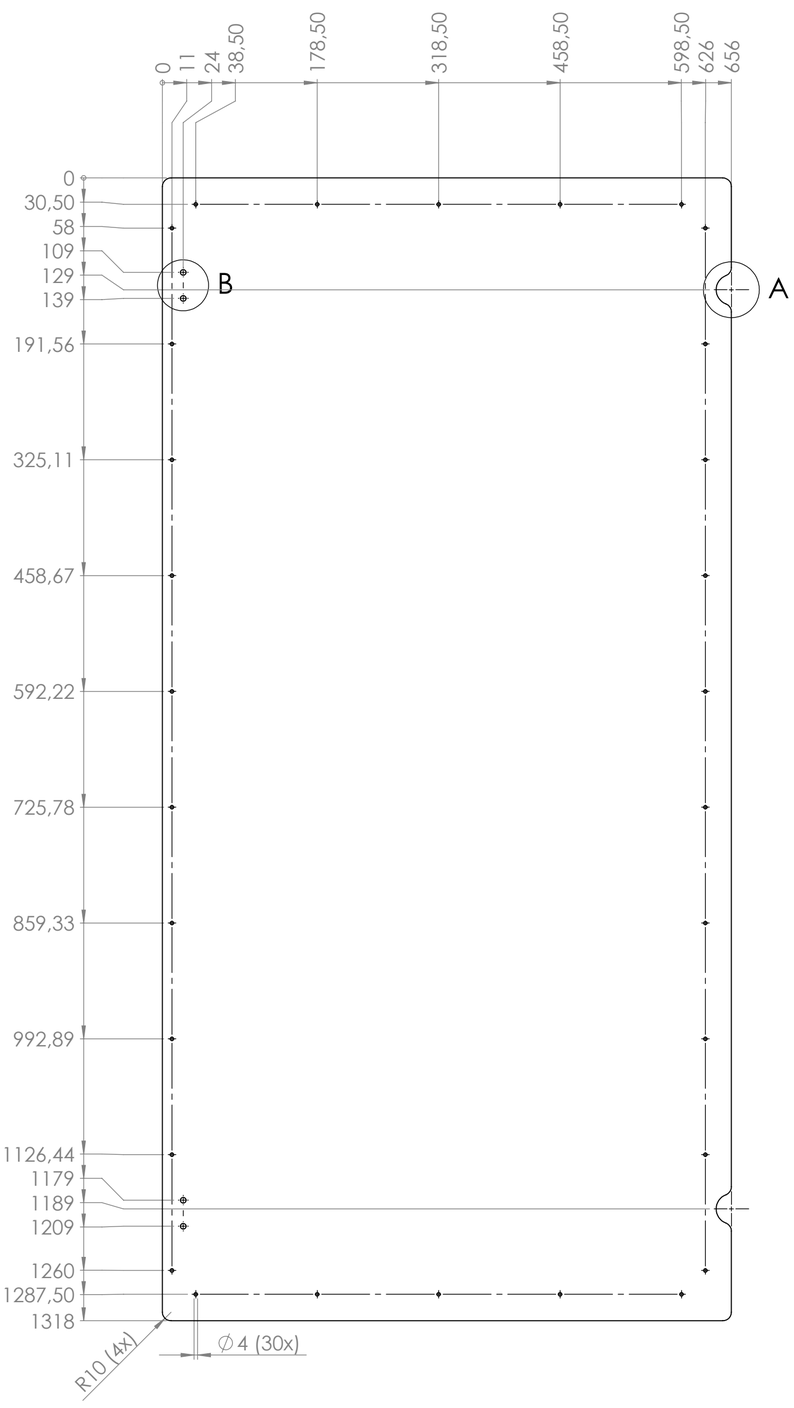
Revision:

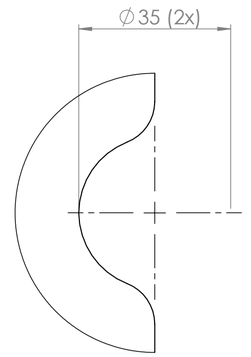
Format A3

Weight: 3361.52

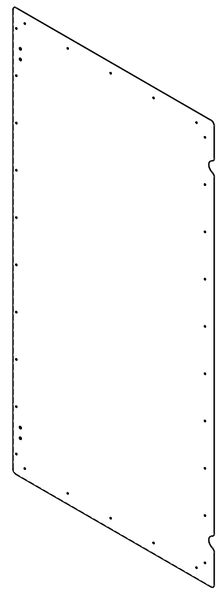
SCALE: 1:2

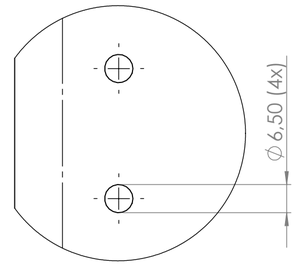
SHEET: 1 OF 1





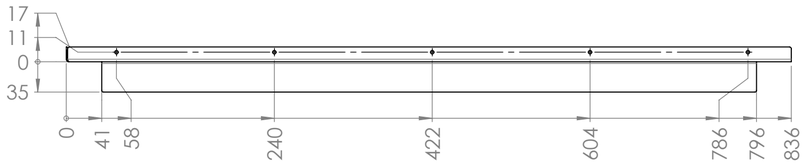
DETAIL A
SCALE 1 : 1

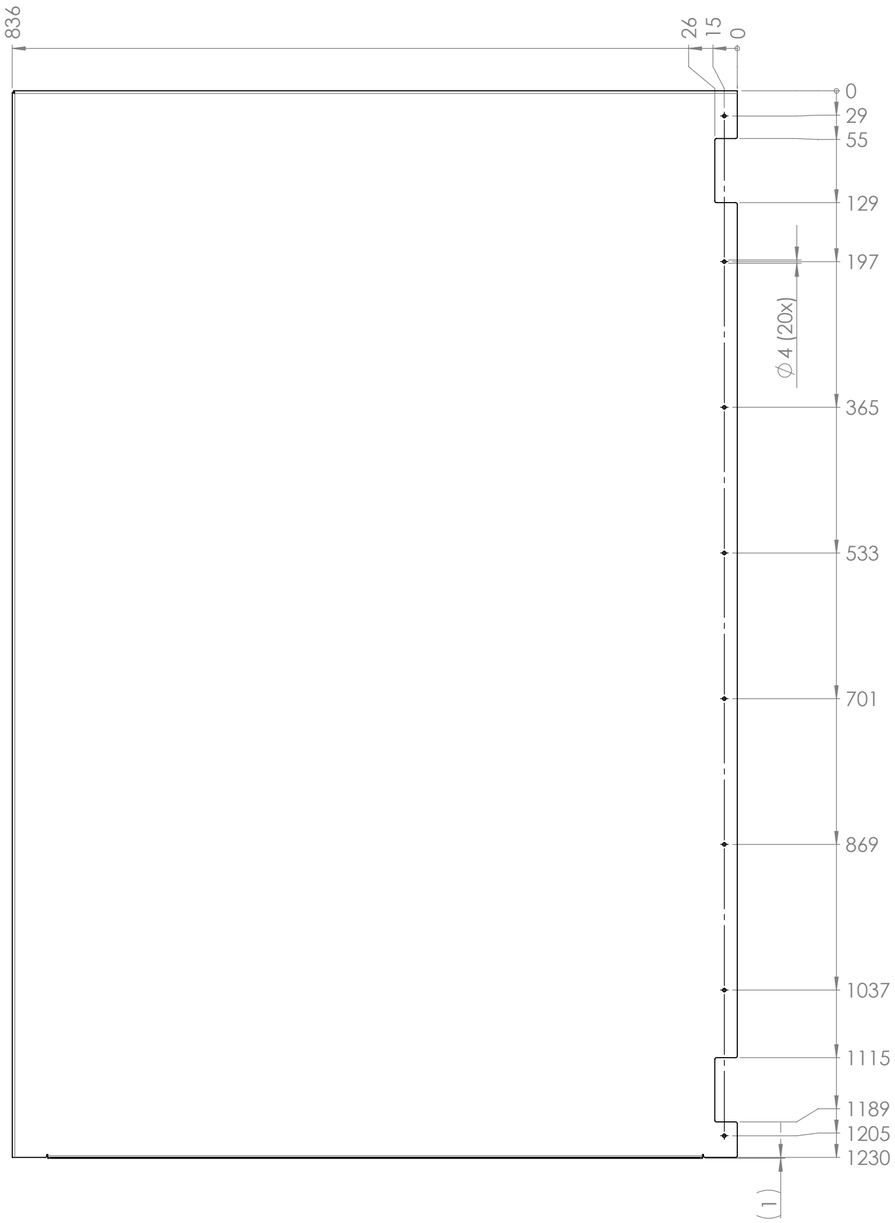


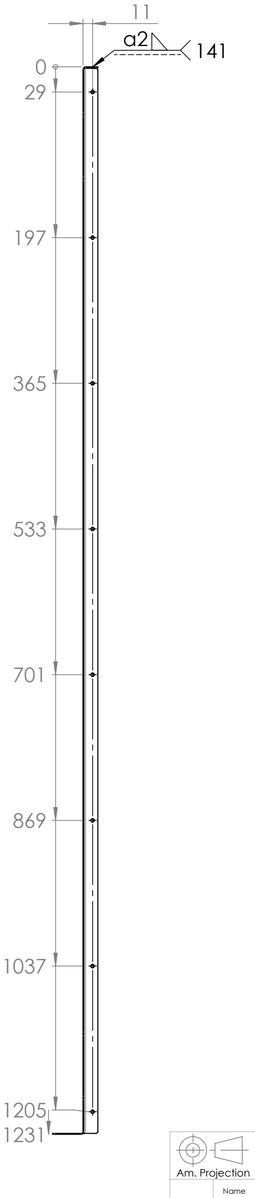


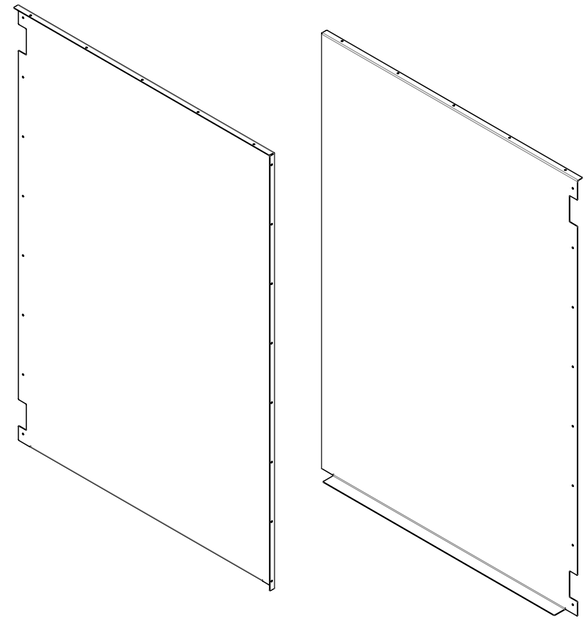
DETAIL B
SCALE 1 : 1

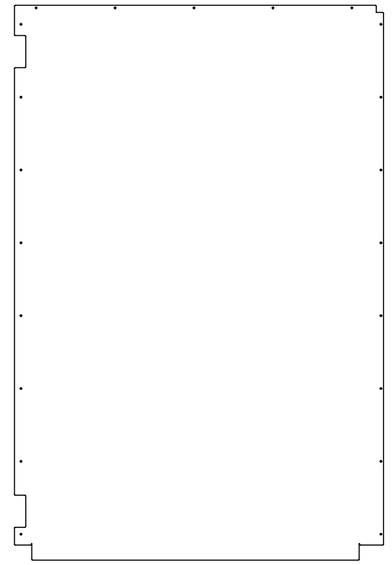
Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
	Name	Signature	Date		Material: AISI 304
Drawn:	S.Braakman		5-6-2019	SAXION	Description: **Plate**
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0030** / Revision: / Format A2
Class:	SSS	StudentNo.			
					Weight: 6904.05 grams / SCALE: 1:5 / SHEET: 1 OF 1





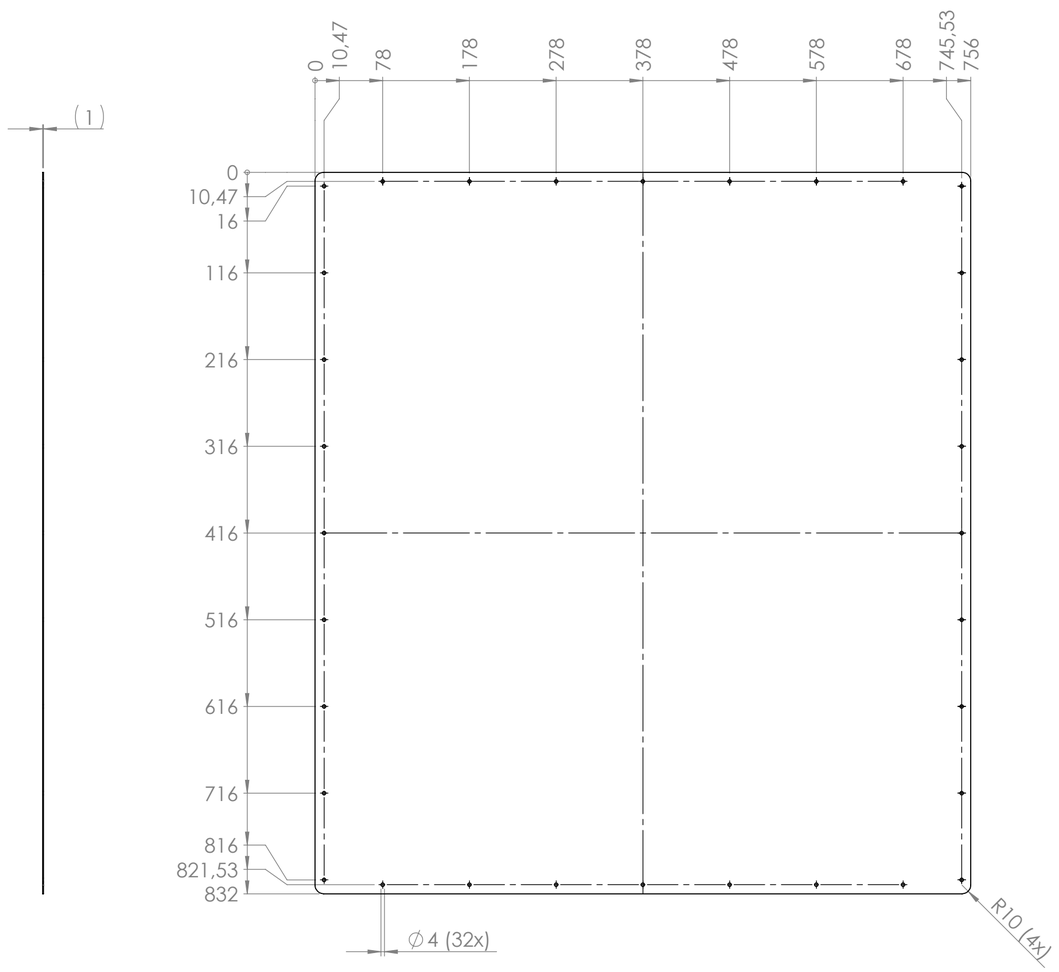


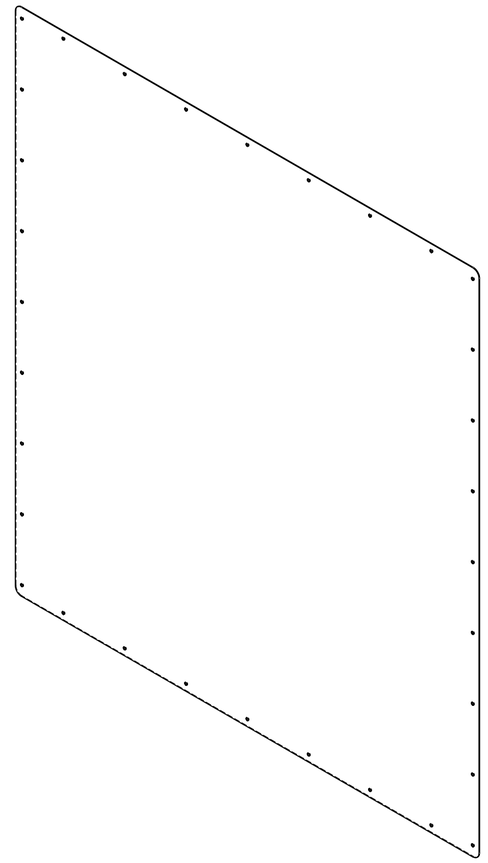




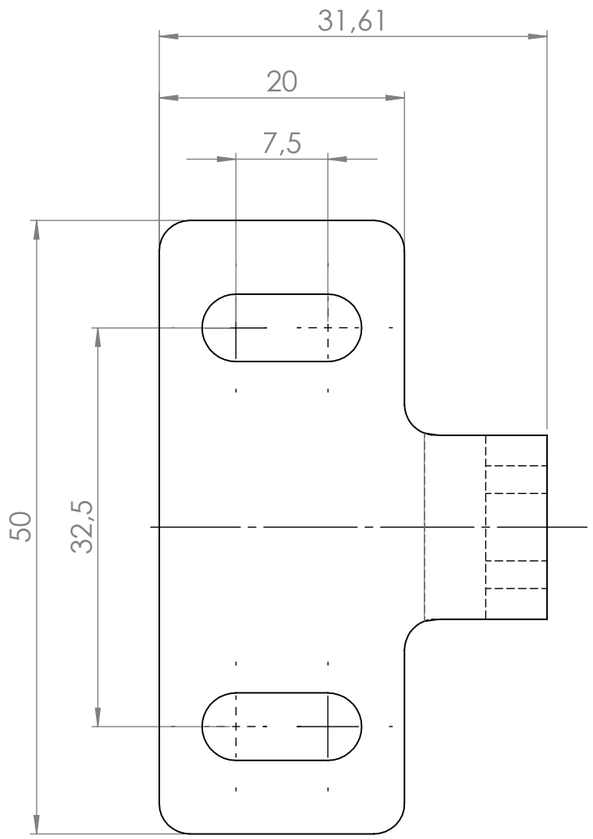
For information (1:10).

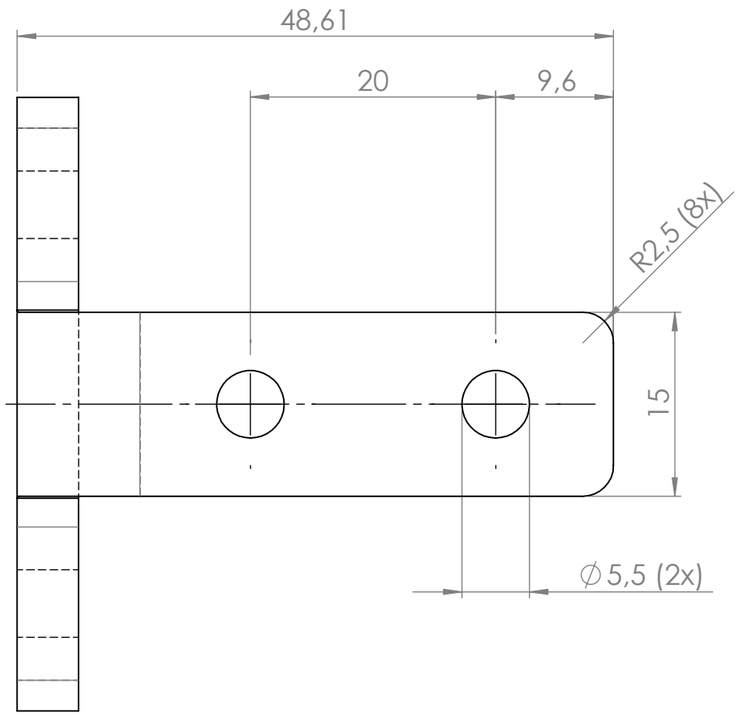
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Soda blasting		
			Material: AISI 304		
	Name / Signature / Date	SAXION	Description: **Panel**		
Drawn: M. ten Cate 5-6-2019		Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0031**	Revision:	Format A2
Checked:			Weight: 8650.46 grams	SCALE: 1:5	SHEET: 1 OF 1
Class: SSS StudentNo.					

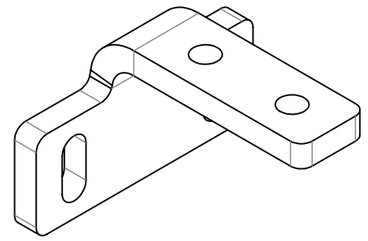


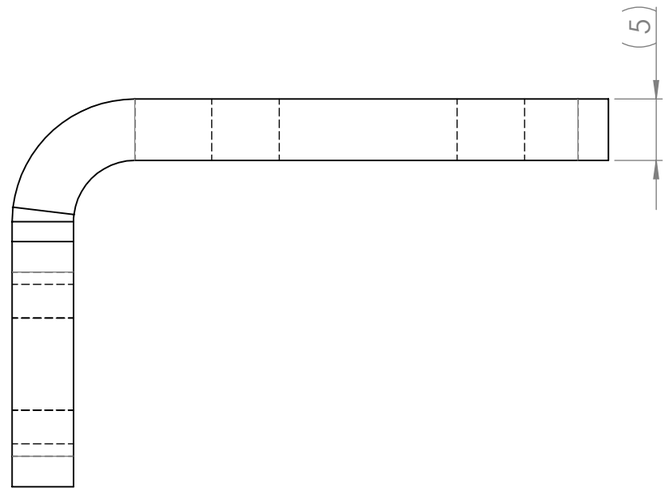


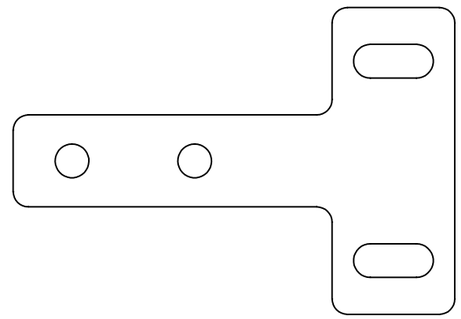
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish: Powercoat (RAL9006)	
	Name / Signature / Date	SAXION		Material: 1.0037 (S235JR)	
Drawn:	M. ten Cate / 5-6-2019			Description: **Top plate**	
Checked:		Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl		Drawing number: **03.0032**	Revision: / Format A2
Class:	SSS / StudentNo.			Weight: 4902.33 grams	SCALE: 1:5 / SHEET: 1 OF 1





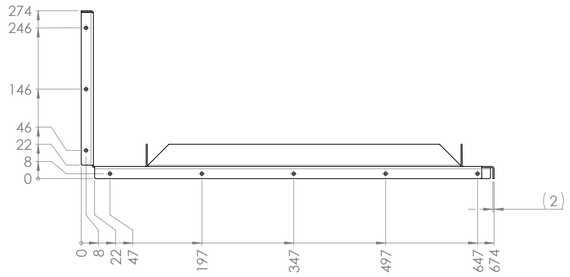


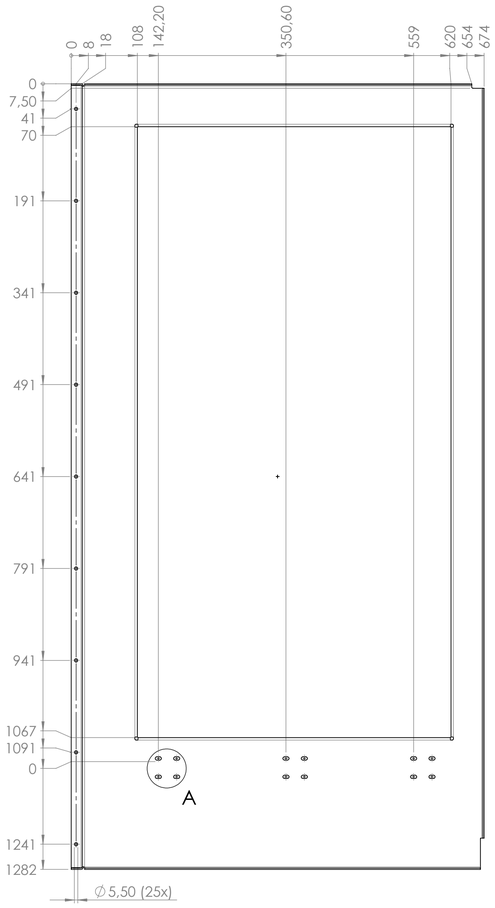


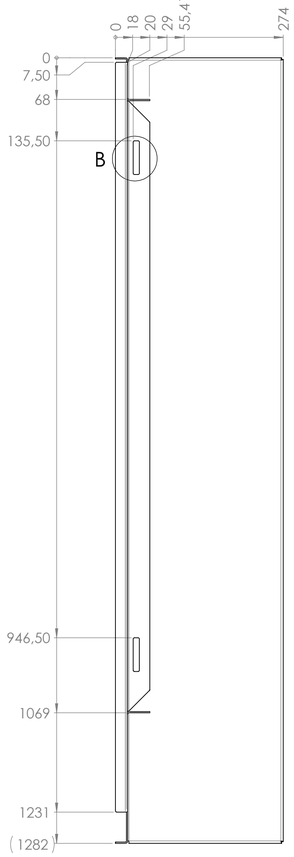


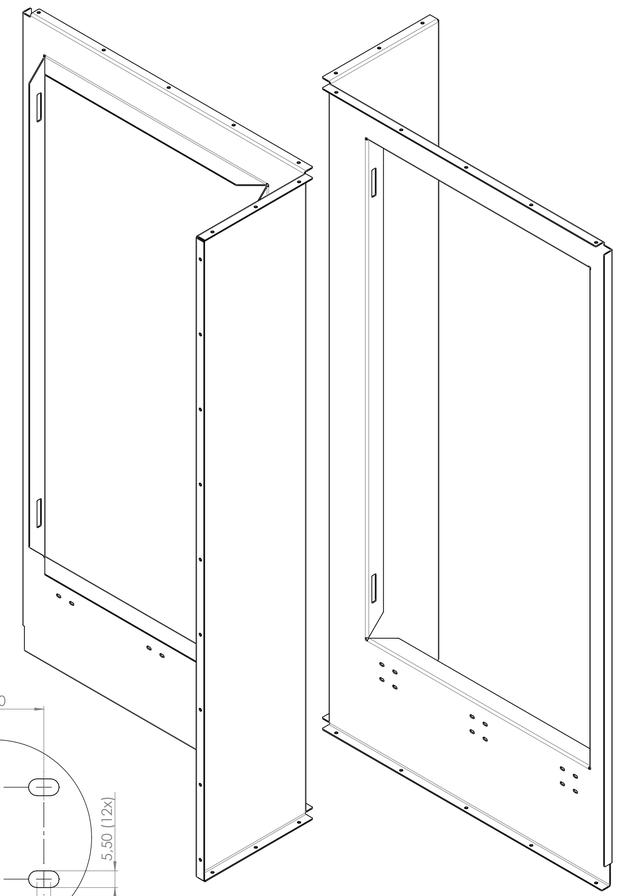
For information (1:1).

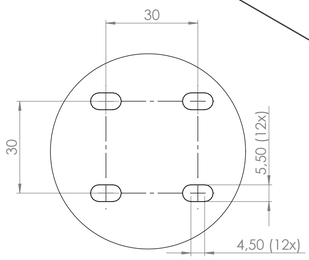
Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
					Material: AISI 304
	Name	Signature	Date	SAXION	Description: **Bracket**
Drawn:	M. ten Cate		5-6-2019		
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0035** / Revision: / Format: A3
Class:	SSS	StudentNo.			
					Weight: 63.88 grams / SCALE: 2:1 / SHEET: 1 OF 1



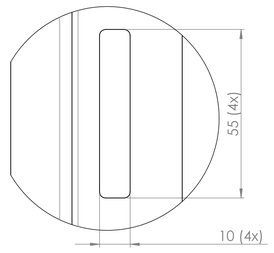




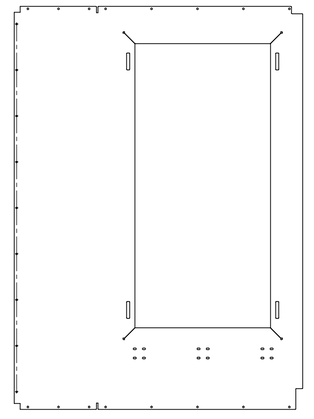




DETAIL A
SCALE 1 : 1



DETAIL B
SCALE 1 : 1

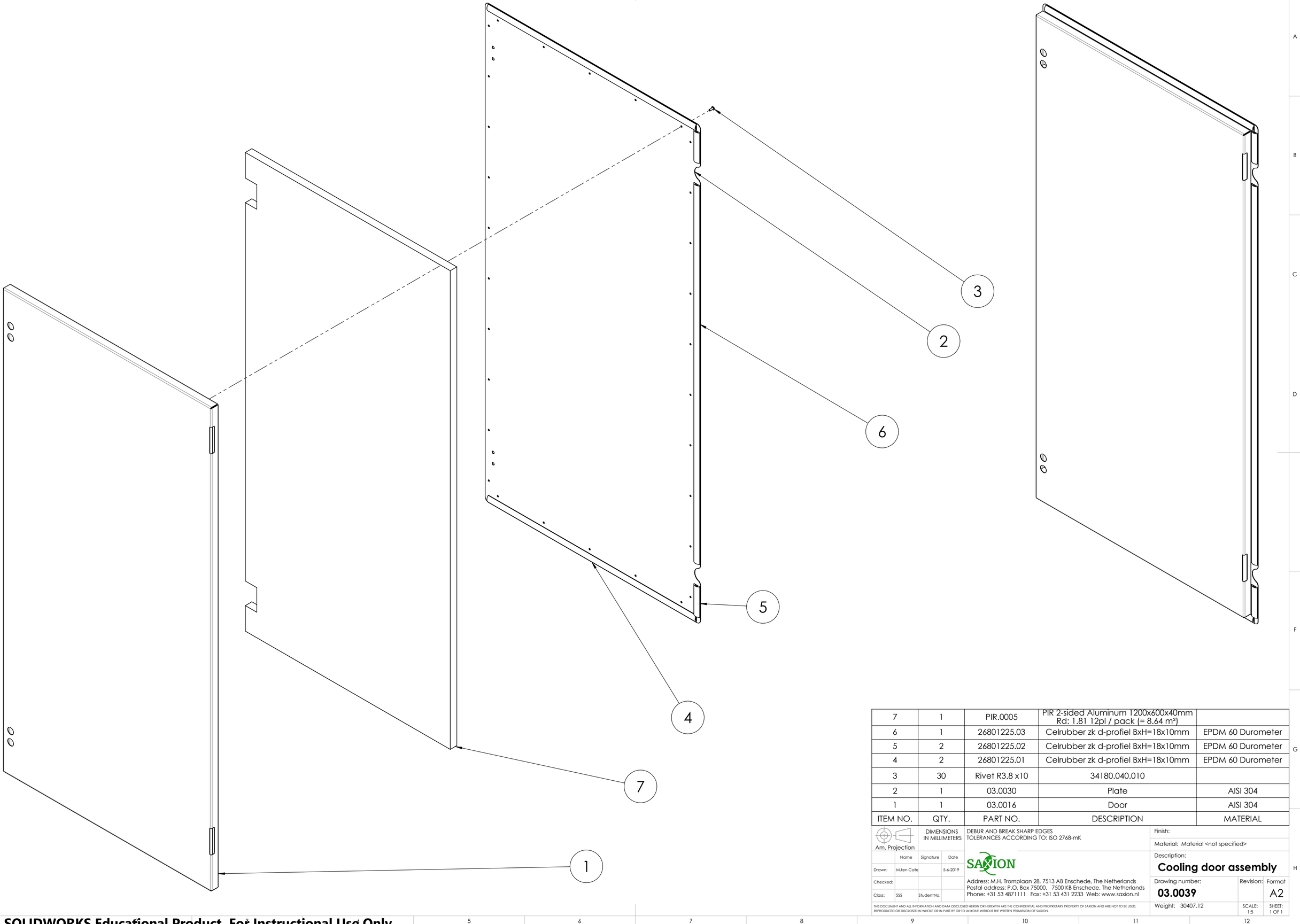


For information (1:10).

Arm. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
	Name	Signature	Date	Material: AISI 304	
Drawn:				Description: **Plate**	
Checked:				Drawing number: **03.0036**	Revision:
Class:		Student No.		Weight: 13149.84 grams	SCALE: 1:5
					SHEET: 1 OF 1

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Format: A1



ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
7	1	PIR.0005	PIR 2-sided Aluminum 1200x600x40mm Rd: 1.81 12pl / pack (= 8.64 m²)	
6	1	26801225.03	Celrubber zk d-profiel BxH=18x10mm	EPDM 60 Durometer
5	2	26801225.02	Celrubber zk d-profiel BxH=18x10mm	EPDM 60 Durometer
4	2	26801225.01	Celrubber zk d-profiel BxH=18x10mm	EPDM 60 Durometer
3	30	Rivet R3.8 x10	34180.040.010	
2	1	03.0030	Plate	AISI 304
1	1	03.0016	Door	AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

	Name	Signature	Date
Drawn:	M.ten Cate		5-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Finish:

Material: Material <not specified>

Description:

Cooling door assembly

Drawing number: **03.0039**

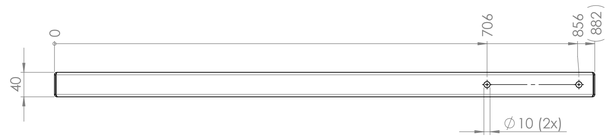
Revision:

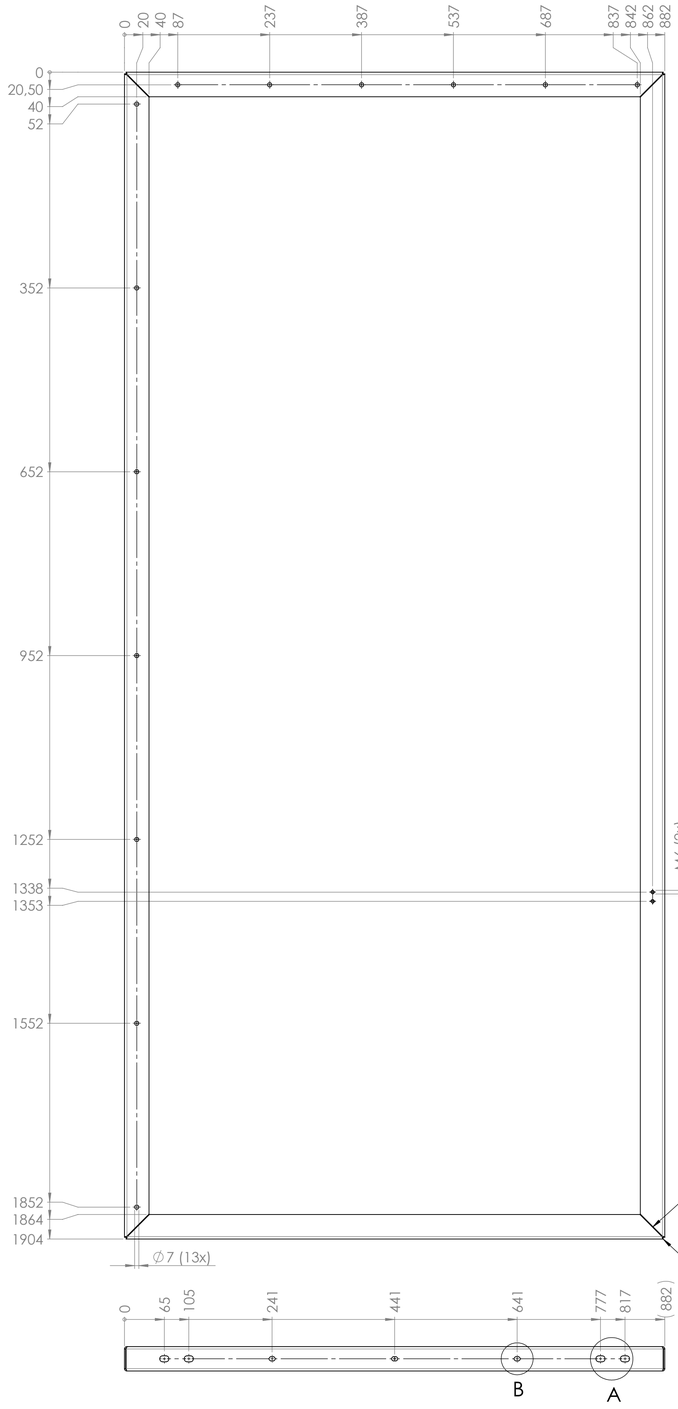
Format A2

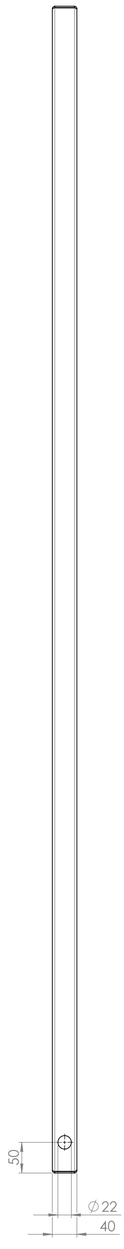
Weight: 30407.12

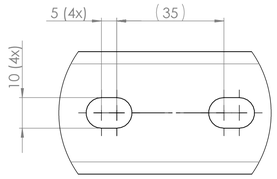
SCALE: 1:5

SHEET: 1 OF 1

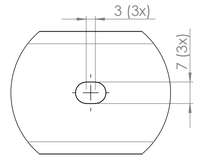




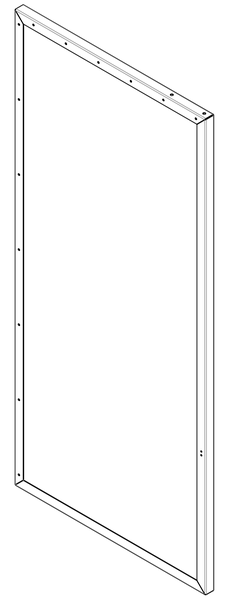


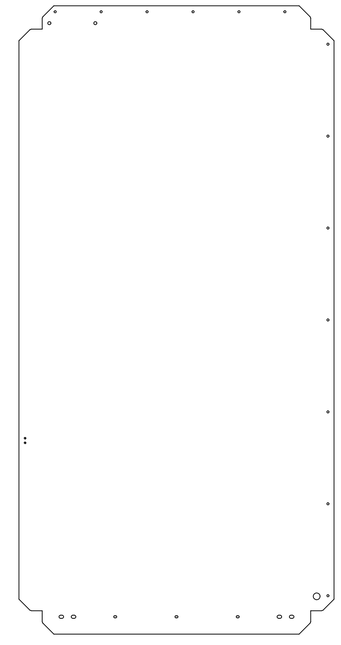


DETAIL A
SCALE 1 : 1



DETAIL B
SCALE 1 : 1

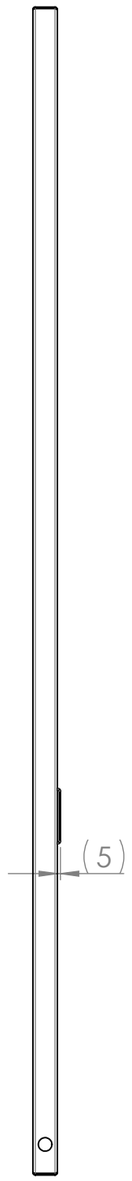


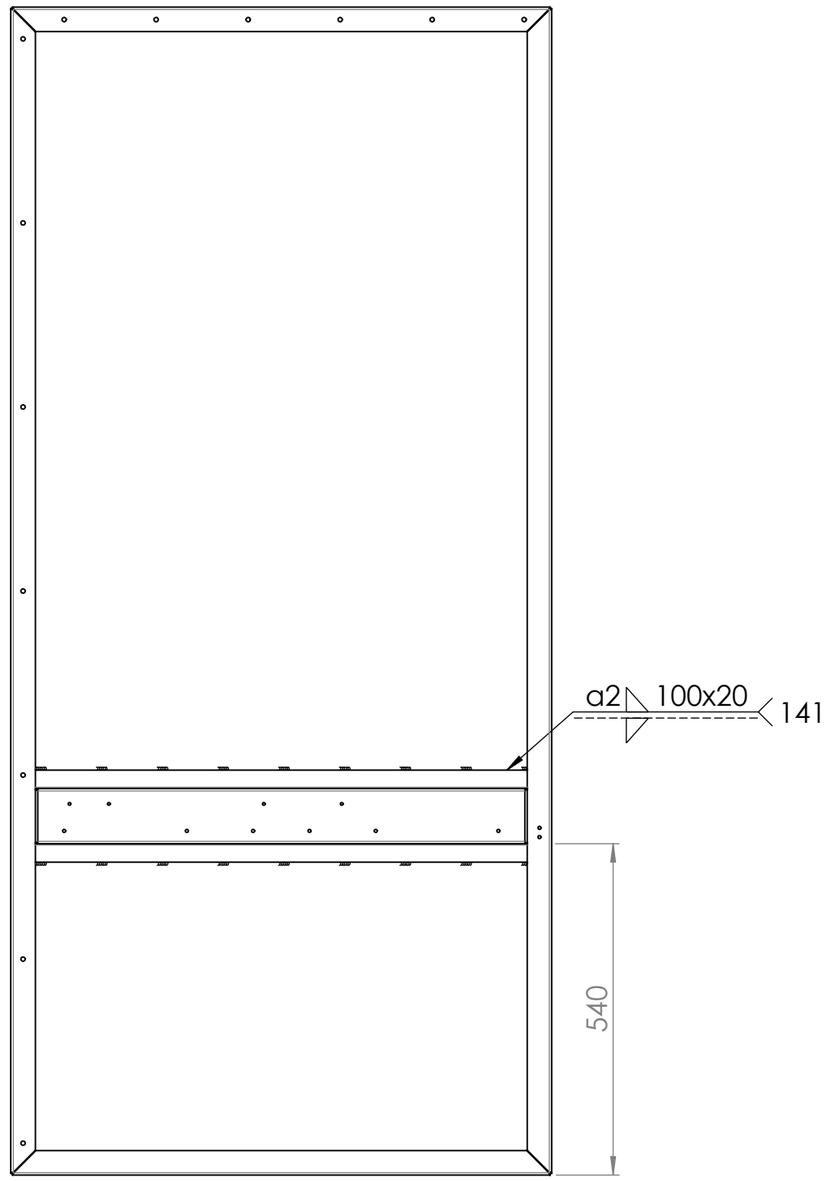


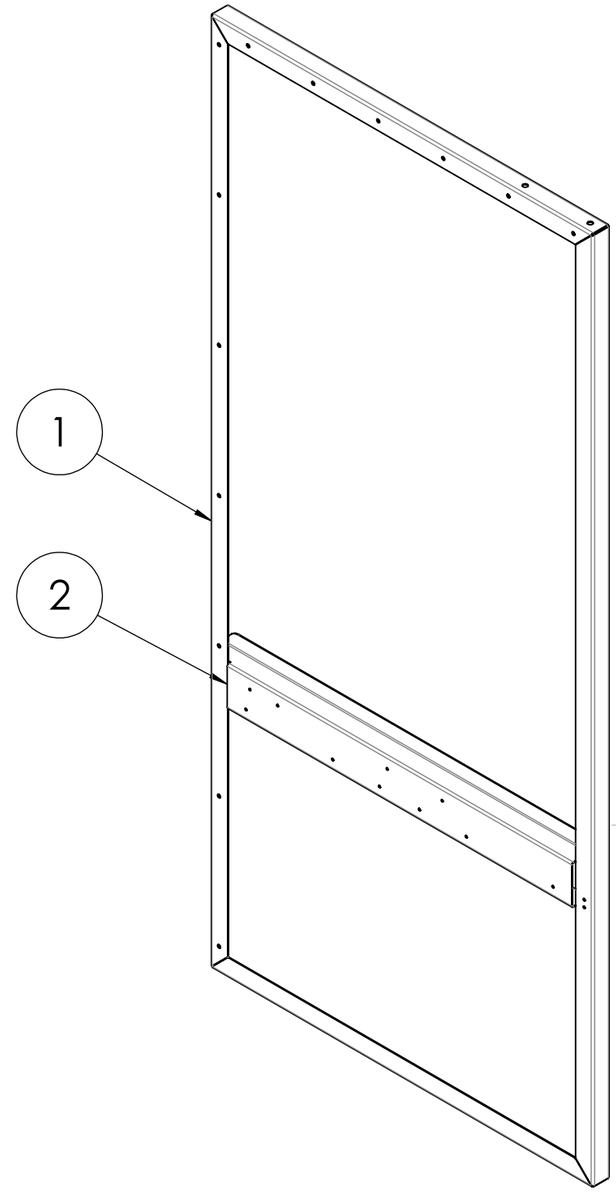
For information (1:10).

Am. Projection			DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
	Name	Signature	Date		Material: AISI 304
Drawn:	M. ten Cate		10-6-2019	SAXION	Description: **Plate**
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0040**
Class:	SSS	StudentNo.			Weight: 33266.05 grams

Revision: | Format: A1 | SCALE: 1:5 | SHEET: 1 OF 1







ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
2	1	03.0004	Plate	AISI 304
1	1	03.0040	Plate	AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish: Powdercoat (RAL9006)

Material:

	Name	Signature	Date
Drawn:	S.Braakman		15-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:
Side panel assembly

Drawing number: **03.0041**

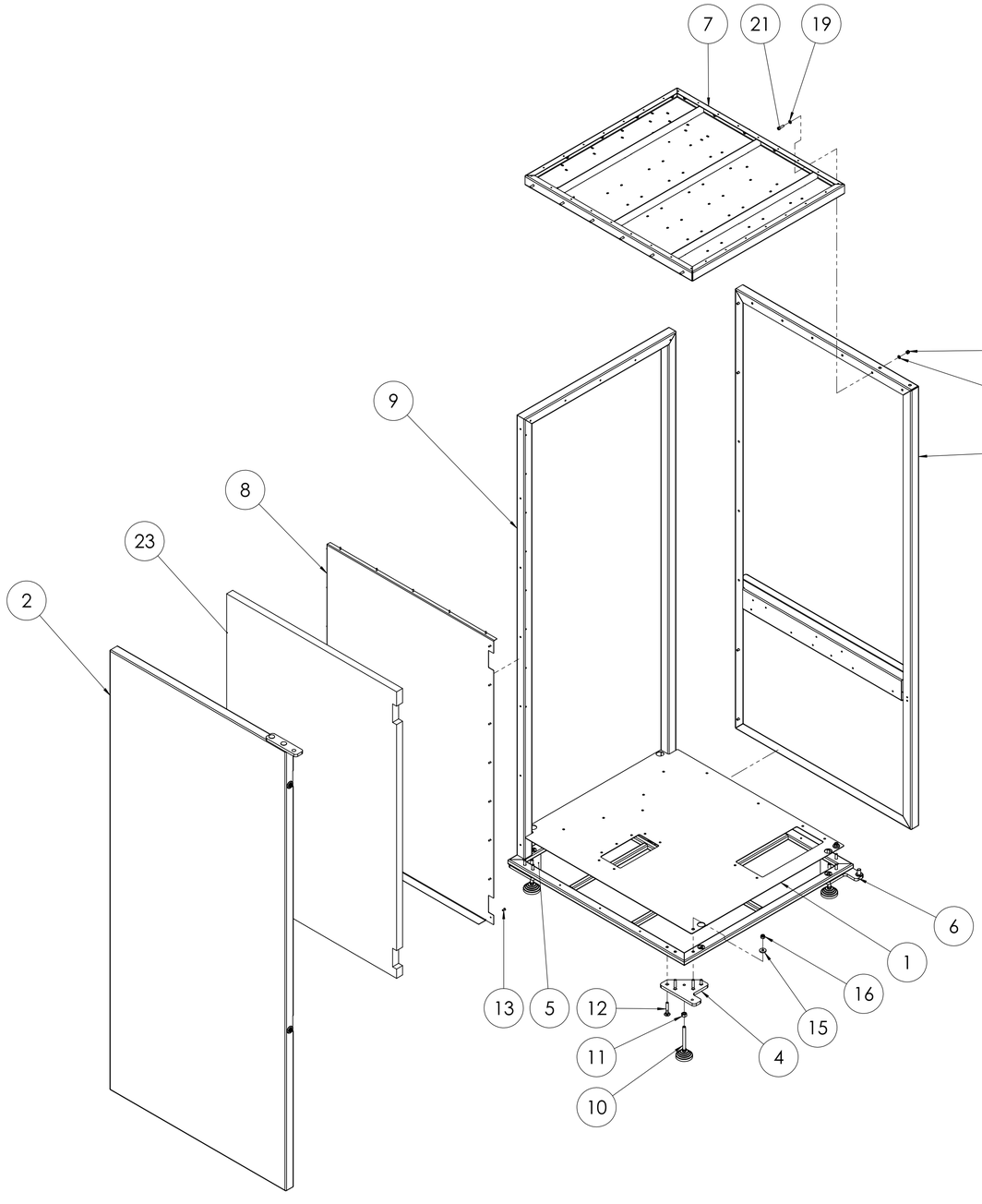
Revision:

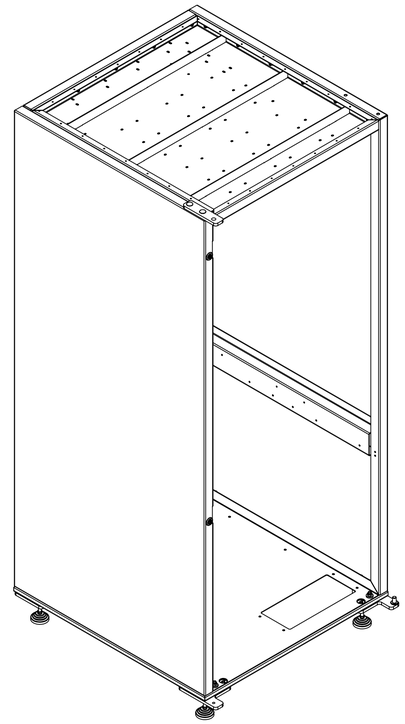
Format A3

Weight: 36299.56

SCALE: 1:10

SHEET: 1 OF 1





ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
23	1	PIR.0002		Material <not specified>
22	19	M6x12 Hex. socket screw A2	51050.060.012	
21	12	M6x20 Hex. socket screw A2	51050.060.020	
20	12	M6 Hex lock nut A2	51730.060.001	
19	43	M6 Washer A2	51420.060.001	
18	6	M6x8 Hex. socket screw A2	51050.060.008	
17	6	M6 Big washer DIN9021 A2	51530.060.001	
16	16	M8 Hex lock nut A2	51718.080.001	
15	16	M8 Washer A2	51420.080.001	
14	4	Locking bolt M8x30 A2 DIN603	55500.080.030	Steel
13	21	Rivet R3.8 x10 A2	34180.040.010	
12	12	Locking bolt M8x50 A2 DIN603	51500.080.045	Material <not specified>
11	4	M10 ISO 4034 nut A2	52080.100.001	
10	4	323231	LV.A-60-14-SST-M10x98	
9	1	02.0001	Frame assembly	Material <not specified>
8	1	03.0031	Panel	AISI 304
7	1	03.0011	Top plate assembly	Material <not specified>
6	1	04.0207	Hinge plate	Material <not specified>
5	2	04.0206	Plate	AISI 304
4	1	04.0211	Plate	AISI 304
3	1	03.0041	Side panel assembly	
2	1	03.0043	Side panel assembly	
1	1	03.0008	Base plate	AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material: Material <not specified>

Description:

Sub Ass. Frame

	Name	Signature	Date
Drawn:	S. Braakman		18-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Drawing number: **03.0042**

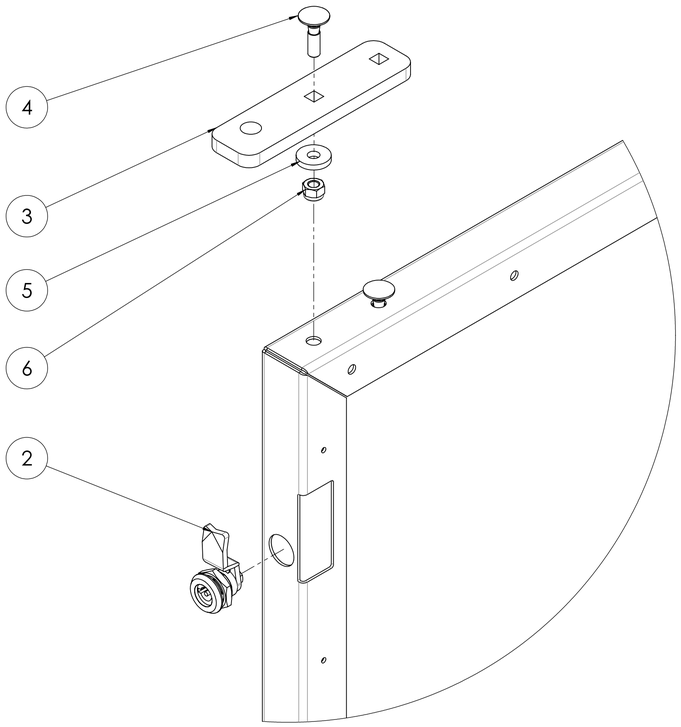
Revision:

Format: A1

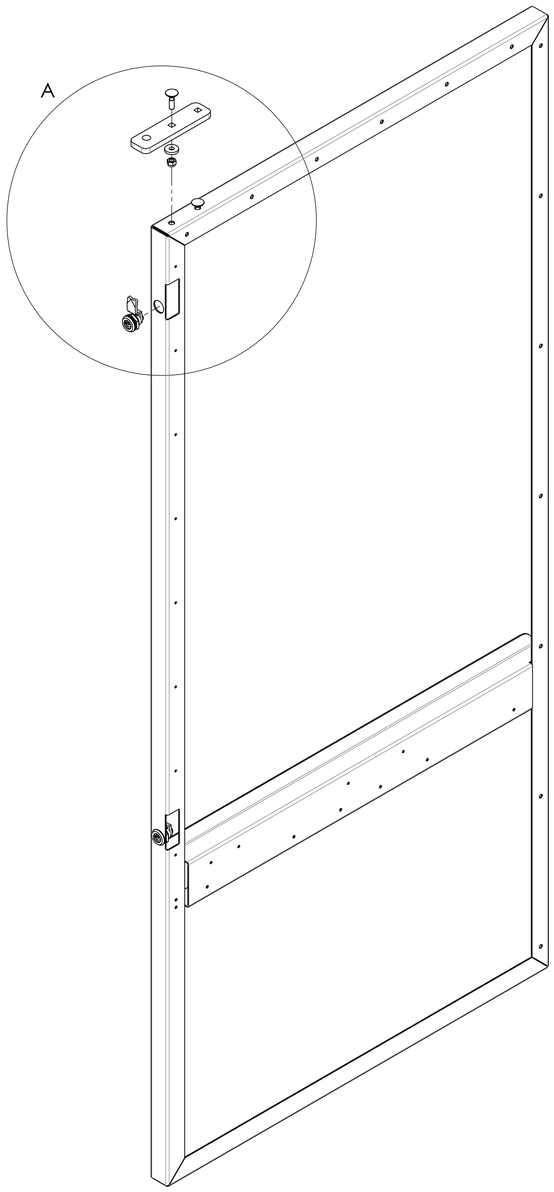
Weight: 160187.68

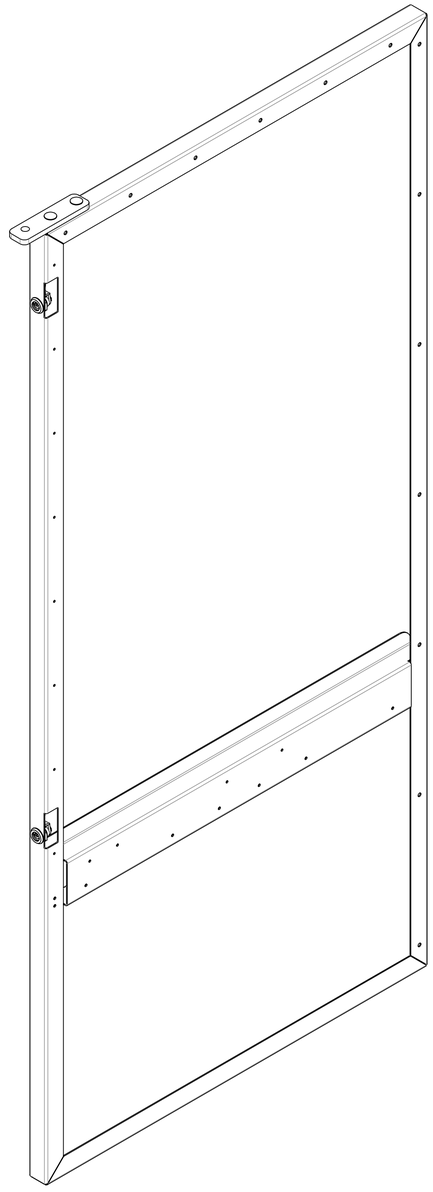
SCALE: 1:10

SHEET: 1 OF 1



DETAIL A
SCALE 1 : 2





ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
6	2	M8 Hex lock nut A2	51718.080.001	
5	2	M8 Washer A2	51420.080.001	
4	2	Locking bolt M8x30 A2 DIN603	55500.080.030	Steel
3	1	04.0212	Locking plate	AISI 304
2	2	gn115-vde-6	100910017	
1	1	03.0006	Side panel assembly	

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material:

	Name	Signature	Date
Drawn:	M. ten Cate		16-6-2019
Checked:			
Class:	SSS	StudentNo.	

Description:

Side panel assembly

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Drawing number: **03.0043**

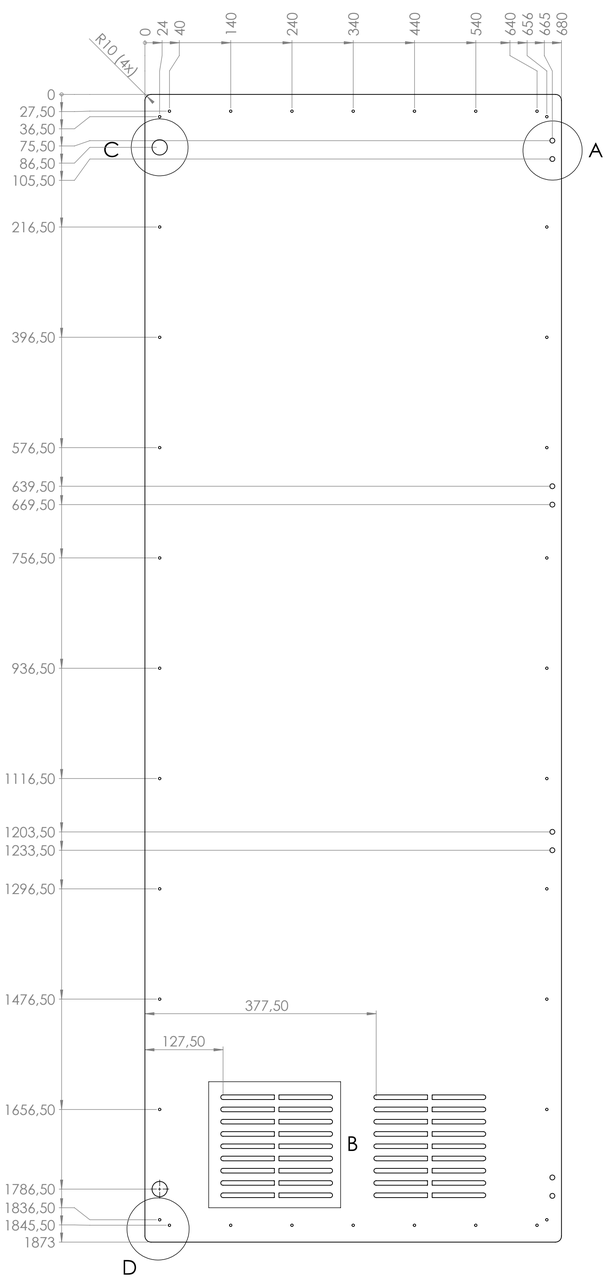
Revision:

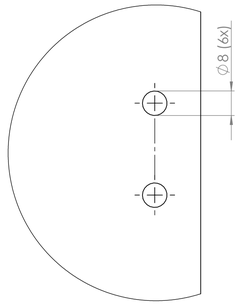
Format: A1

Weight: 36724.34

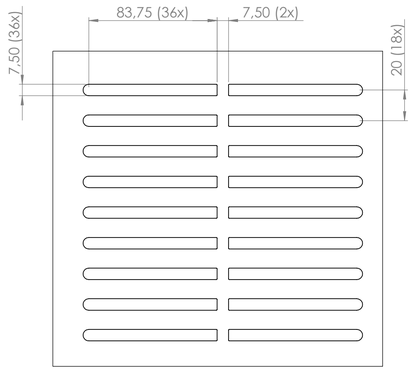
SCALE: 1:5

SHEET: 1 OF 1

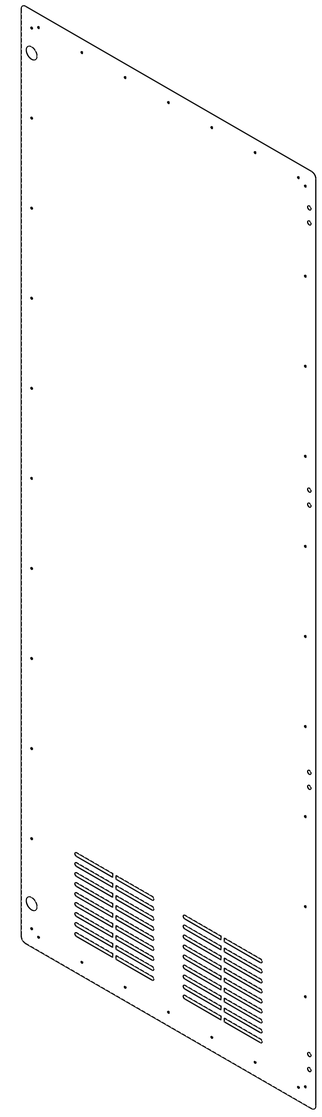


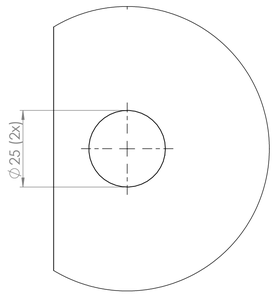


DETAIL A
SCALE 1 : 1

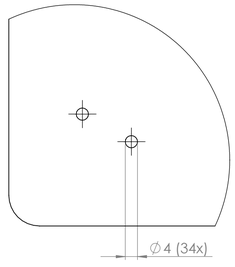


DETAIL B
SCALE 1 : 2





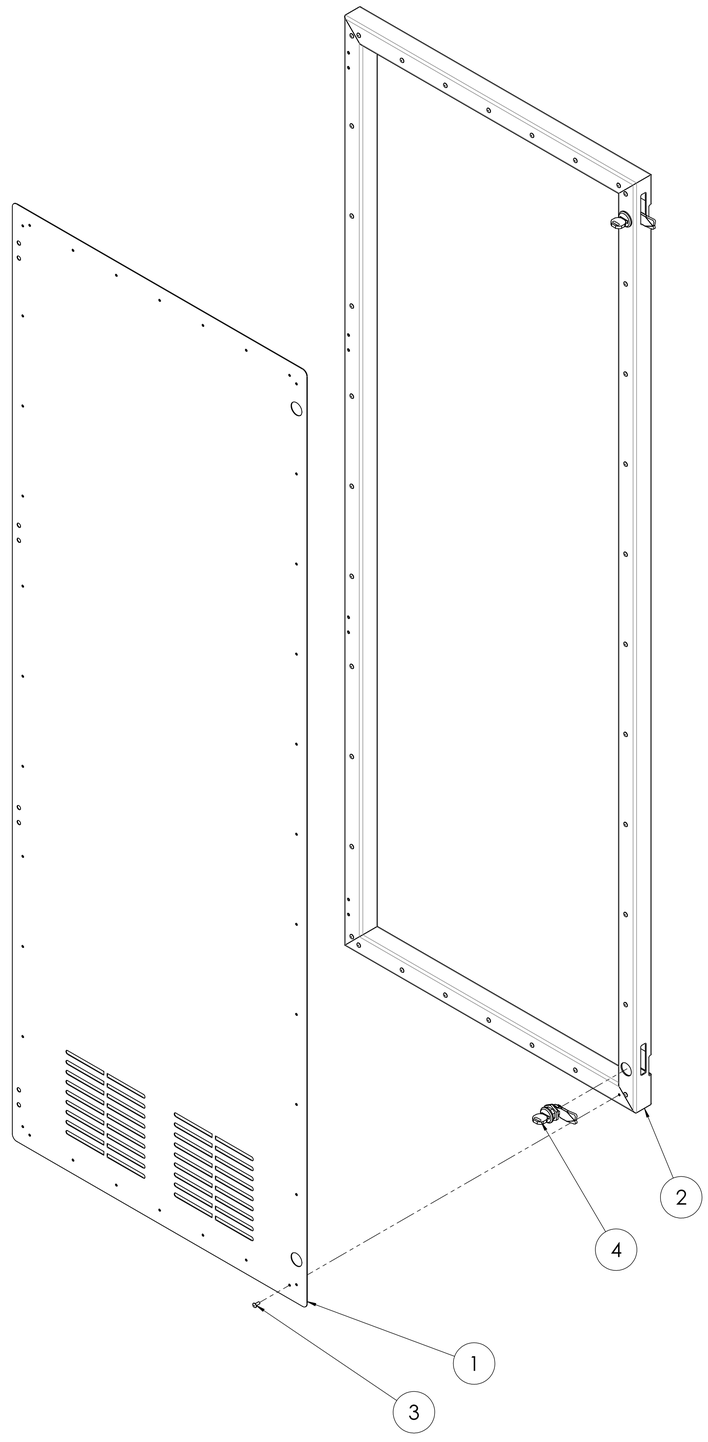
DETAIL C
SCALE 1 : 1

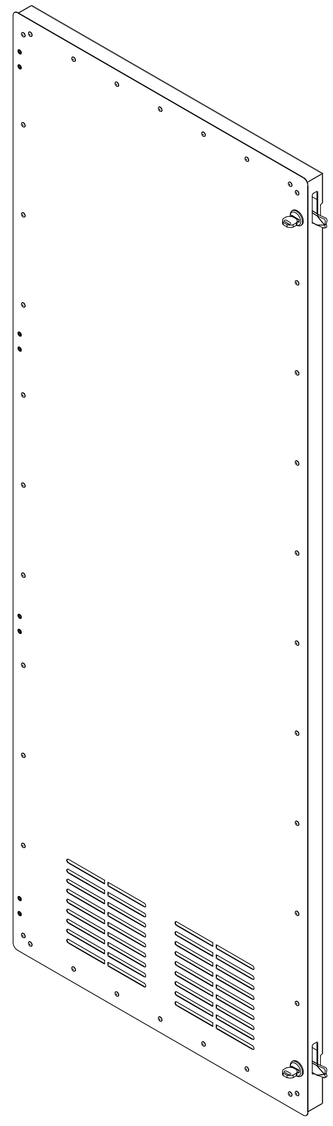


DETAIL D
SCALE 1 : 1

Am. Projection		DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:	
	Name	Signature	Date	Material: AISI 304	
Drawn:	S.Braakman		15-6-2019	Description: **Back panel**	
Checked:				Drawing number: **03.0046**	Revision: / Format A1
Class:	SS5	StudentNo.		Weight: 9986.51 grams	SCALE: 1:5 / SHEET: 1 OF 1

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl





ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
4	2	gn_115-sc-18-ni	109540490	
3	36	Rivet R3.8 x10 A2	34180.040.010	
2	1	02.0011	Door assembly	
1	1	03.0046	Back panel	AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material:

	Name	Signature	Date
Drawn:	S. Braakman		19-6-2019
Checked:			
Class:	SSS	StudentNo.	

Description:

Back door assembly

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Drawing number: **03.0047**

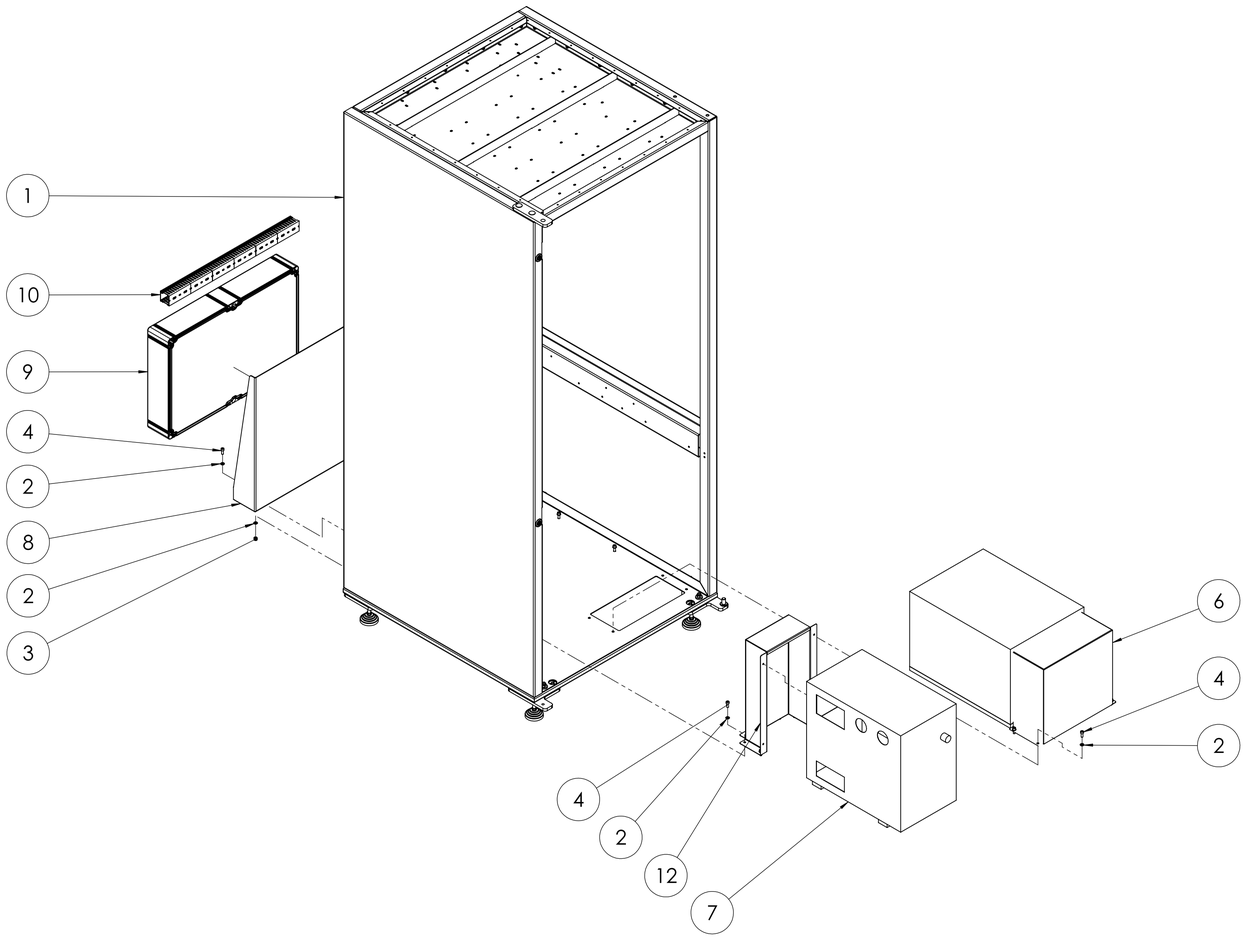
Revision:

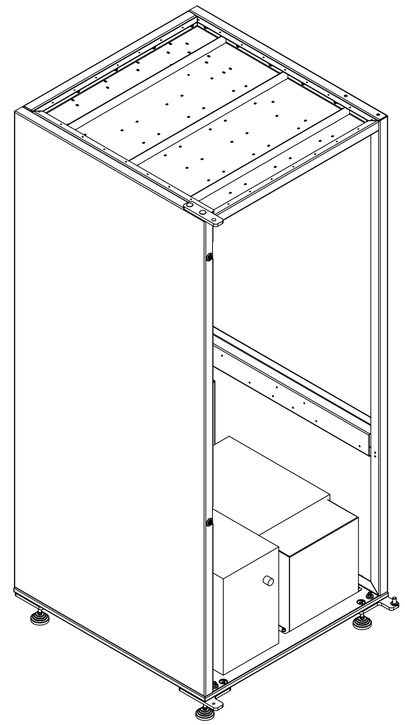
Format: A1

Weight: 21442.97

SCALE: 1:5

SHEET: 1 OF 1





ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
12	1	03.0073	Air exhaust	AISI 304
11	1	1.209.1301.14		
10	1	78122.03		
9	1	06.0001		Material <not specified>
8	1	03.0049	Mount	AISI 304
7	1	Koeler AS-40		
6	1	Condensor		Material <not specified>
5	3	M6x30 Hex. socket screw A2	51050.060.030	
4	15	M6x16 Hex. socket screw A2	51050.060.016	
3	18	M6 Hex lock nut A2	51730.060.001	
2	36	M6 Washer A2	51420.060.001	
1	1	03.0042	Sub Ass. Frame	Material <not specified>

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material: Material <not specified>

	Name	Signature	Date
Drawn:	S. Braakman		18-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:

Sub ass. Bottem

Drawing number: **03.0048**

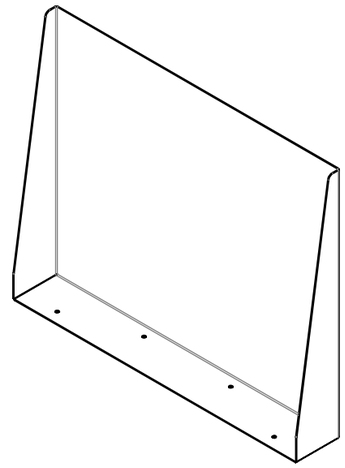
Revision:

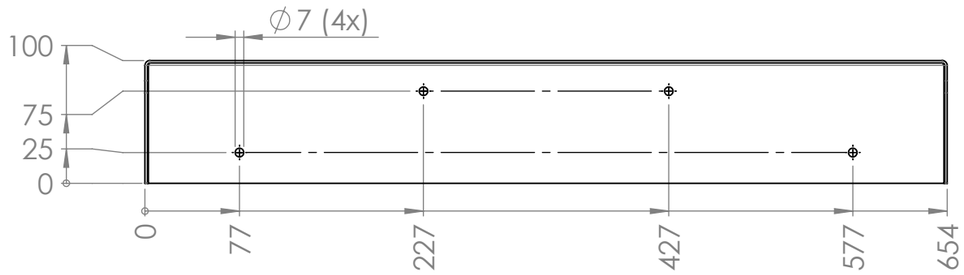
Format: A1

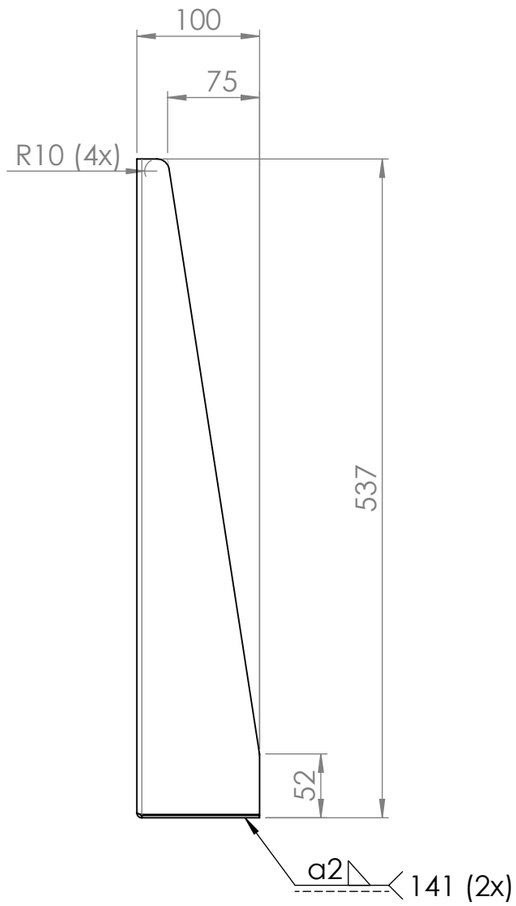
Weight: 0.00

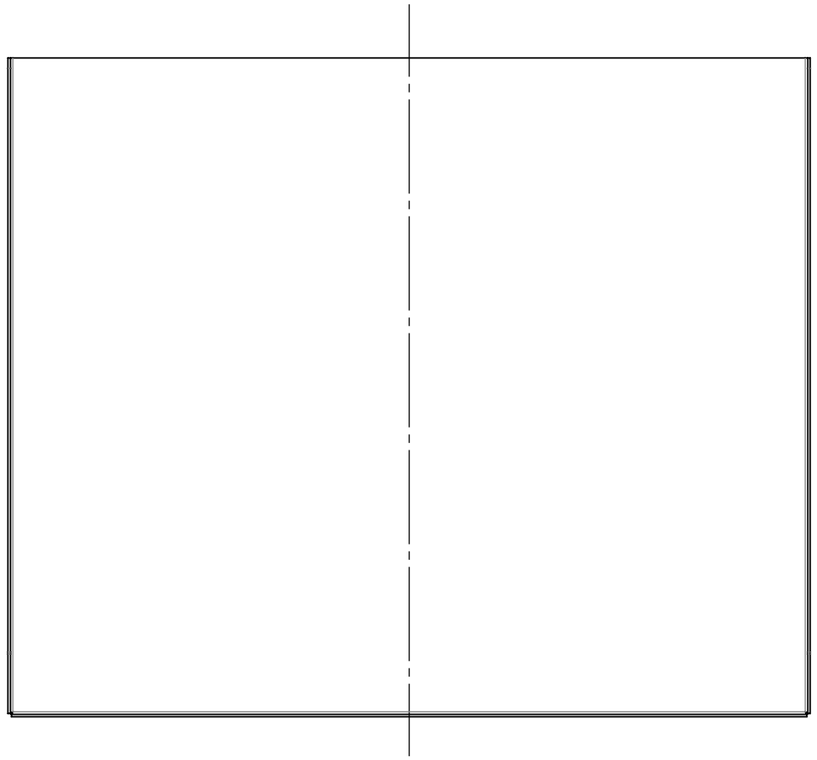
SCALE: 1:10

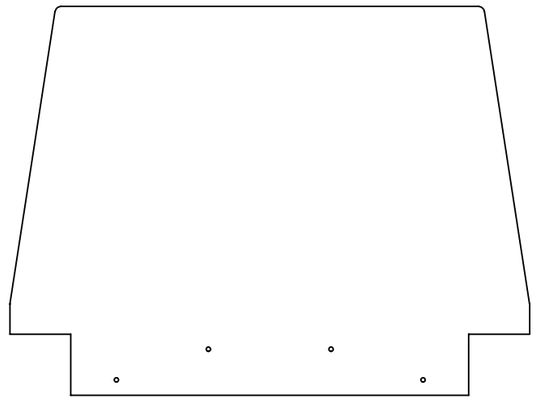
SHEET: 1 OF 1





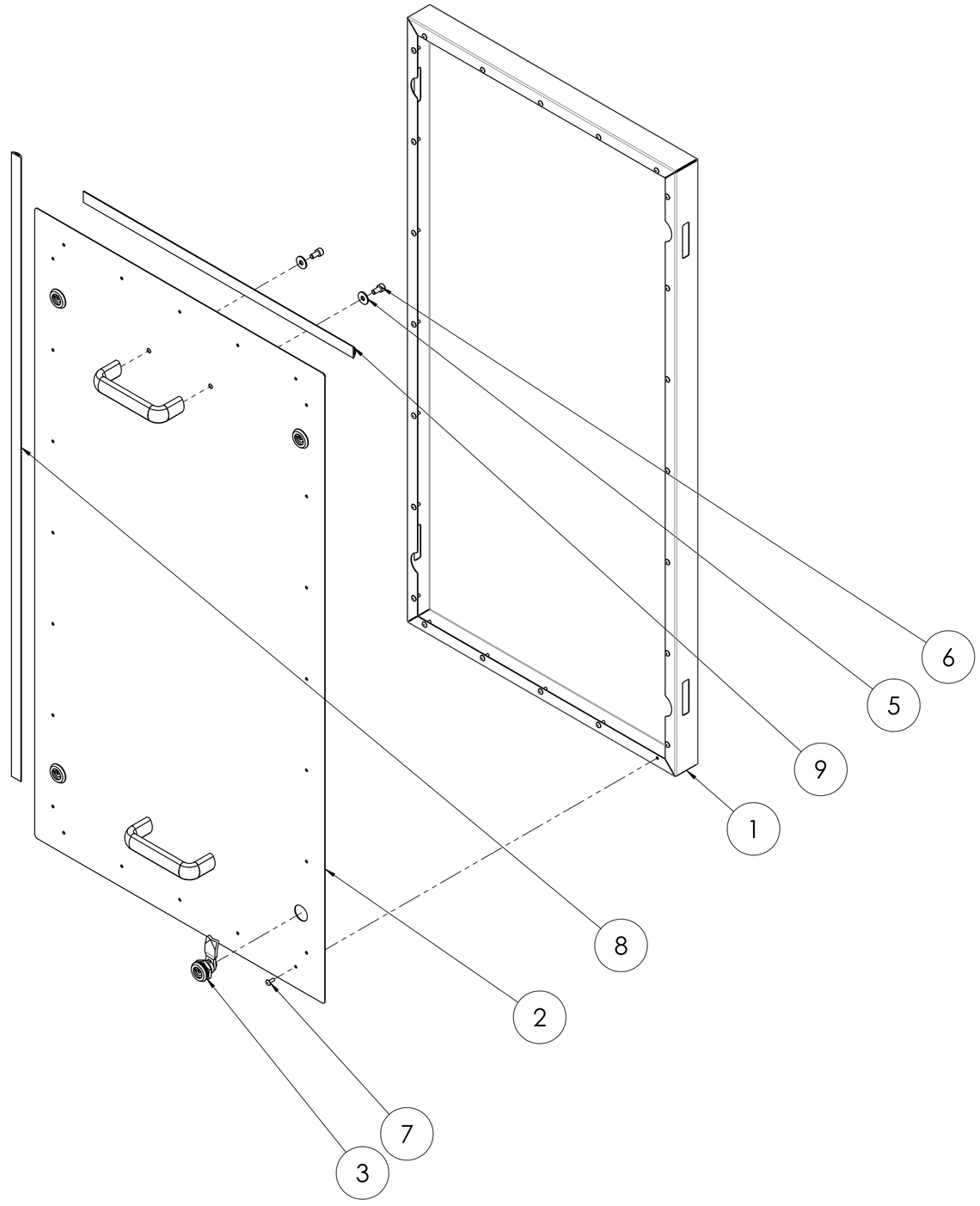


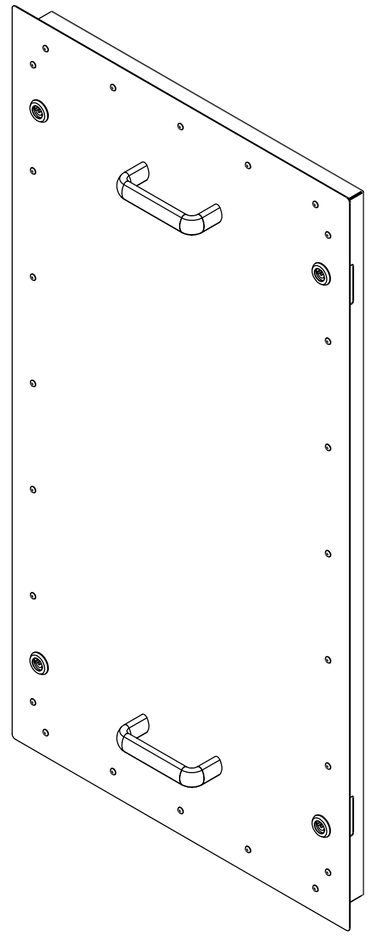




For information (1:10).

Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Soda blasting
					Material: AISI 304
	Name	Signature	Date	SAXION	Description: **Mount**
Drawn:	S. Braakman		16-6-2019		
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0049** / Revision: / Format: A3
Class:	SSS	StudentNo.			Weight: 7690.96 grams / SCALE: 1:5 / SHEET: 1 OF 1





9	2	26801225.07	Celrubber zk d-profiel BxH=18x10mm	EPDM 60 Durometer
8	2	26801225.06	Celrubber zk d-profiel BxH=18x10mm	EPDM 60 Durometer
7	24	Rivet R3.8 x10	34180.040.010	
6	4	M6x12 Hex. socket screw A2	51050.060.012	
5	4	M6 Big washer DIN9021 A2	51530.060.001	
4	2	GN 565.1-26-116-BL	100102290	
3	4	gn_115-vde-18-ni	100909105	
2	1	03.0051	Panel	AISI 304
1	1	03.0026	Back panel	AISI 304
ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

	Name	Signature	Date
Drawn:	S. Braakman		17-6-2019
Checked:			
Class:	SSS	StudentNo.	

Finish:

Material:

Description:

Cooling door assembly (back)

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Drawing number: **03.0050**

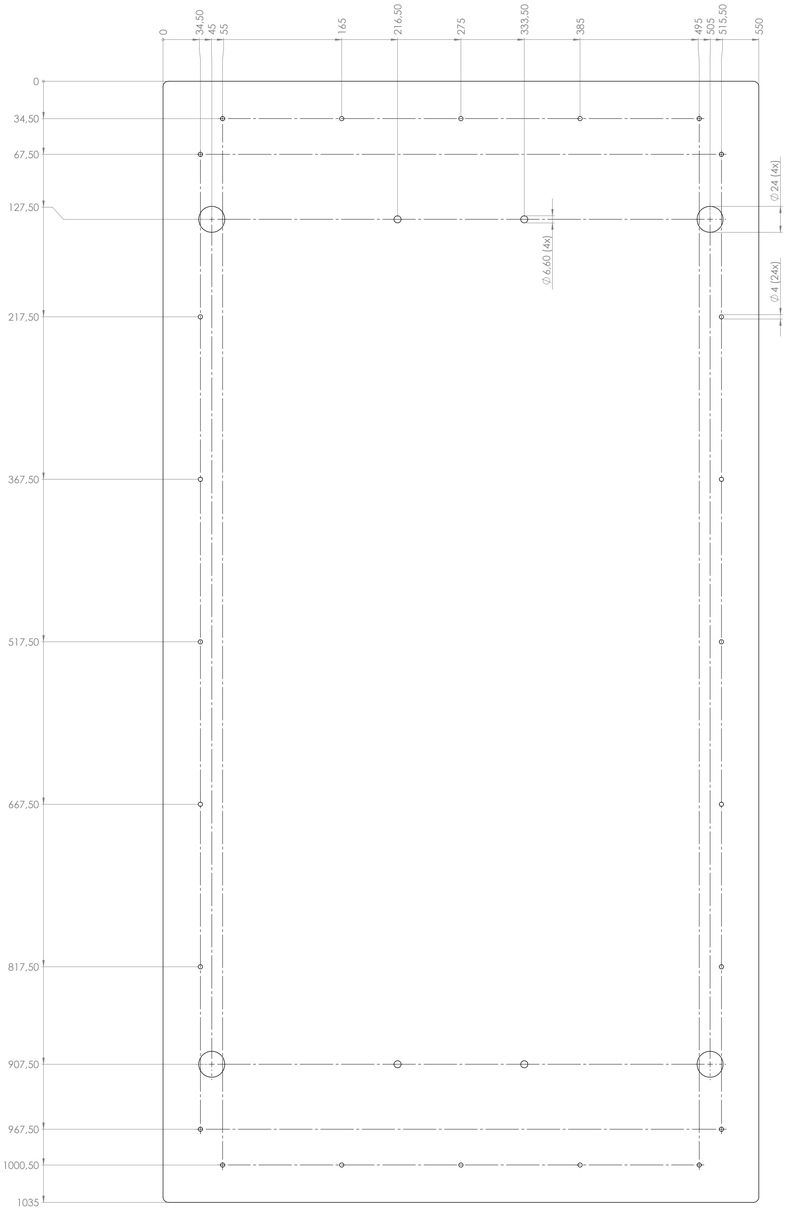
Revision:

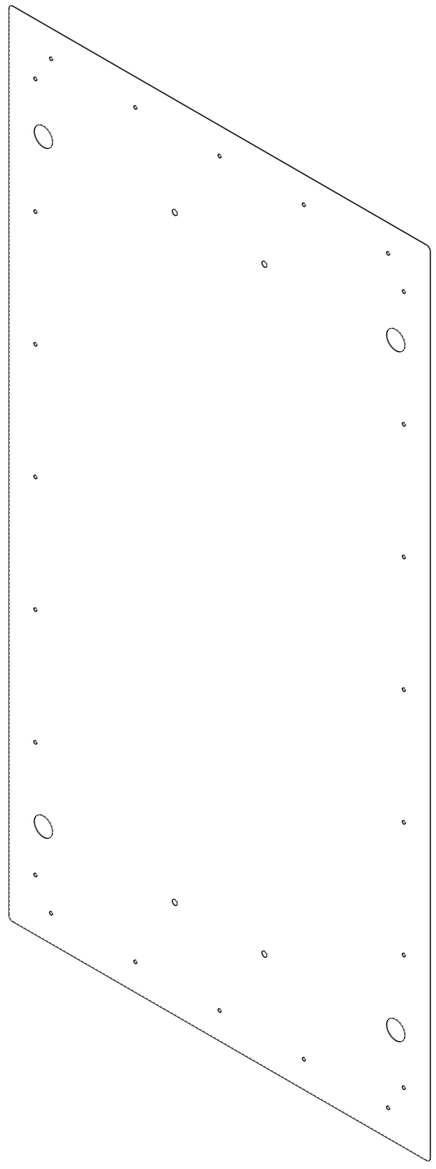
Format A2

Weight: 10379.50

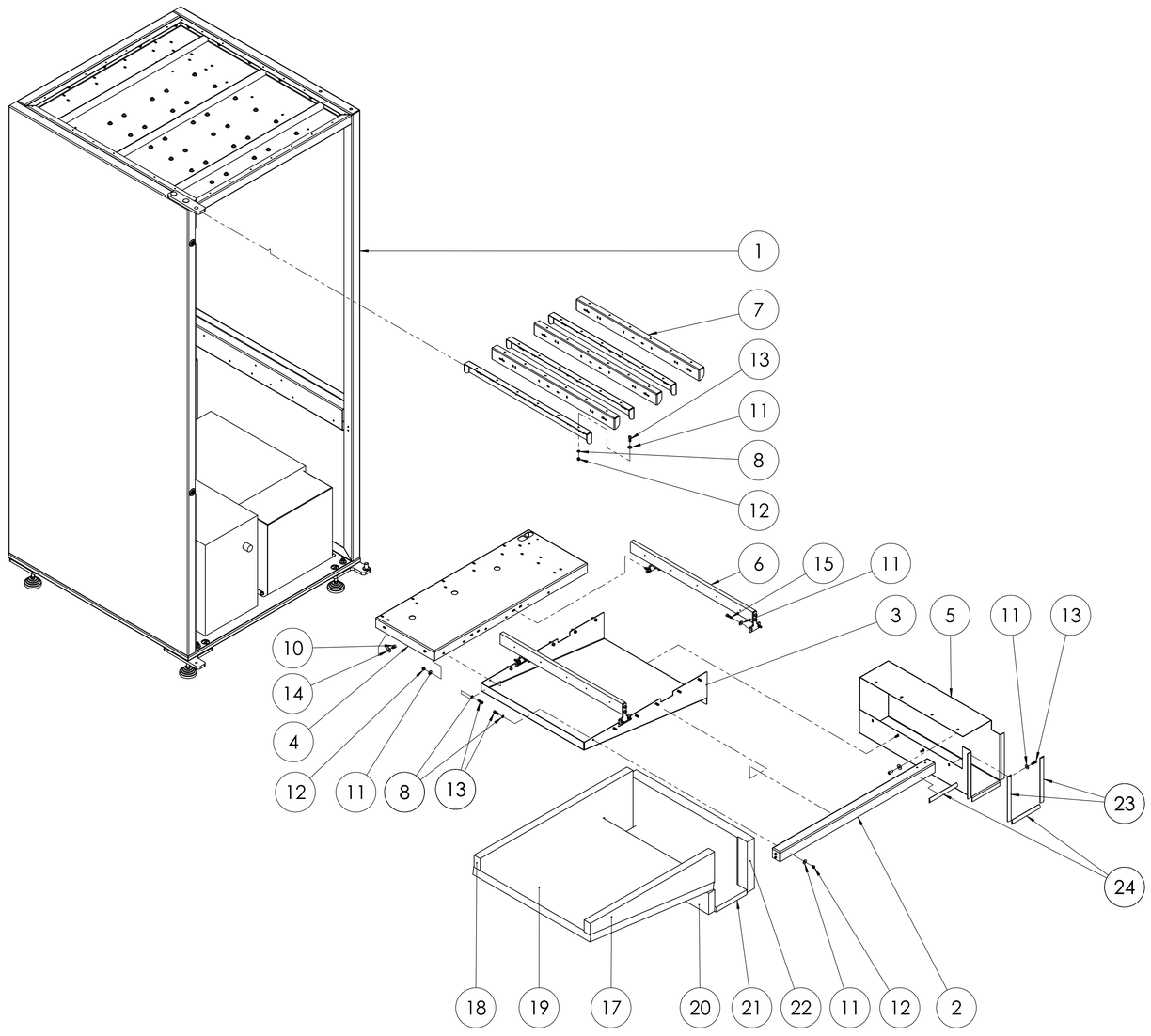
SCALE: 1:10

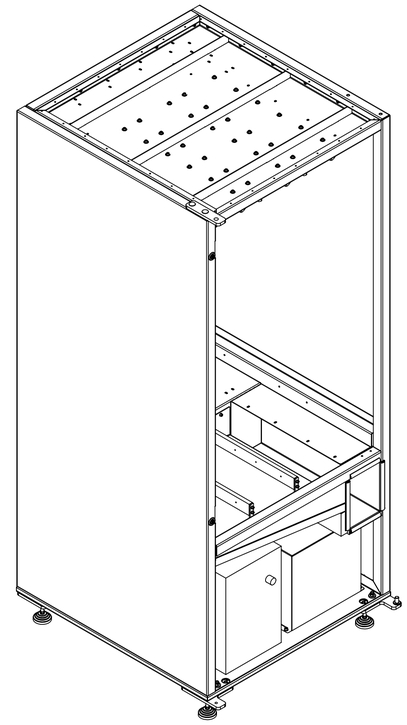
SHEET: 1 OF 1





Arm_Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
			Material: AISI 304
Name / Signature / Date	SAXION Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 487 1111 Fax: +31 53 431 2233 Web: www.saxion.nl		Description: **Panel**
Drawn: S. Bradenkamp / 16-6-2019			
Checked:		Drawing number: **02.0051**	Revision: Format: A0
Class: (Academic)		Weight: 4535.84 grams	SCALE: 1:2 SHEET 1 OF 1





ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
24	2	26801225.05	Celrubber zk d-profiel BxH=18x10mm	EPDM 60 Durometer
23	2	26801225.04	Celrubber zk d-profiel BxH=18x10mm	EPDM 60 Durometer
22	1	PIR.0012		Material <not specified>
21	1	PIR.0011		Material <not specified>
20	1	PIR.0010		Material <not specified>
19	1	PIR.0009		Material <not specified>
18	1	PIR.0008		Material <not specified>
17	1	PIR.0007		Material <not specified>
16	3	M6x12 Hex. socket screw A2	51050.060.012	
15	8	M5 x 20 Hex. socket screw A2	51050.050.020	
14	7	M6 Big washer DIN9021 A2	51530.060.001	
13	52	M5 x 16 Hex. socket screw A2	51050.050.016	
12	60	M5 Hex lock nut A2	51730.050.001	
11	68	M5 Big Washer A2	51530.050.001	
10	8	M6x8 Hex. socket screw A2	51050.060.008	
9	4	M6 Washer A2	51420.060.001	
8	52	M5 Washer A2	51420.050.001	
7	6	01.0002	Bracket	AISI 304
6	2	03.0029	Bracket assembly	
5	1	03.0017	Output	AISI 304
4	1	03.0010	Plate	AISI 304
3	1	03.0022	Output plate	AISI 304
2	1	03.0002	Plate	AISI 304
1	1	03.0048	Sub ass. Bottem	Material <not specified>

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material: Material <not specified>

	Name	Signature	Date
Drawn:	S. Braakman		18-6-2019
Checked:			
Class:	SS5	StudentNo.	

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:

Sub ass. Bottle guide

Drawing number: **03.0058**

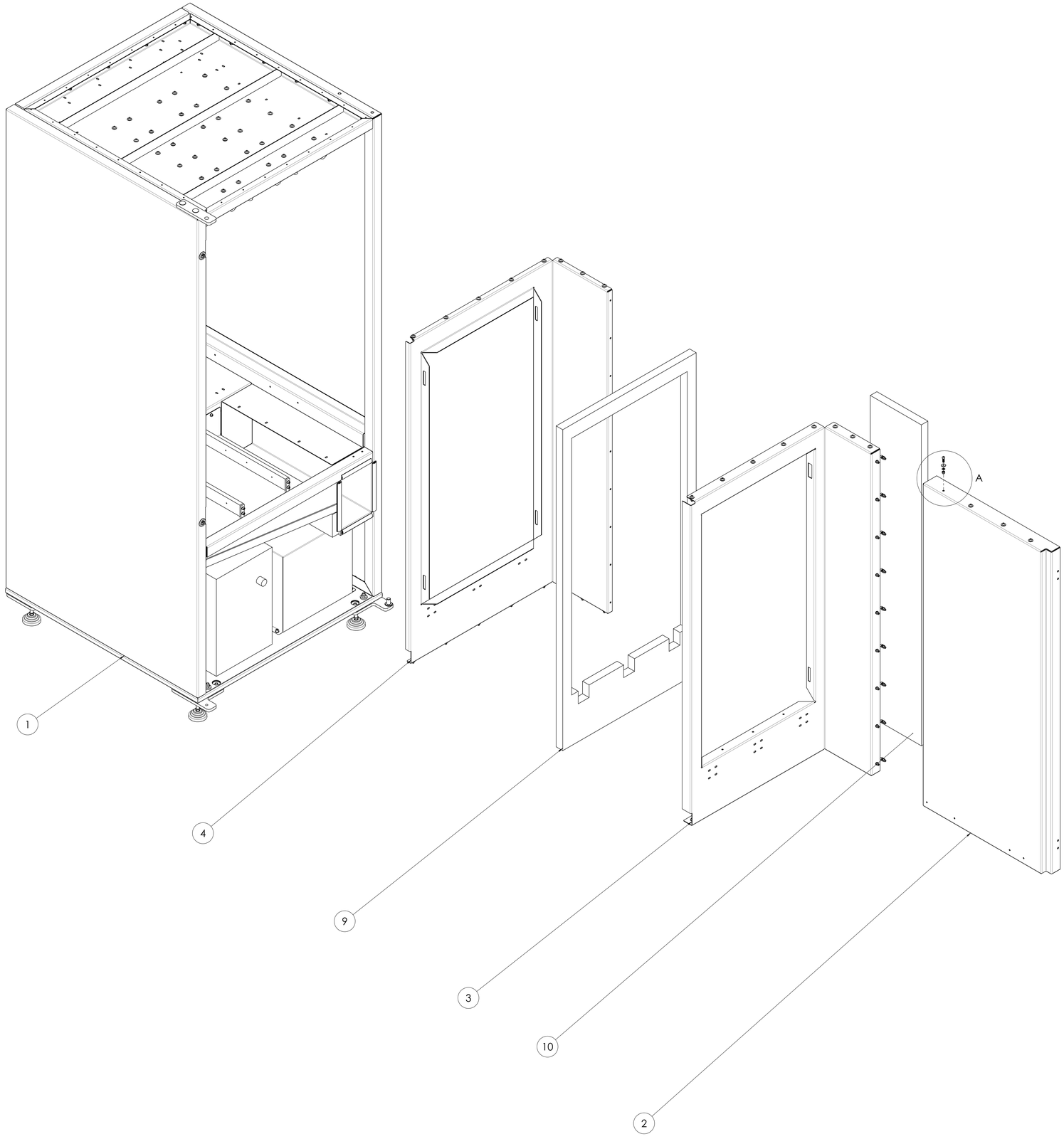
Revision:

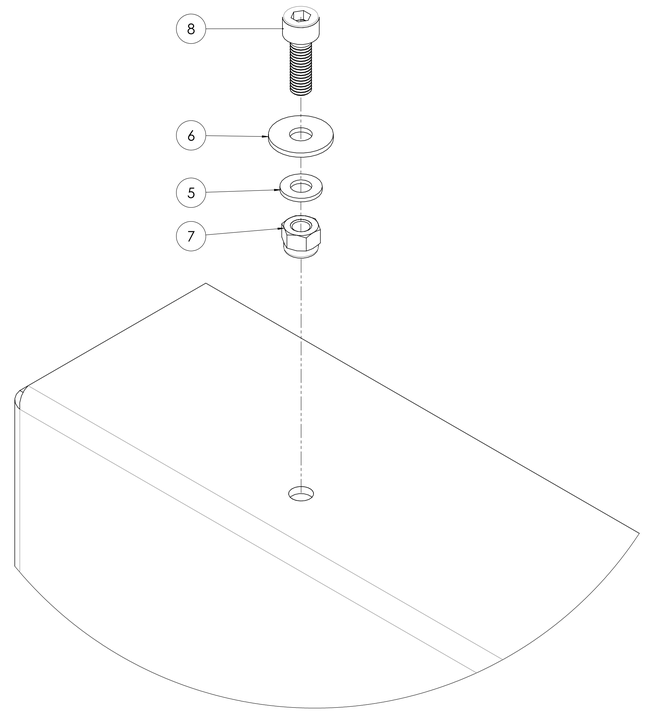
Format: A1

Weight: 0.00

SCALE: 1:10

SHEET: 1 OF 1





DETAIL A
SCALE 2 : 1

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
10	1	PIR.0004	PIR 2-sided Aluminum 1200x600x40mm Rd: 1.81 12pl / pack [= 8.64 m²]	
9	1	PIR.0003	PIR 2-sided Aluminum 1200x600x40mm Rd: 1.81 12pl / pack [= 8.64 m²]	
8	58	M5 x 16 Hex. socket screw A2	51050.050.016	
7	58	M5 Hex lock nut A2	51730.050.001	
6	40	M5 Big Washer A2	51530.050.001	
5	76	M5 Washer A2	51420.050.001	
4	1	03.0036	Plate	AISI 304
3	1	03.0021	Plate	AISI 304
2	1	03.0019	Plate	AISI 304
1	1	03.0058	Sub ass. Bottle guide	Material <not specified>

Arm. Projection

DIMENSIONS IN MILLIMETERS
DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:
Material:
Description: **Sub ass. Cooling**

	Name	Signature	Date
Drawn:	S. Roubenoff		19-6-2019
Checked:			
Class:		Student Proj.	

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 70000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Drawing number: **03.0059**
Revision:
Format: A0
Weight: 0.00
SCALE: 1:5
SHEET 1 OF 1

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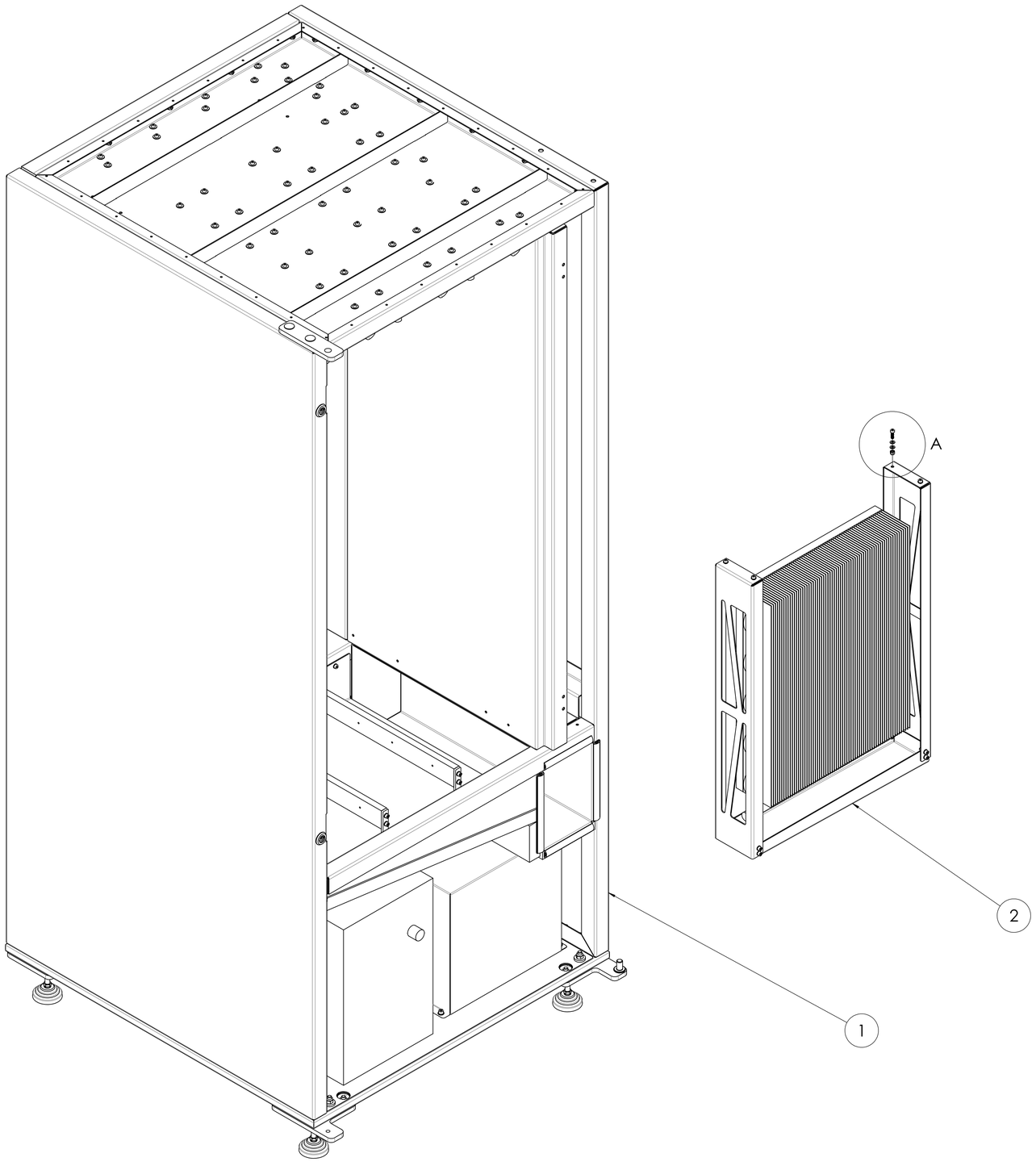
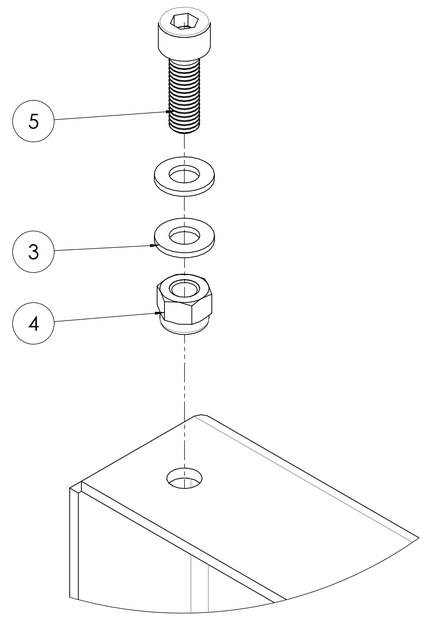




DETAIL A
SCALE 2 : 1

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
5	4	M5 x 16 Hex. socket screw A2	51050.050.016	
4	4	M5 Hex lock nut A2	51730.050.001	
3	8	M5 Washer A2	51420.050.001	
2	1	07.0004	Evaporator + mount assembly	
1	1	03.0059	Sub ass. Cooling	

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material: Material <not specified>

Description: **Sub ass. evaporator**

	Name	Signature	Date
Drawn:	S. Braakman		18-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Drawing number: **03.0060**

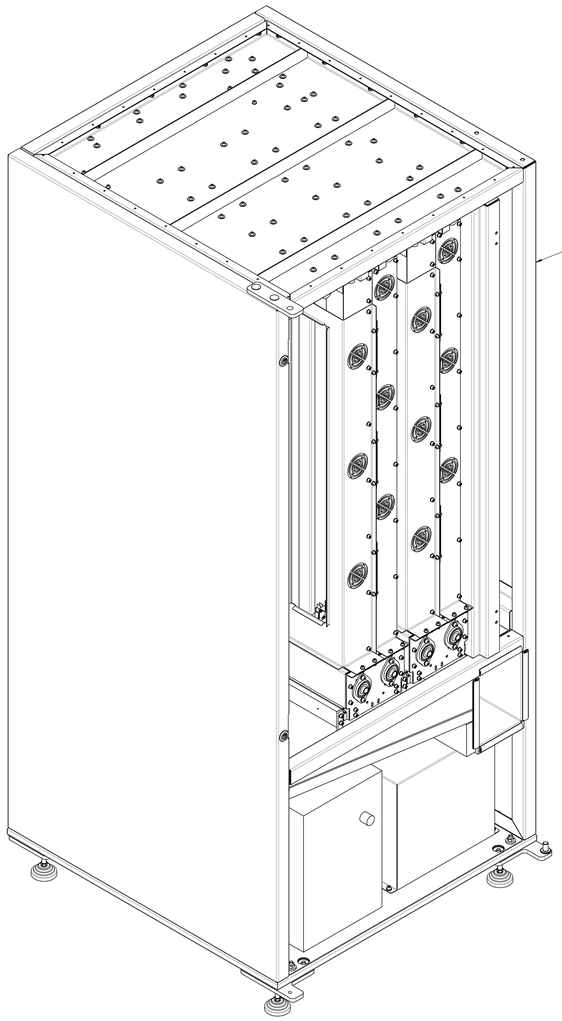
Revision:

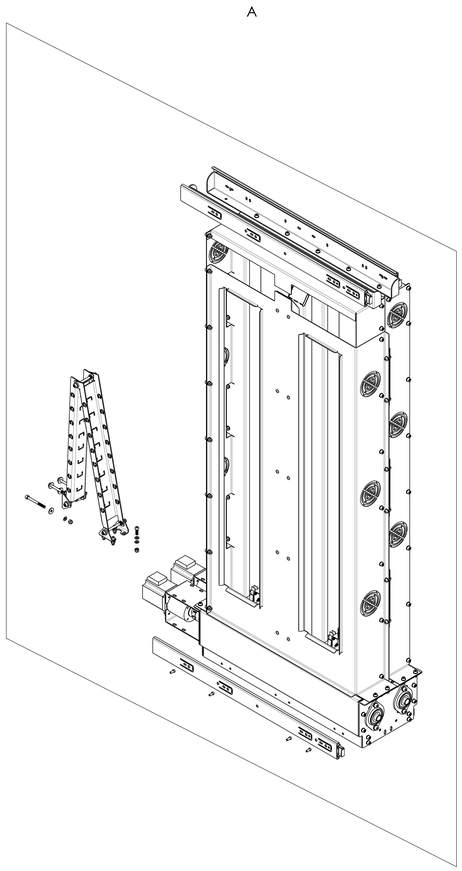
Format: A1

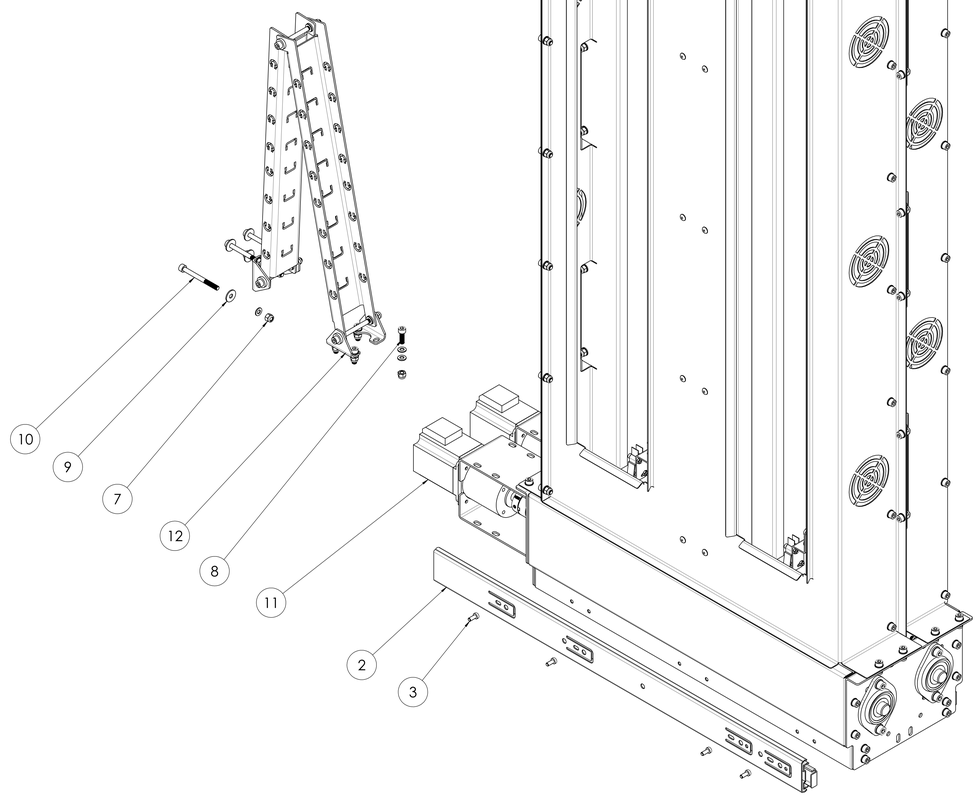
Weight: 0.00

SCALE: 1:5

SHEET: 1 OF 1







DETAIL A
SCALE 2 : 5

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
12	3	05.0007	Cable bracket assembly	Material <not specified>
11	3	01.0001	Stockroom assembly	Material <not specified>
10	12	M5 x 55 Hex. socket screw A2	S1050.050.055	
9	12	M5 Big Washer A2	S1530.050.001	
8	4	M5 x 16 Hex. socket screw A2	S1050.050.016	
7	16	M5 Hex lock nut A2	S1730.050.001	
6	20	M5 Washer A2	S1420.050.001	
5	4	M4 Hex lock nut A2	S1730.040.001	
4	4	M4 Washer A2	S1418.040.001	
3	11	M4 x 10 Low head Hex. socket screw A2	S1042.040.010	
2	8	757-0600SC - Topslide	757-0600SC	
1	1	03.0060	Sub ass. evaporator	Material <not specified>

Arm. Projection

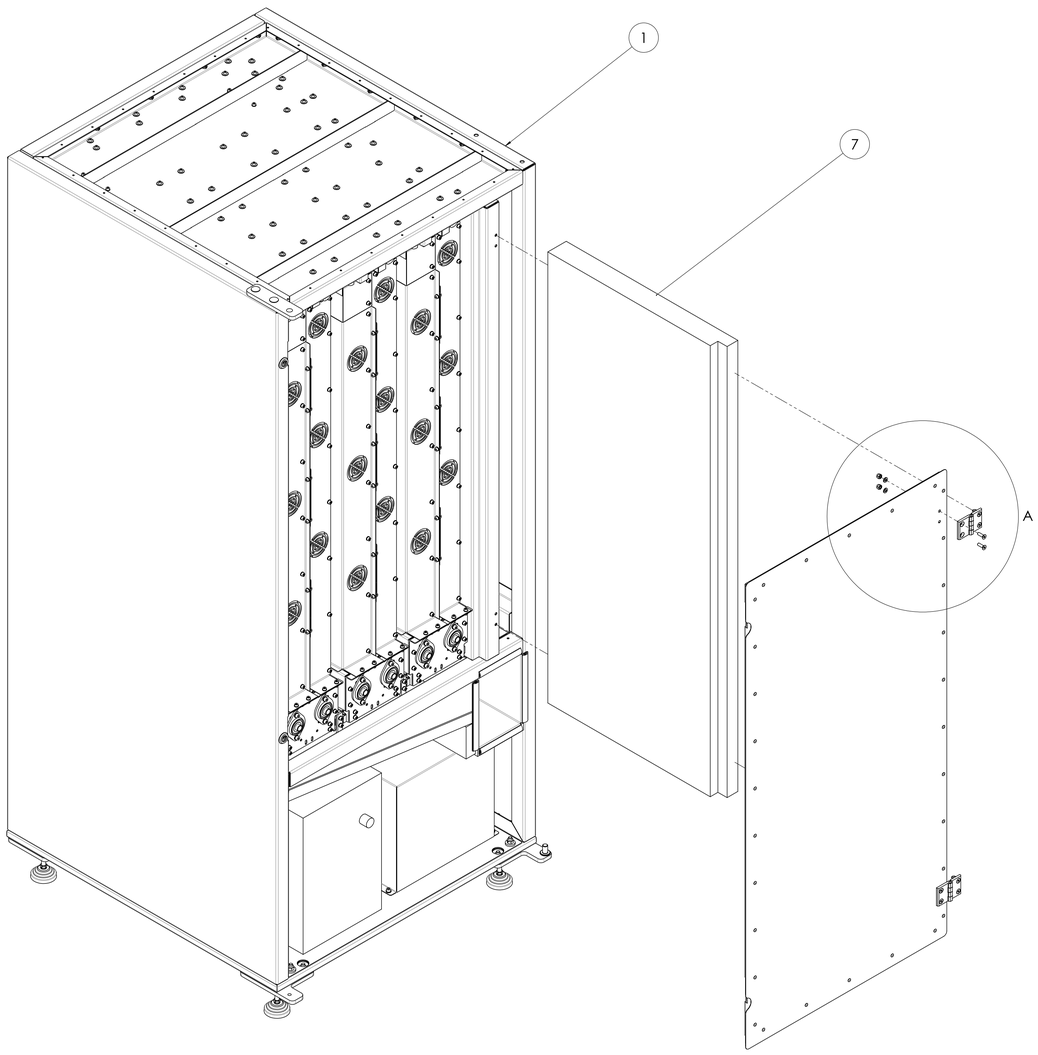
	Name	Signature	Date
Drawn:	S. Boddeman		18-6-2019
Checked:			
Class:	Student No.		

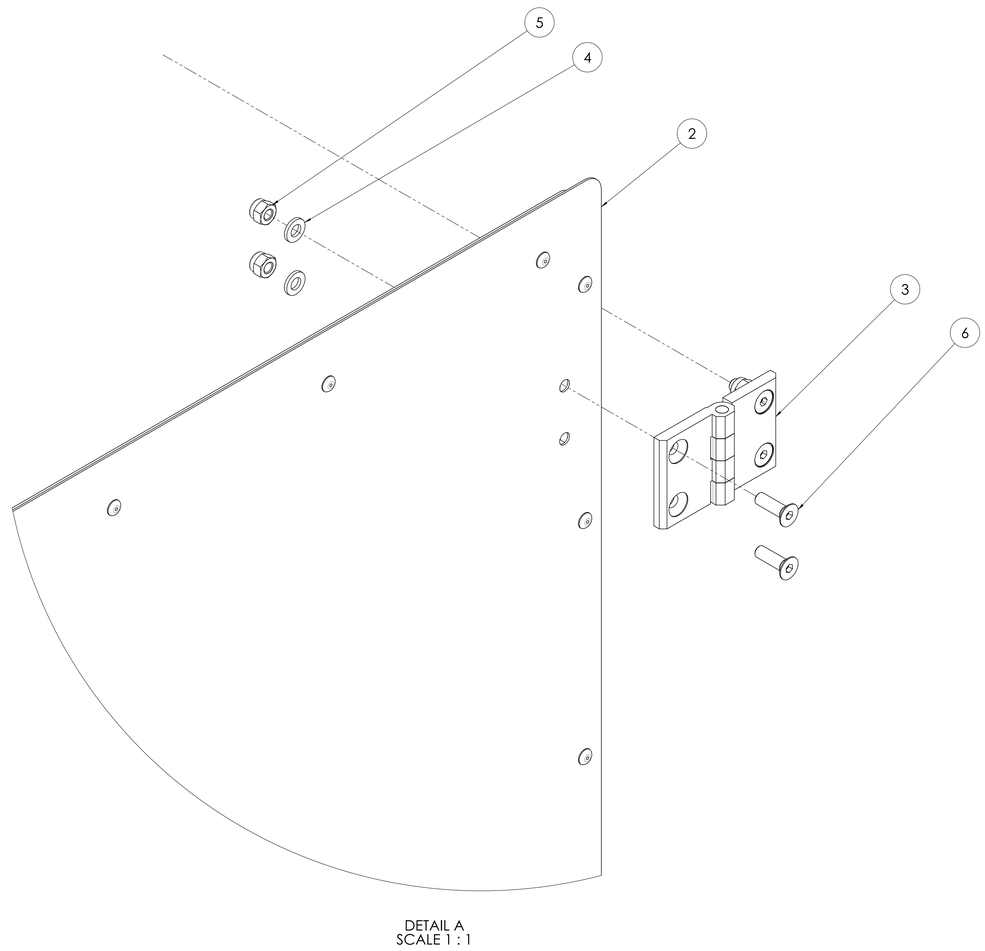
DIMENSIONS IN MILLIMETERS
DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:
Material:
Description: **Sub ass. drawers**

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 70300, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Drawing number: **03.0061**
Revision:
Format: A0
Weight: 0.00
SCALE: 1:5
SHEET 1 OF 1





DETAIL A
SCALE 1 : 1

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
7	1	PIR.0006		Material <not specified>
6	8	M6 x 20 Hex. CSTK screw A2 DIN7991	51060.060.020	
5	8	M6 Hex lock nut A2	51730.060.001	
4	8	M6 Washer A2	51420.060.001	
3	2	237-ni-76-50-a-gs	109516315	
2	1	03.0039	Cooling door assembly	Material <not specified>
1	1	03.0061	Sub ass. drawers	

Arm. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:	
			Material: Material <not specified>	
	Name	Signature	Date	Description: **Sub ass. cooling door**
Drawn	S. Brademan		18-6-2019	
Checked				Drawing number: **03.0062** Revision: Format A0
Qual.	(Student No.)			Weight: 0.00 SCALE: 1:5 SHEET 1 OF 1

SAXION
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Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
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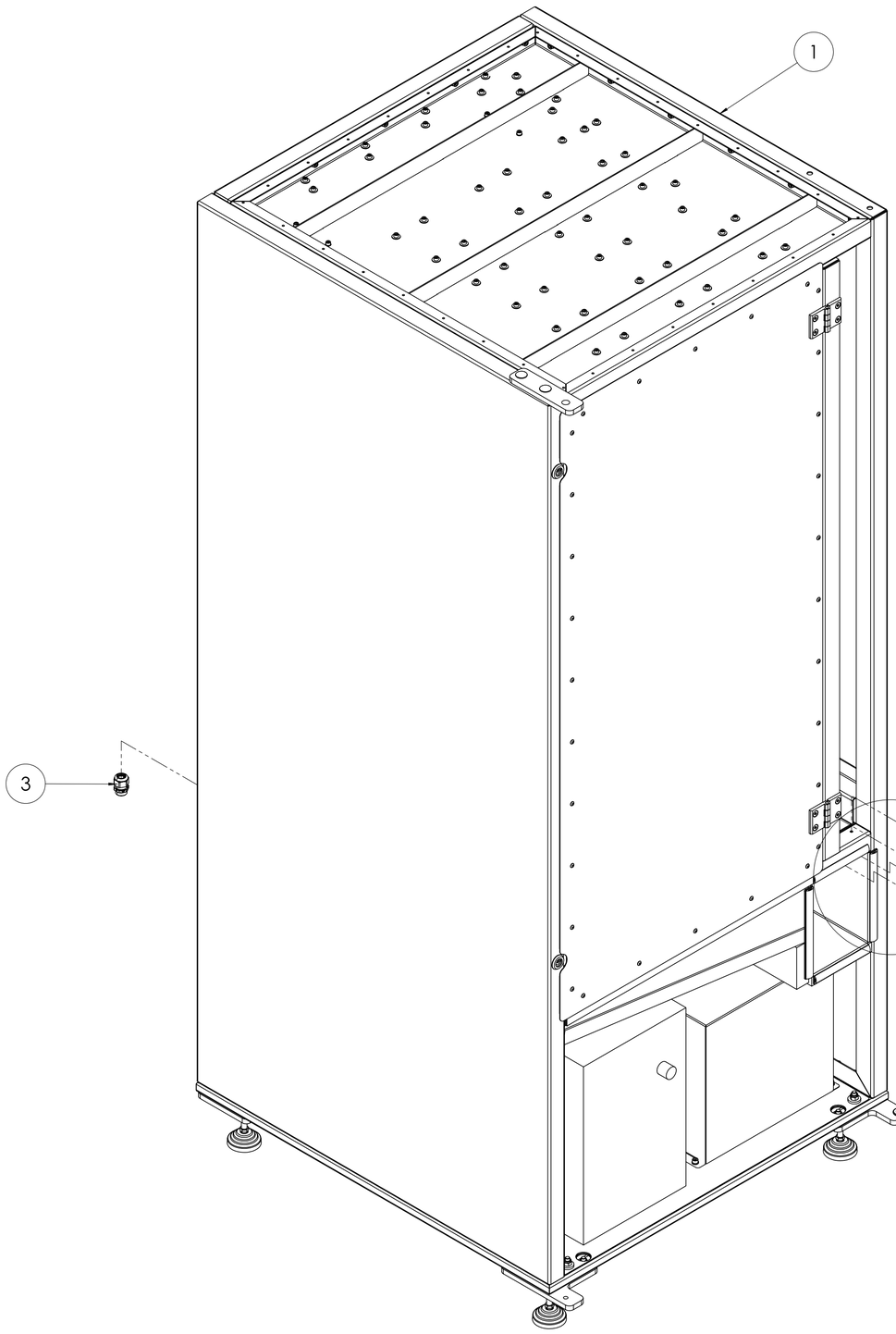
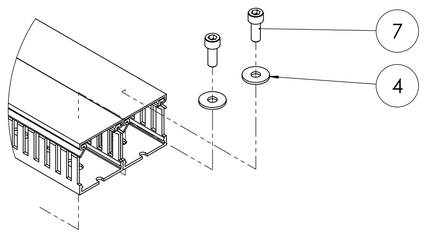
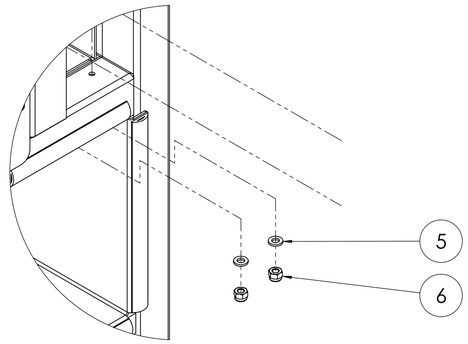
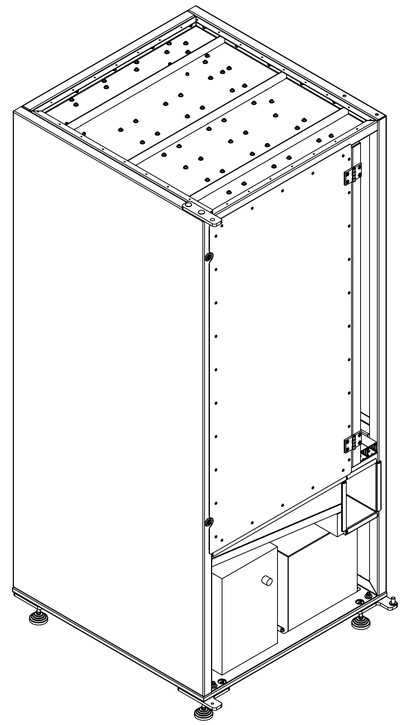




DETAIL A
SCALE 1 : 2



DETAIL B
SCALE 2 : 5



ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
7	4	M6x16 Hex. socket screw A2	51050.060.016	
6	5	M6 Hex lock nut A2	51730.060.001	
5	4	M6 Washer A2	51420.060.001	
4	4	M6 Big washer DIN9021 A2	51530.060.001	
3	3	1.209.1301.14		
2	2	78122.02		
1	1	03.0062		Material <not specified>

Am. Projection

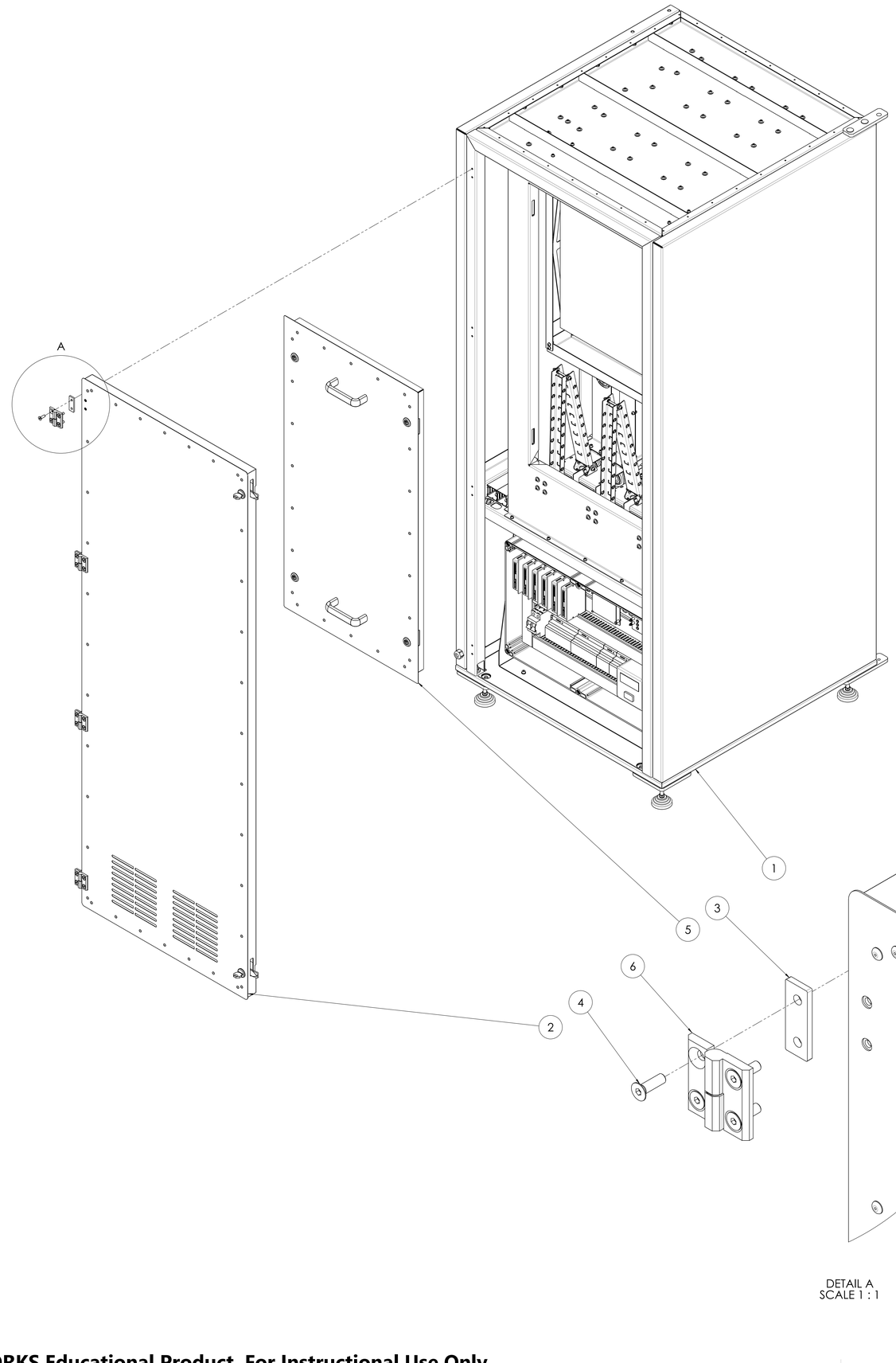
DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

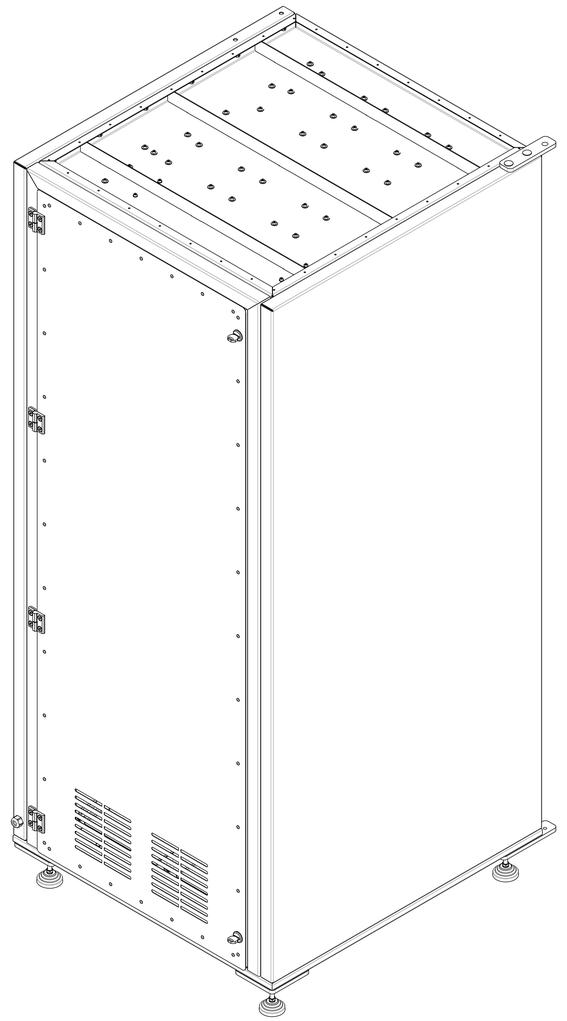
	Name	Signature	Date
Drawn:	S. Braakman		18-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Finish:
Material: Material <not specified>
Description: **Sub ass. Electrical**
Drawing number: **03.0063**
Revision:
Format: A1
Weight: 0.00
SCALE: 1:5
SHEET: 1 OF 1



DETAIL A
SCALE 1 : 1



ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
6	4	gn_337-zd-30-30-a-2-sw	100420097	
5	1	03.0050	Cooling door assembly (back)	
4	16	M6 x 20 Hex. CS1K screw AZ DIN7991	51060.060.020	
3	4	03.0065	Fill plate	AISI 304
2	1	03.0047	Back door assembly	
1	1	03.0063	Sub ass. Electrical	Material <not specified>

Arm. Projection

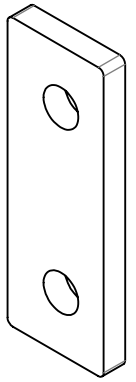
DIMENSIONS IN MILLIMETERS
DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

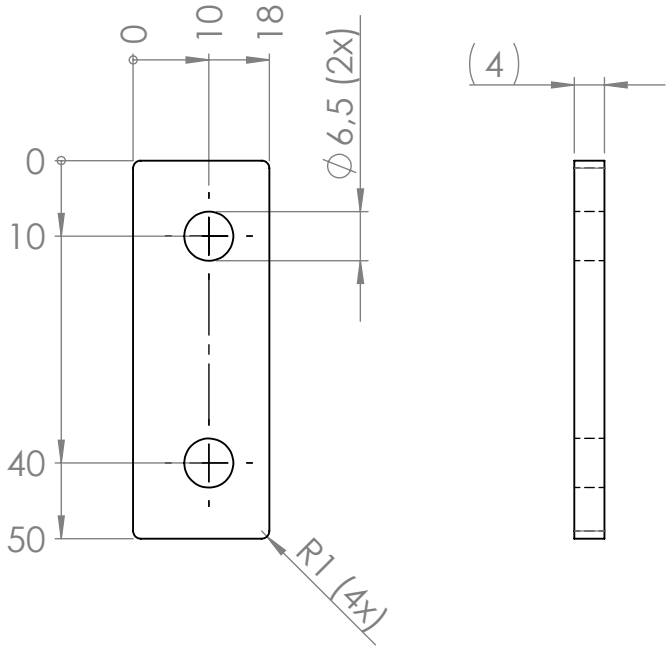
	Name	Signature	Date
Drawn:	S. Boudenijn		19-6-2019
Checked:			
Class:		Studentfirm	

SAXION

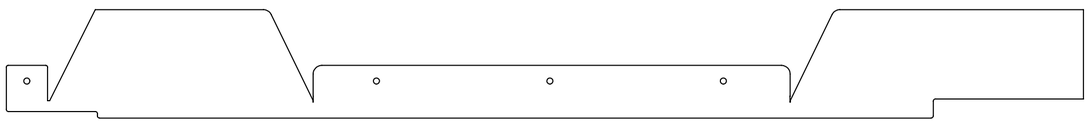
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Finish:
Material:
Description: **Sub ass. back + cooling door**
Drawing number: **03.0064**
Revision:
Format: A0
Weight: 0.00
SCALE: 1:12
SHEET: 1 OF 1

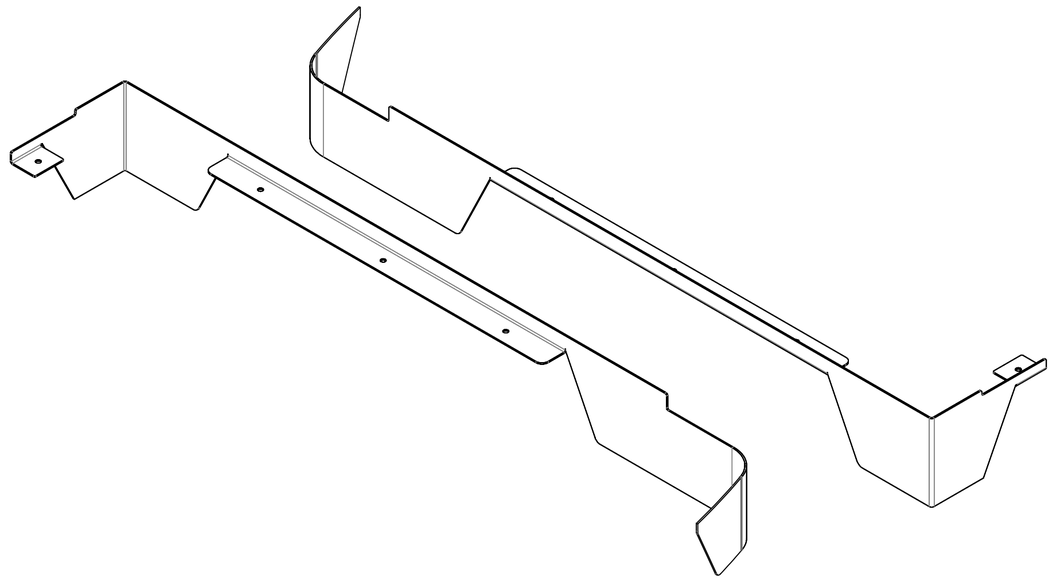


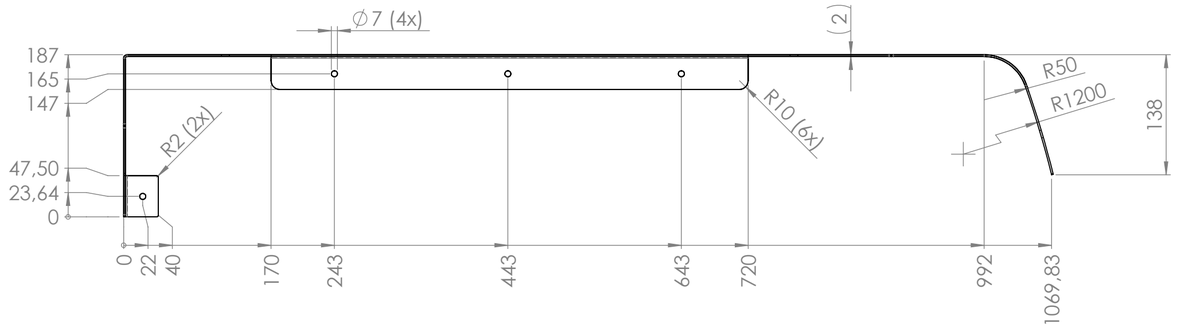


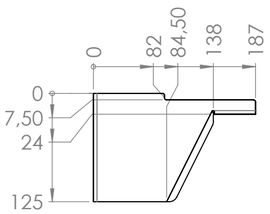
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Material: AISI 304
	Name / Signature / Date	SAXION	Description: **Fill plate**
Drawn:	S. Braakman / 16-6-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0065** / Revision: / Format A4
Checked:			Weight: 26.65 grams / SCALE: 1:1 / SHEET: 1 OF 1
Class:	SSS / StudentNo.		



For information (1:5).







Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
	Name	Signature	Date	Material: 1.0037 (S235JR)	
Drawn:	S. Braakman		17-6-2019	Description:	
Checked:				**Decorative base plate (R)**	
Class:		StudentNo.		Drawing number: **03.0068**	Revision: / Format A2
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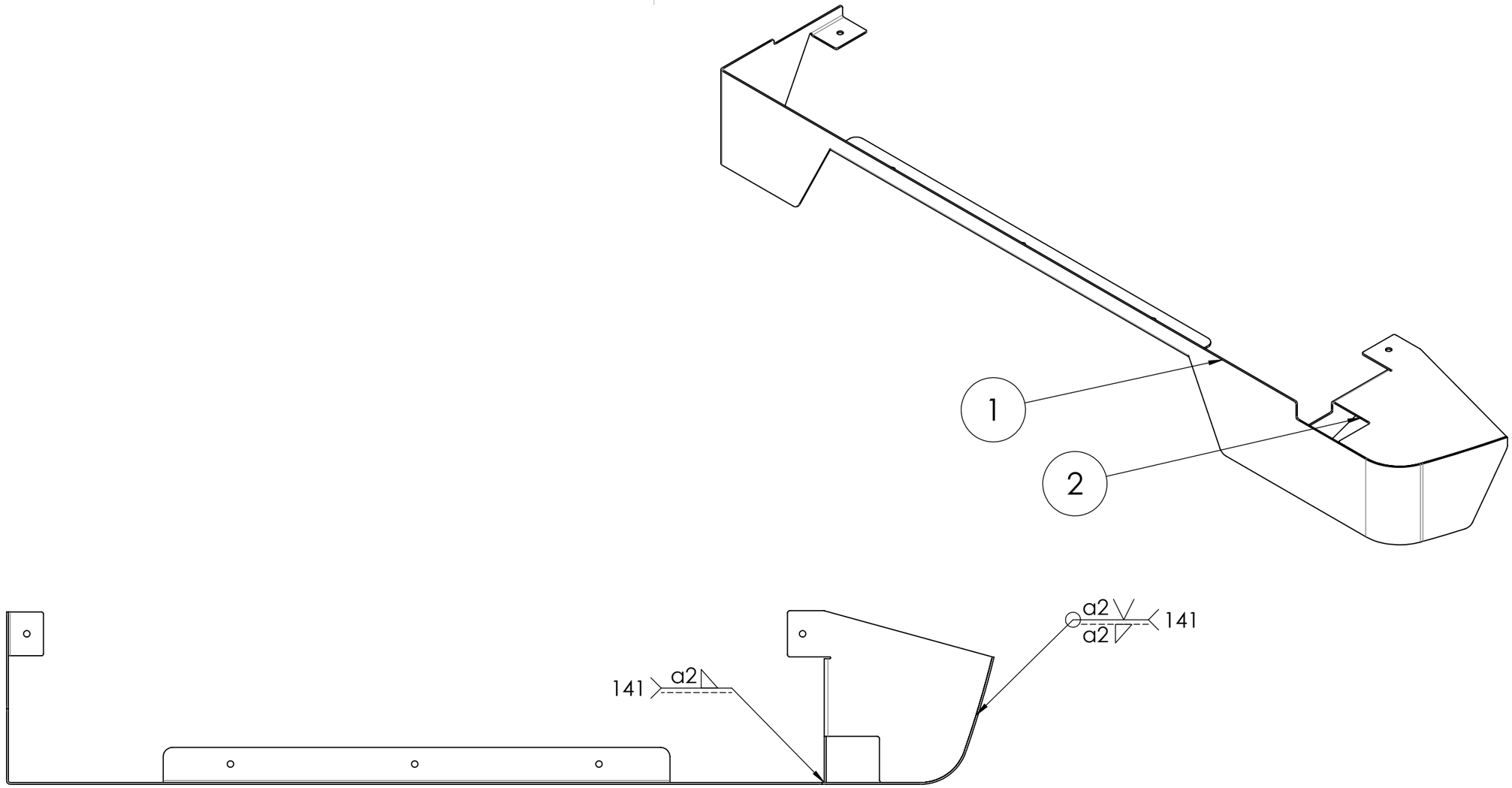


GRIND WELDS FLAT

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
2	1	03.0070	Support plate (L)	1.0037 (S235JR)
1	1	03.0025	Decorative base plate (L)	1.0037 (S235JR)

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish: Powdercoat (RAL9006)

Material: Material <not specified>

	Name	Signature	Date
Drawn:	S. Braakman		17-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:
Decorative base assembly (L)

Drawing number: **03.0069**

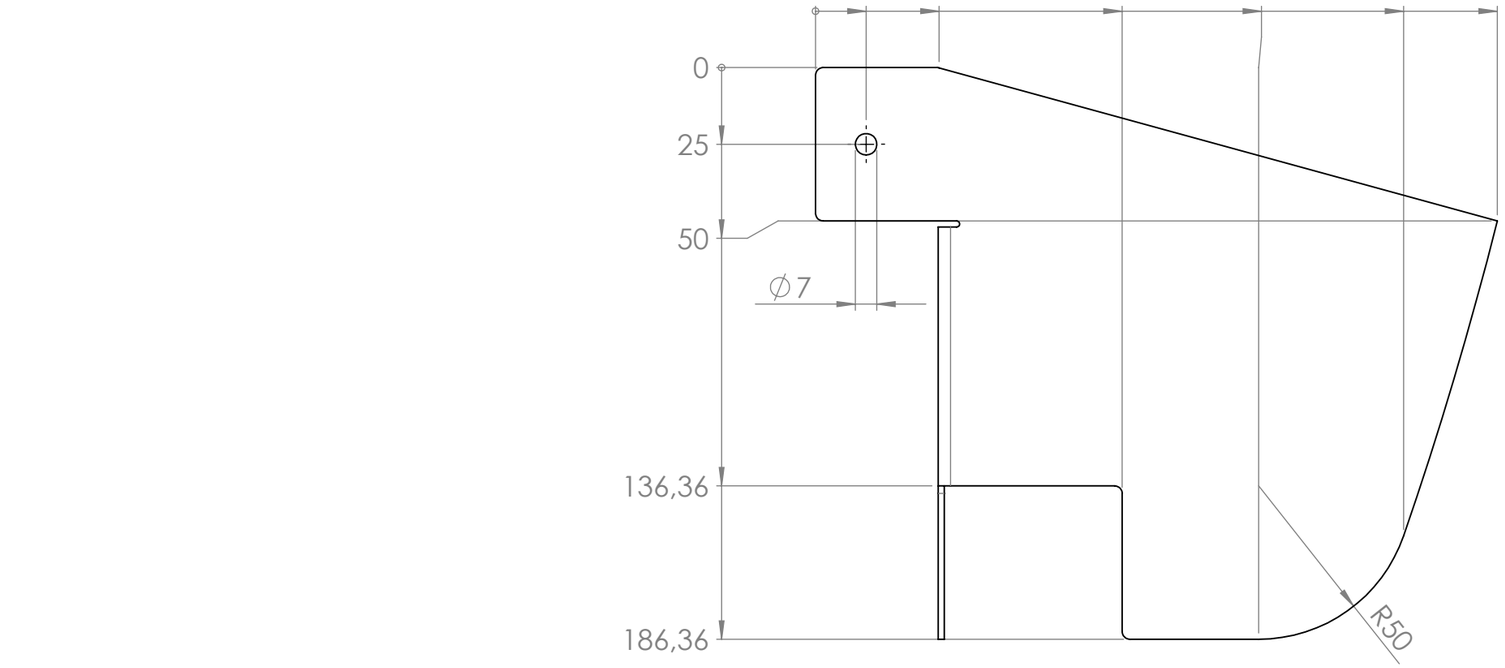
Revision:

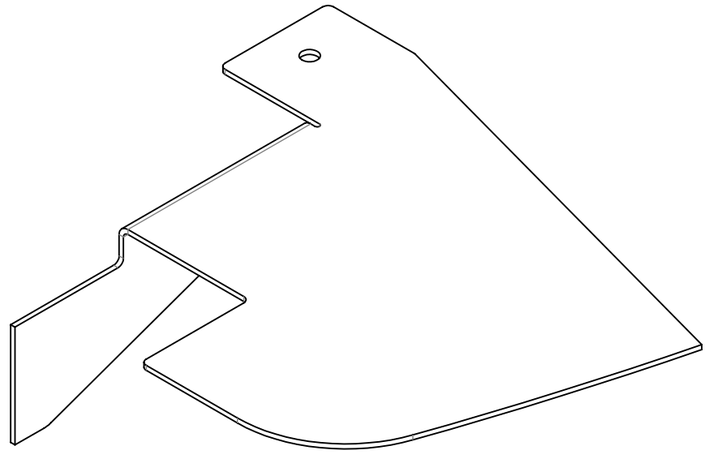
Format A3

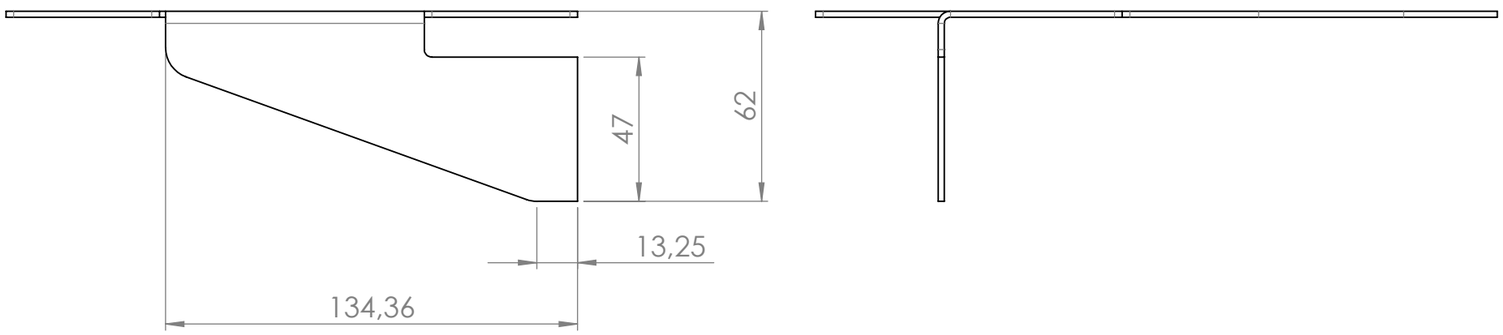
Weight: 2221.79

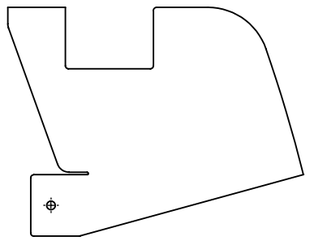
SCALE: 1:5

SHEET: 1 OF 1



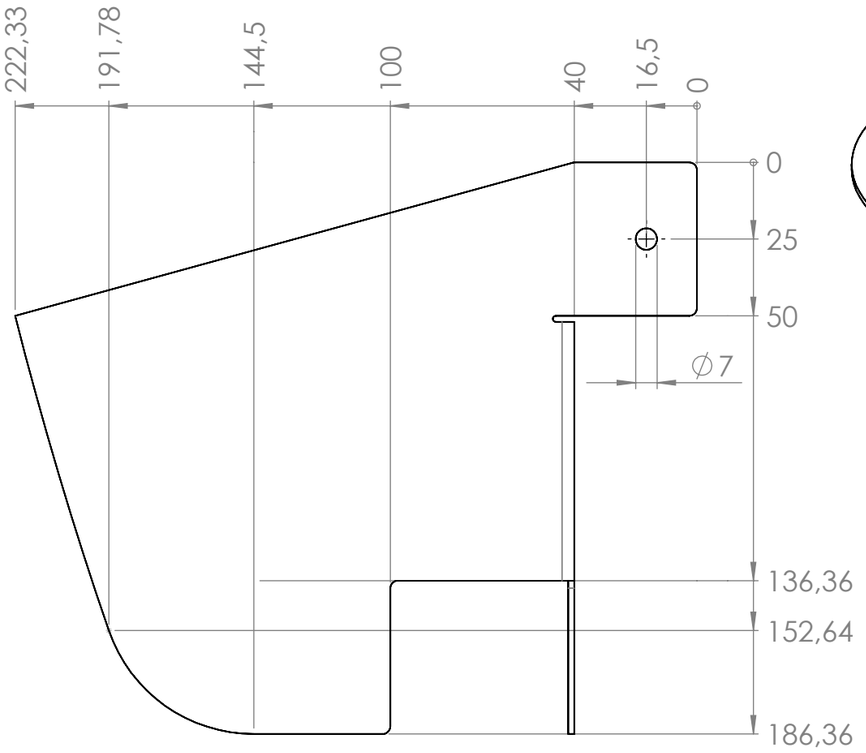


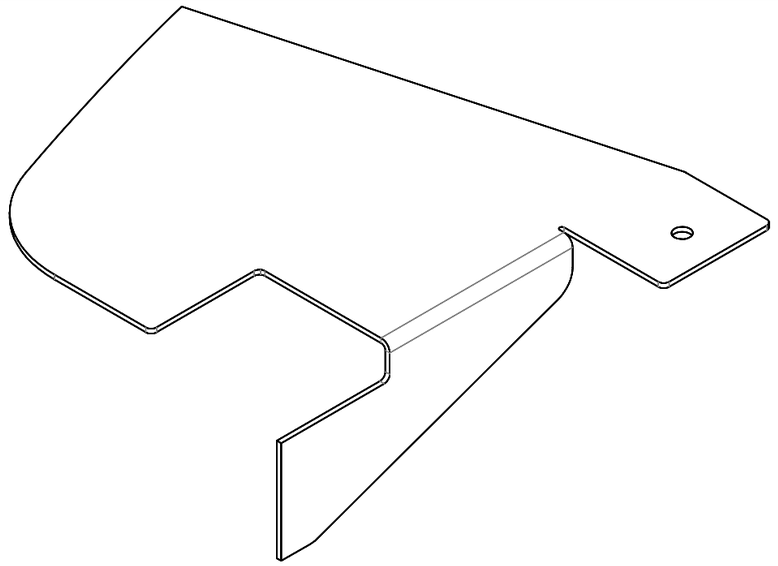


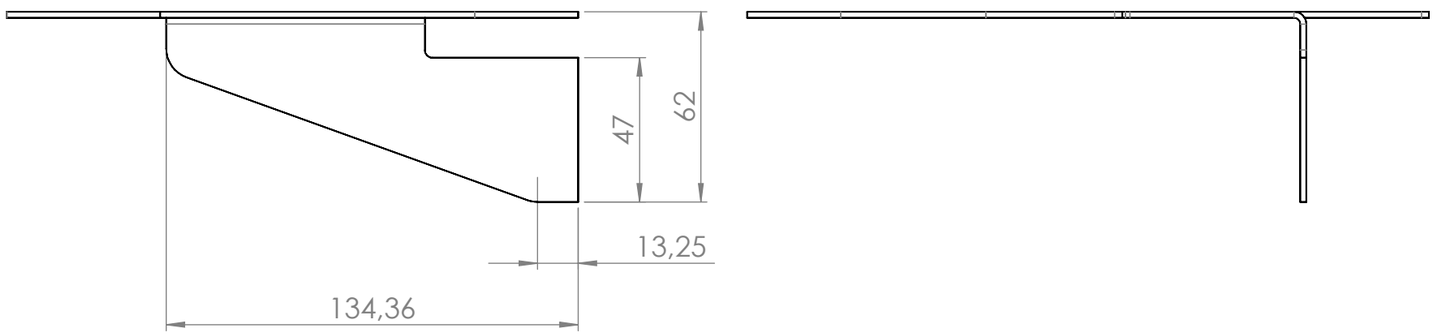


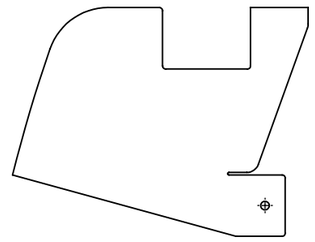
For information (1:5).

Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
					Material: 1.0037 (S235JR)
	Name	Signature	Date	SAXION	Description: **Support plate (L)**
Drawn:	S.Braakman		17-6-2019		
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0070** / Revision: / Format: A3
Class:	SSS	StudentNo.			Weight: 470.32 grams / SCALE: 1:2 / SHEET: 1 OF 1



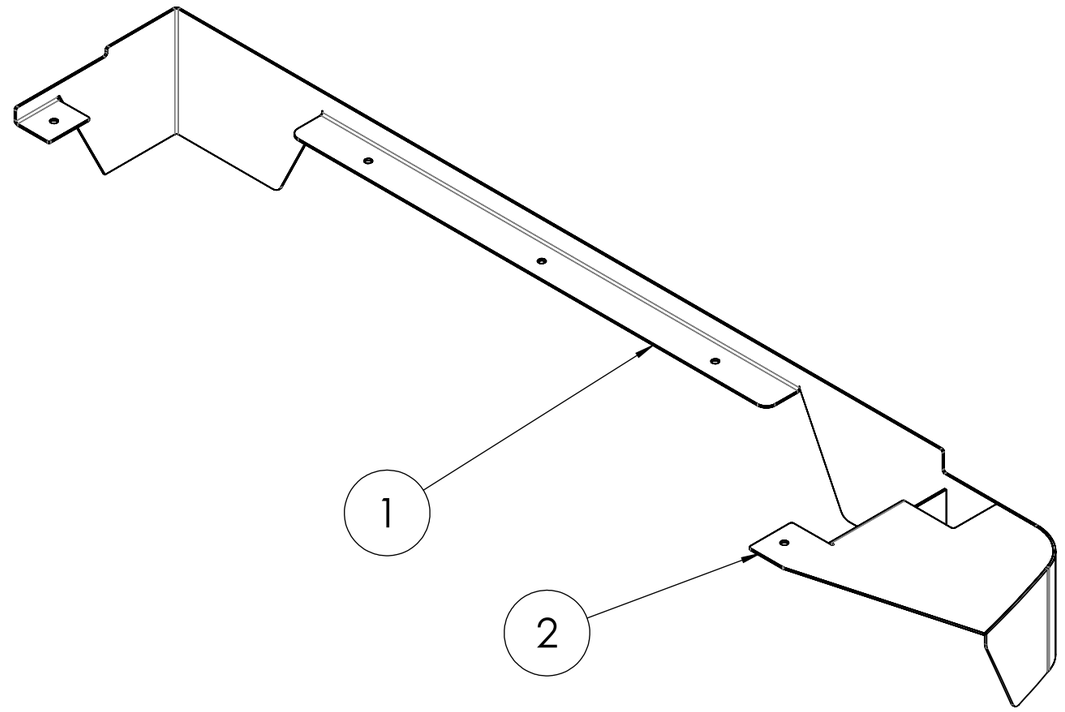


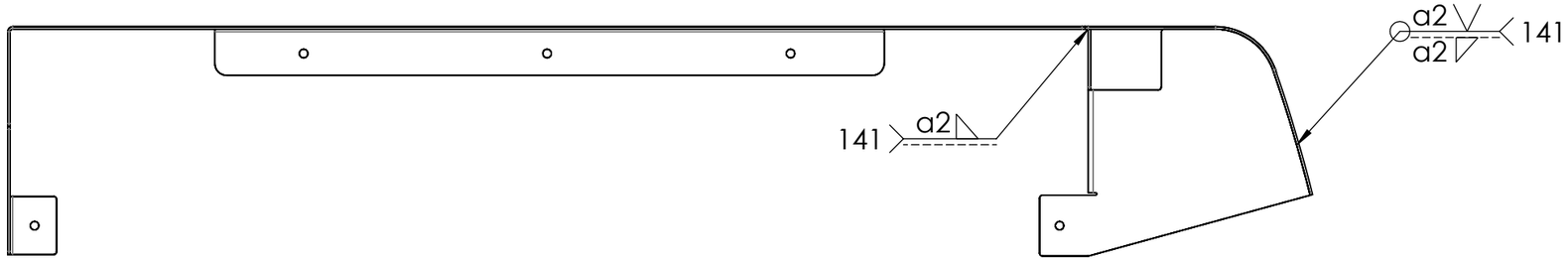




For information (1:5).

Am. Projection			DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
					Material: 1.0037 (S235JR)
	Name	Signature	Date	SAXION	Description: **Decortive plate (R)**
Drawn:	S. Braakman		17-6-2019		
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **03.0071** / Revision: / Format: A3
Class:	SSS	StudentNo.			Weight: 940.63 grams / SCALE: 1:2 / SHEET: 1 OF 1





ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
2	1	03.0071	Decortive plate (R)	1.0037 (S235JR)
1	1	03.0068	Decorative base plate (R)	1.0037 (S235JR)

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish: Powdercoat (RAL9006)

Material:

	Name	Signature	Date
Drawn:	S. Braakman		17-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:

Decorative plate assembly (L)

Drawing number: **03.0072**

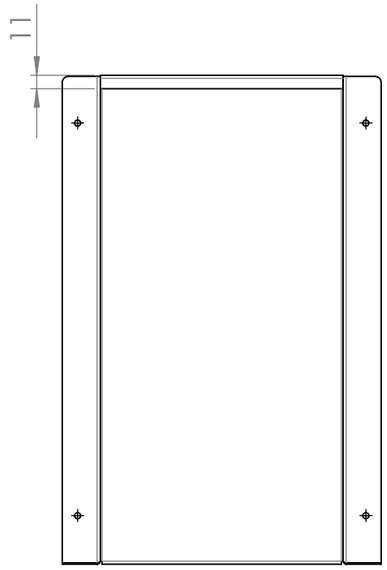
Revision:

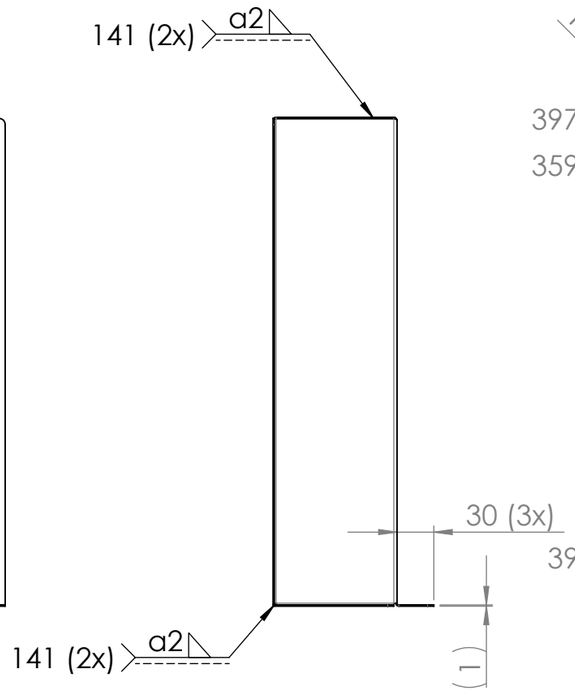
Format: A3

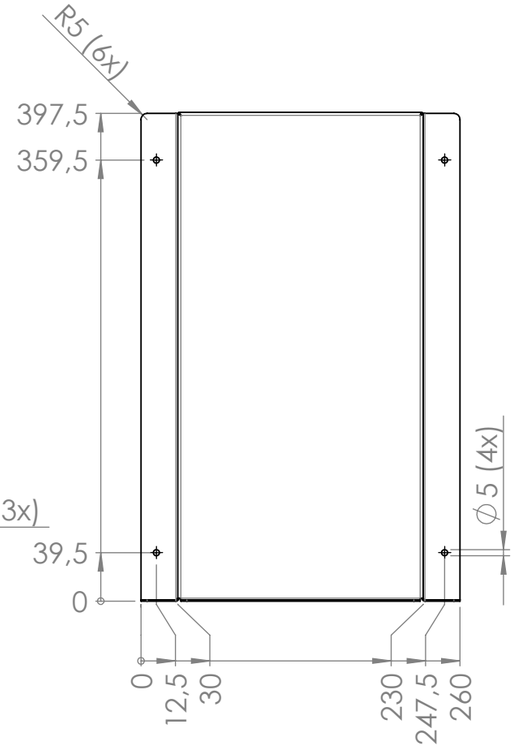
Weight: 4308.71

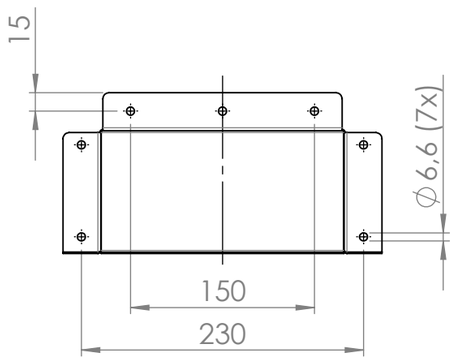
SCALE: 1:5

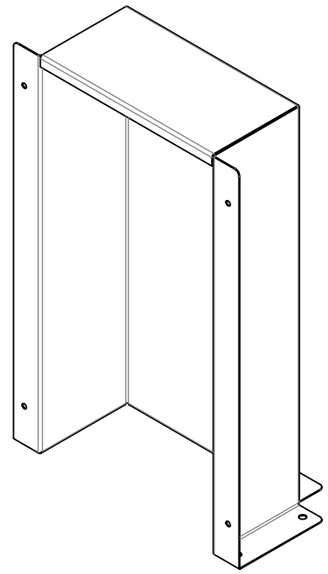
SHEET: 1 OF 1

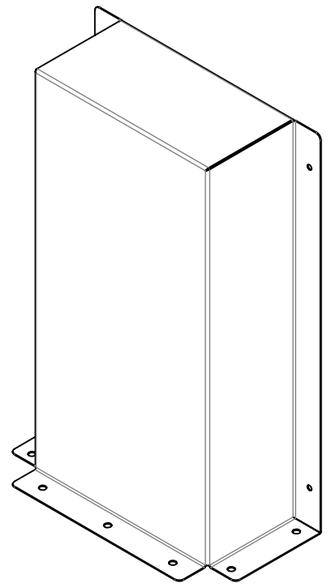


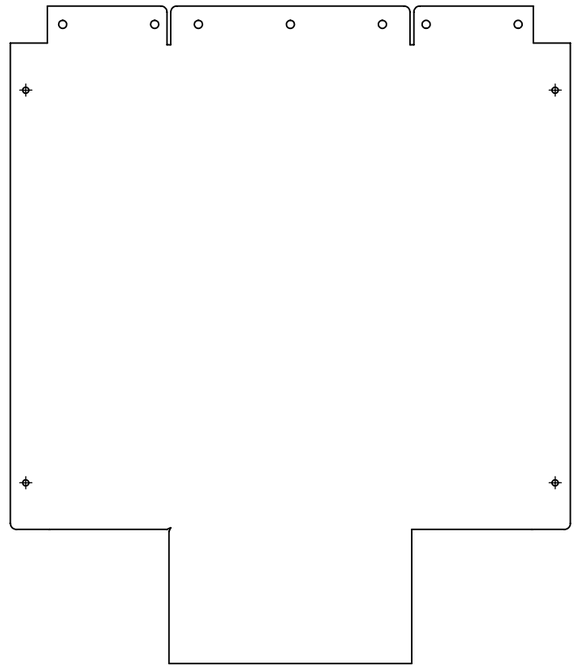










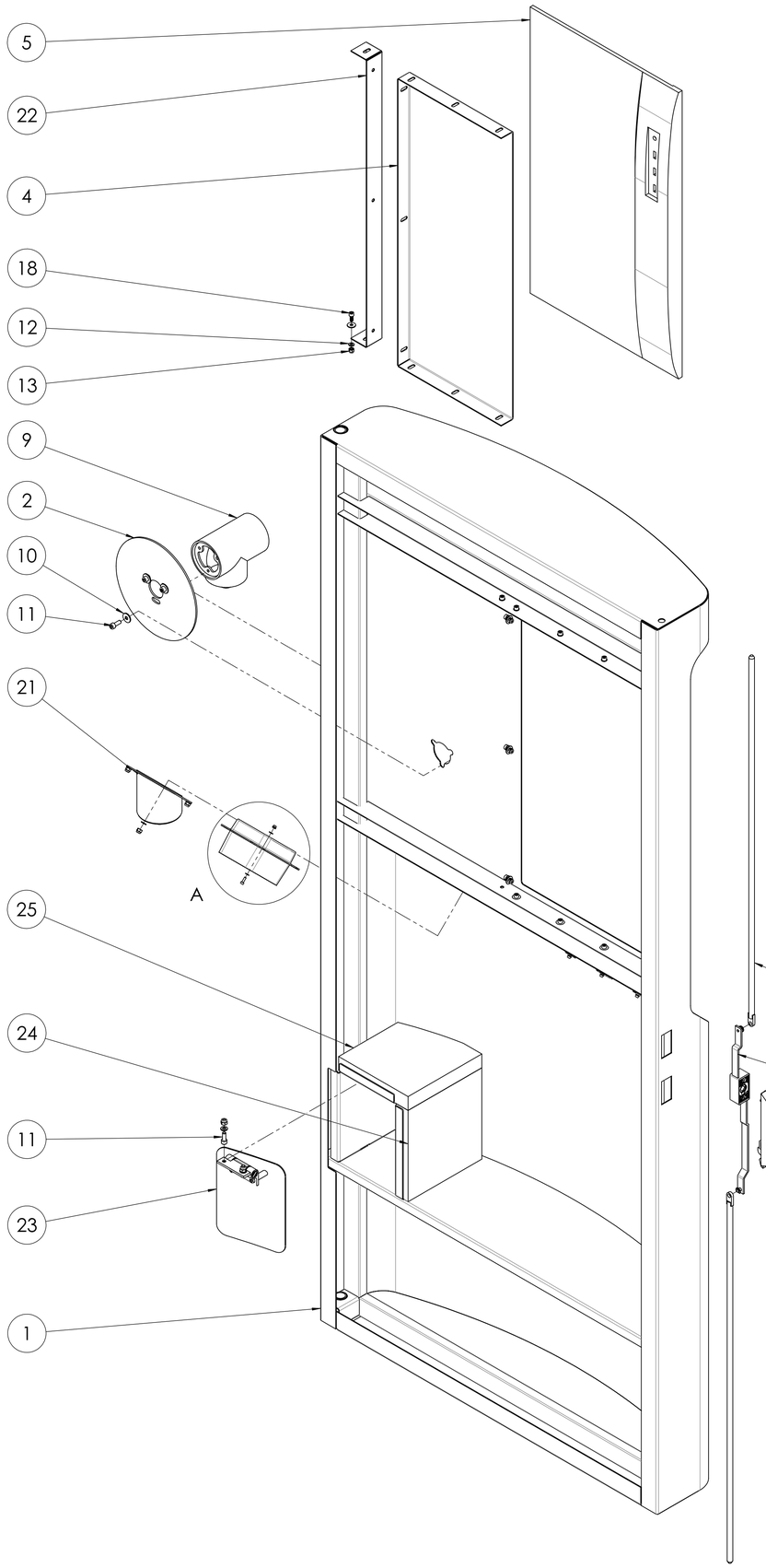


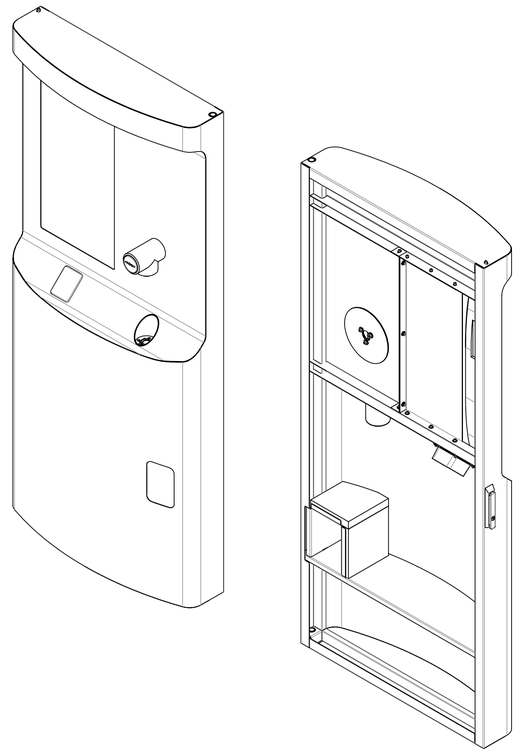
For information (1:5).

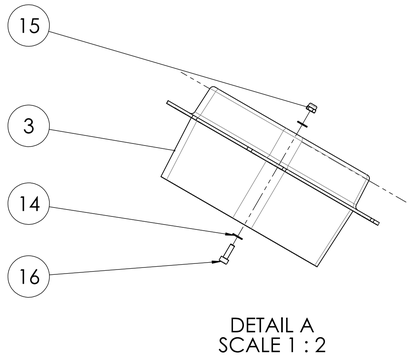
GRIND WELDS FLAT WITH R= ± 2.

Am. Projection				DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK
	Name	Signature	Date	SAXION	
Drawn:	S.Braakman		17-6-2019		
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	
Class:	SSS	StudentNo.			

Finish: Soda blasting			
Material: AISI 304			
Description: **Air exhaust**			
Drawing number: **03.0073**	Revision:	Format A3	
Weight: 1712.12 grams	SCALE: 1:5	SHEET: 1 OF 1	







DETAIL A
SCALE 1 : 2

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
25	1	PIR.0016	PIR 2-sided Aluminum 1200x600x40mmRd: 1.81 12pl / pack (= 8.64 m²)	
24	1	PIR.0015	PIR 2-sided Aluminum 1200x600x40mmRd: 1.81 12pl / pack (= 8.64 m²)	
23	1	04.0022	Closing plate assembly	
22	1	04.0401	Bracket	
21	1	04.0014	Drain assembly	
20	2	M6 Hex lock nut A2	51730.060.001	
19	2	M6 Washer A2	51420.060.001	
18	11	M5 x 12 Hex. socket screw A2	51050.050.012	
17	11	M5 Big Washer A2	51530.050.001	
16	4	M3 x 10 Hex. socket screw A2	51050.030.010	
15	4	M3 Hex lock nut A2	51730.030.001	
14	8	M3 Washer A2	51420.030.001	
13	15	M5 Hex lock nut A2	51730.050.001	
12	15	M5 Washer A2	51420.050.001	
11	5	M6x16 Hex. socket screw A2	51050.060.016	
10	3	M6 Big washer DIN9021 A2	51530.060.001	
9	1	04.0903	JTP Kraan assembly	
8	2	04.0310	Closing pin assembly	
7	1	Rod controls CAR-M-347(0)	Rod controls	
6	1	Latches with handle CLT 160(0)	Door handle with lock	
5	1	27inch Screen	HP	
4	1	04.0402	Bracket	
3	1	Payter P66	Payter P66 wall mount contactless	
2	1	04.0009	Mouting plate	AISI 304
1	1	04.0010	Door weld-assembly	

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material: Material <not specified>

	Name	Signature	Date
Drawn:	S. Brand		5-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:

Door assembly

Drawing number: **04.0001**

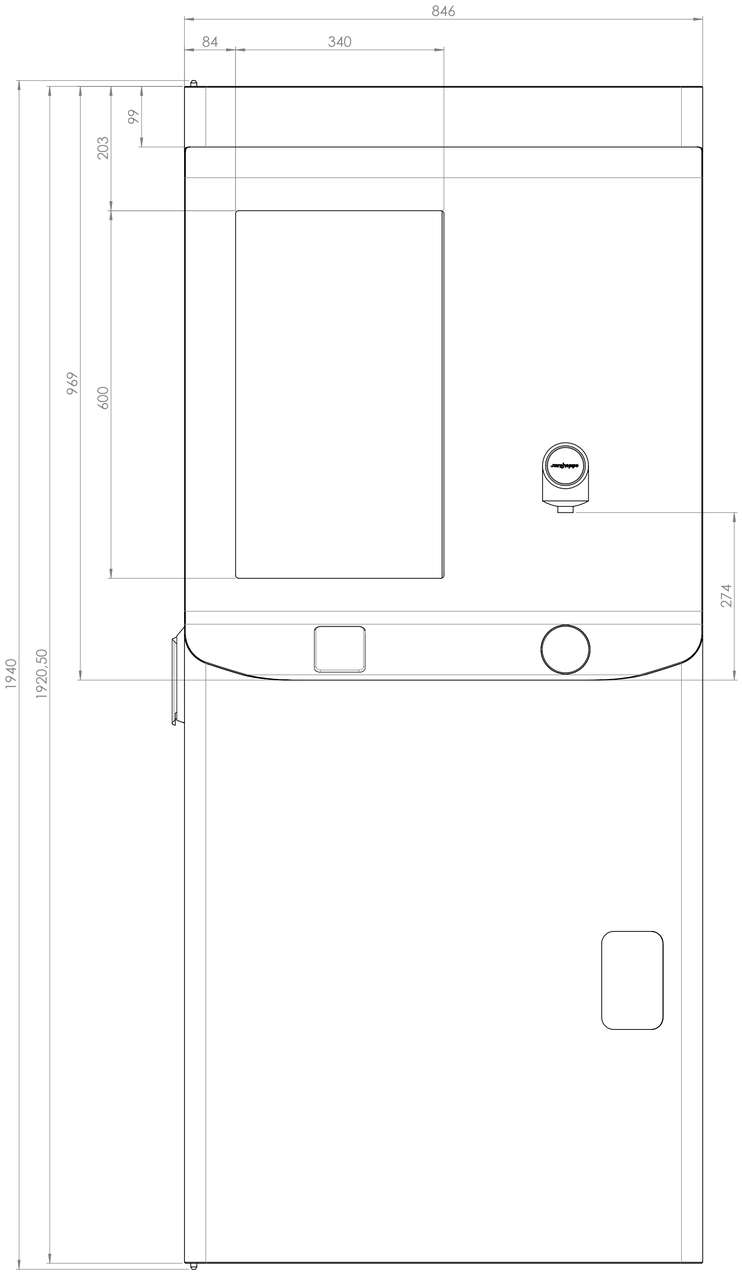
Revision:

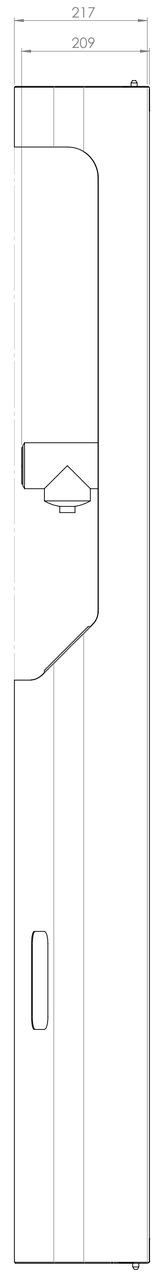
Format: A1

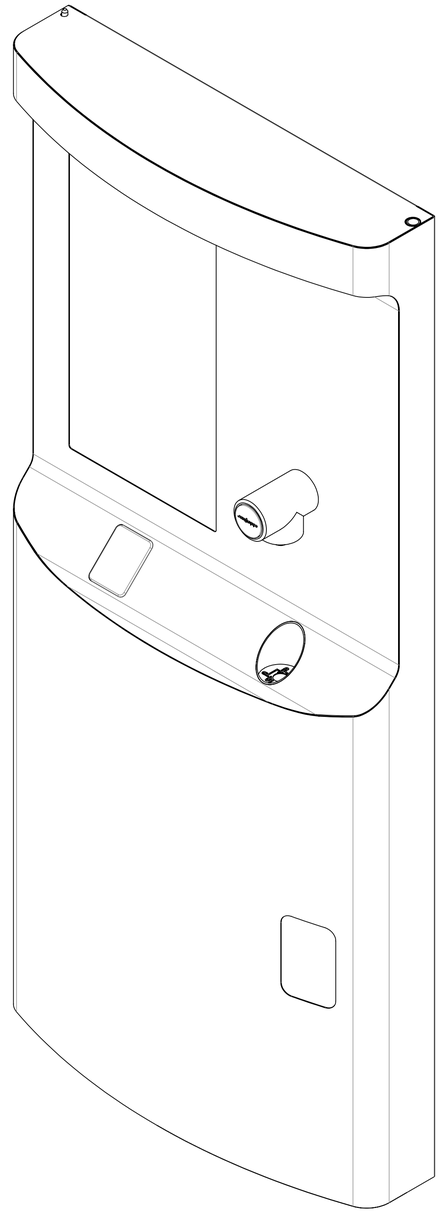
Weight: 0.00

SCALE: 1:5

SHEET: 1 OF 2

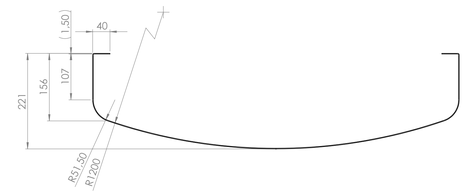


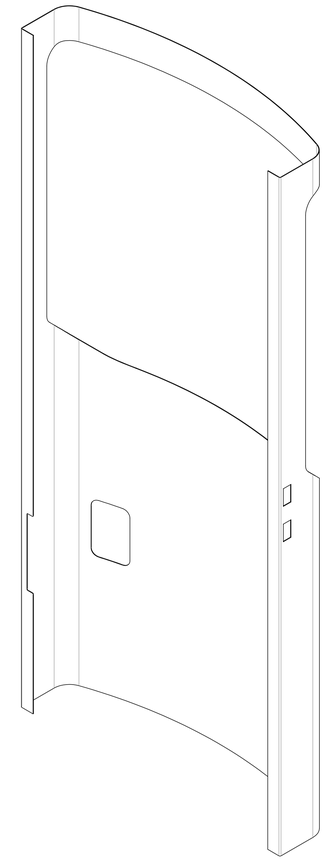


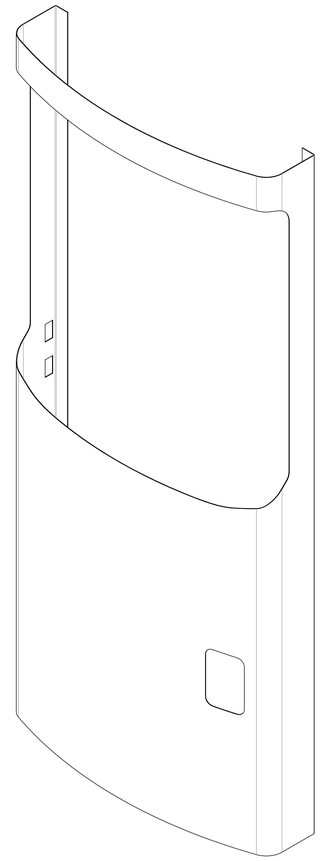


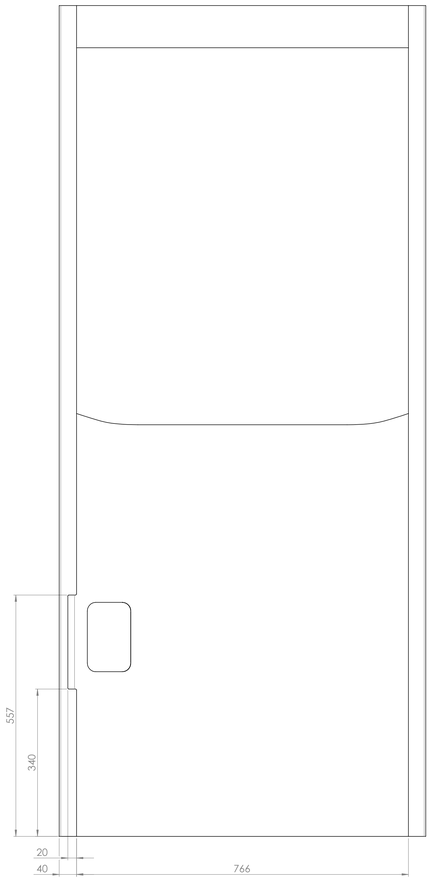
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
				Material: Material <not specified>	
	Name	Signature	Date	Description:	
Drawn:	S. Brand		5-6-2019	**Door assembly**	
Checked:				Drawing number: **04.0001**	Revision:
Class:	SSS	StudentNo.		Weight: 0,00	Format: A1
				SCALE: 1:5	SHEET: 2 OF 2

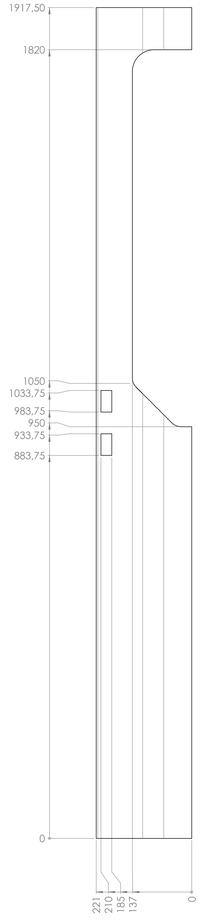
SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

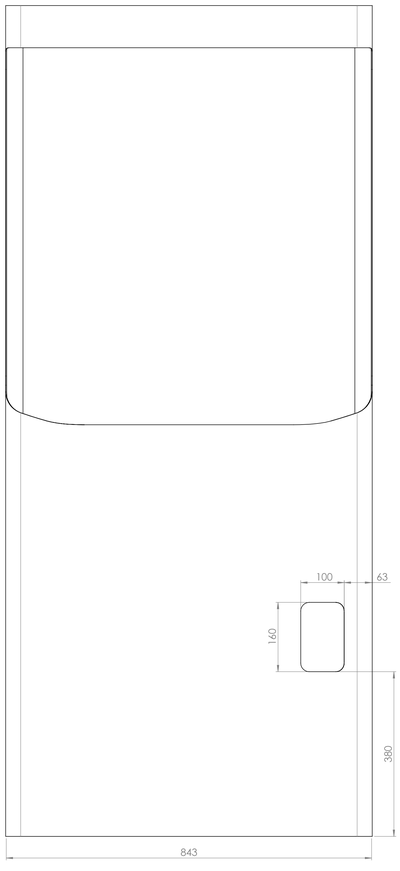


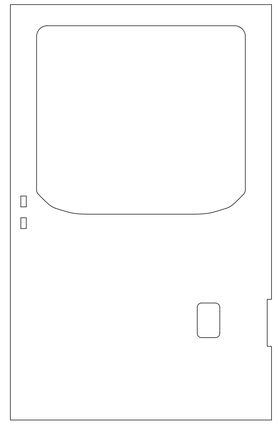










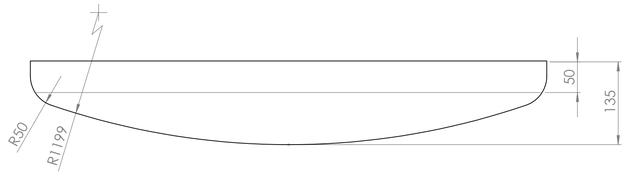


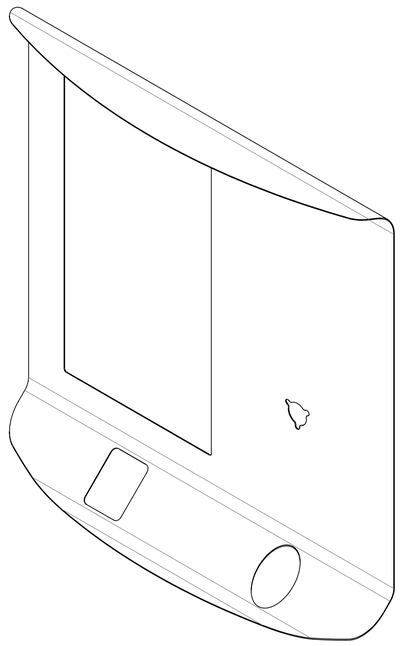
For information (1:10).

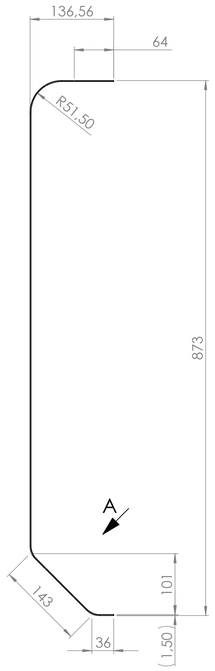
Arn. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
	Name	Signature	Date	Material: 1.0037 (S235JR)	
Drawn:	L. Brand		17-6-2019	Description:	
Checked:				**Front door plate**	
Class:		StudentNo.		Drawing number: **04.0002**	Revision: / Format: A0
				Weight: 17124.89 grams	SCALE: 1:10 / SHEET: 1 OF 1

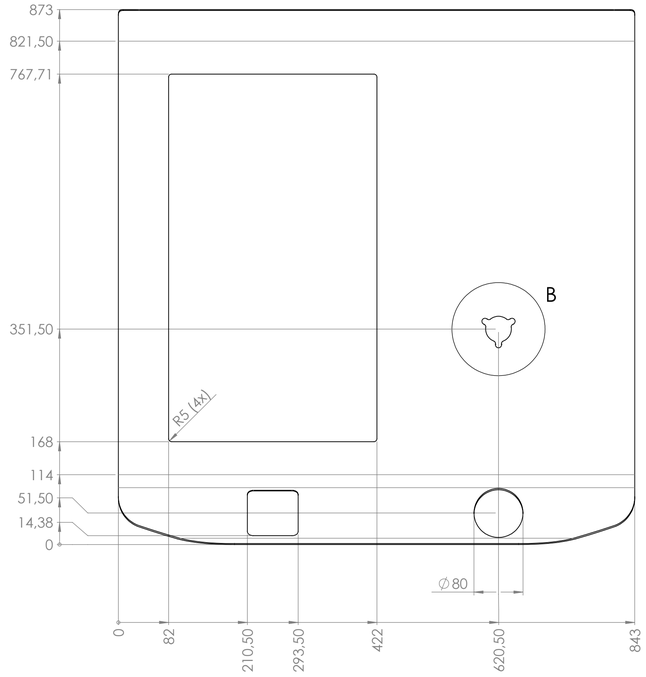
SAXION

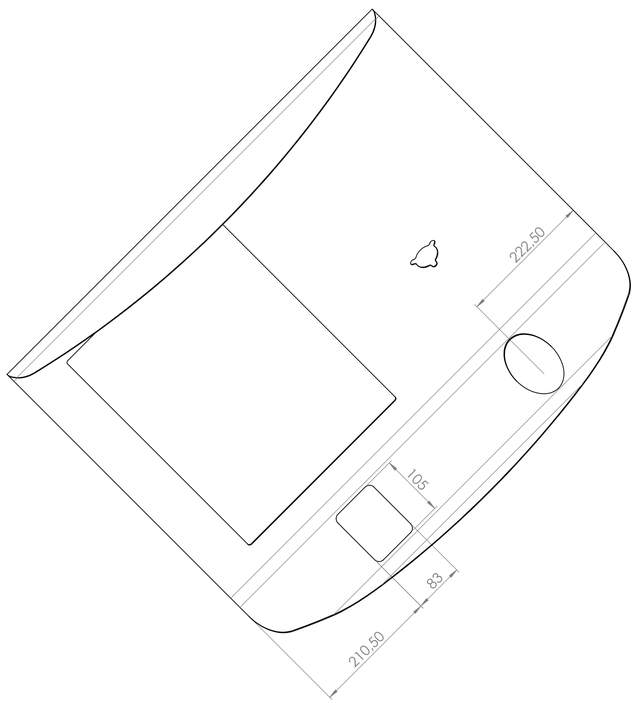
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 70300, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl



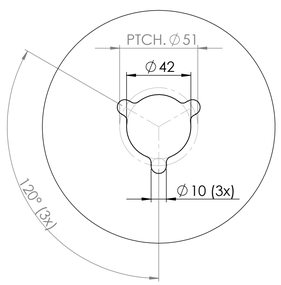




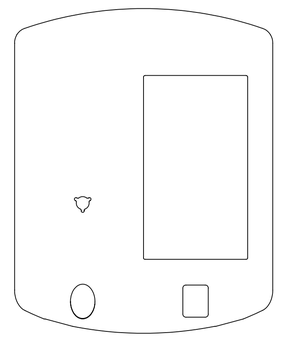




VIEW A



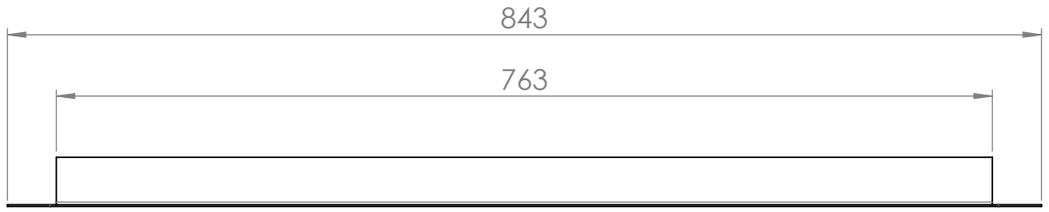
DETAIL B
SCALE 1 : 2

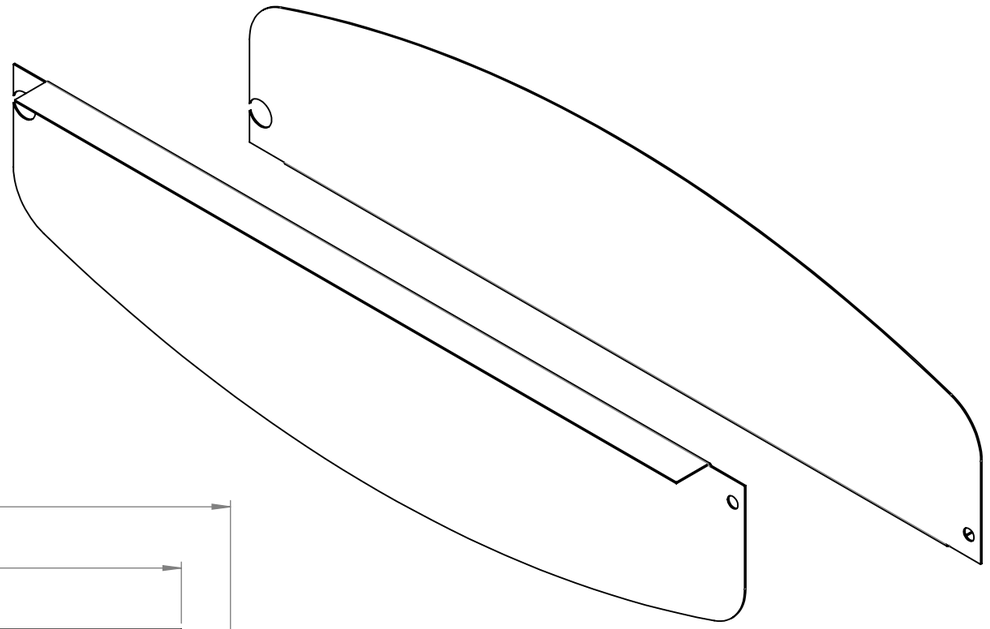


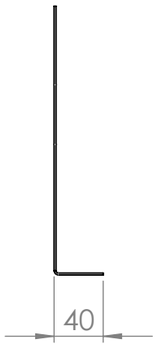
For information (1:10).

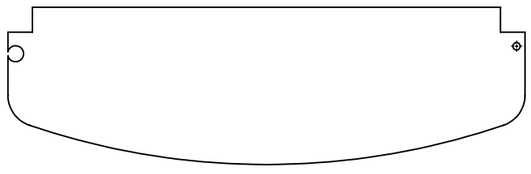
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
				Material: 1.0037 (S235JR)	
	Name	Signature	Date	Description:	
Drawn:	S. Brand		17-6-2019	**Front panel**	
Checked:				Drawing number: **04.0003**	Revision:
Class:	SSS	Studentno.		Weight: 7332.53 grams	Format: A1
				SCALE: 1:5	SHEET: 1 OF 1

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl



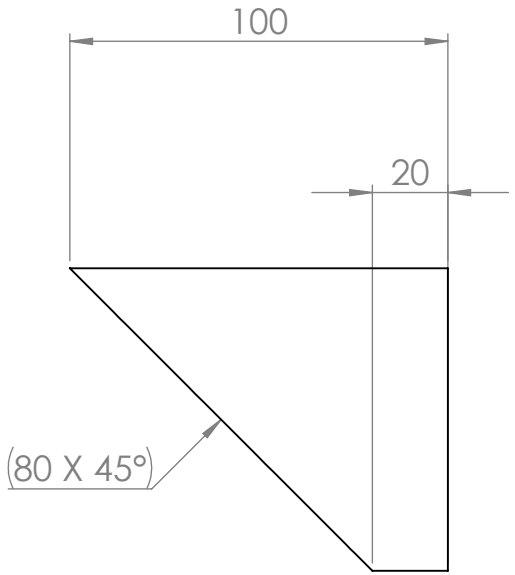


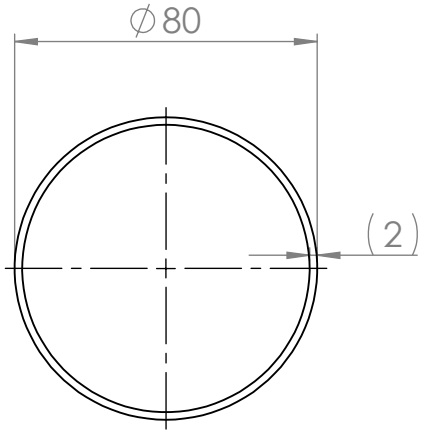


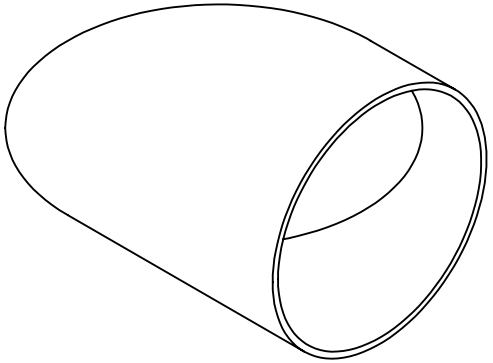


For information (1:10).

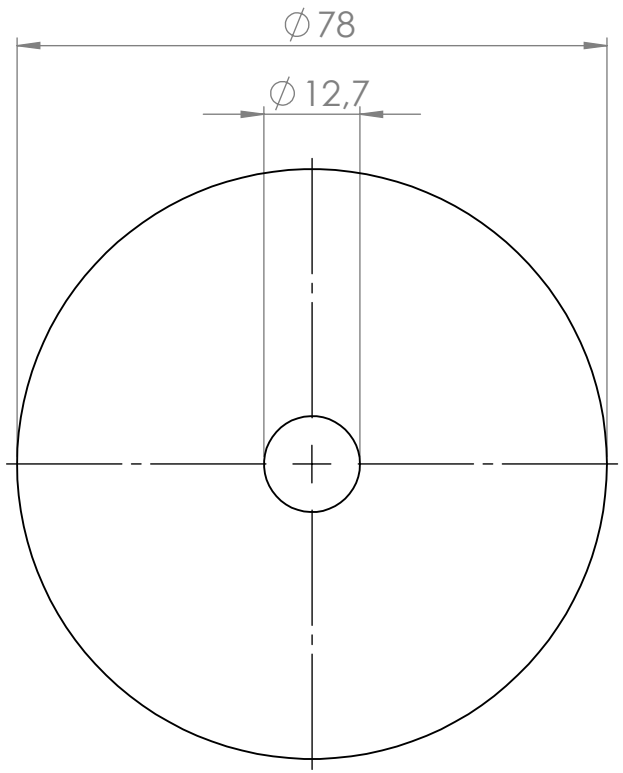
Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
					Material: 1.0037 (S235JR)
	Name	Signature	Date	SAXION	Description: **Bottom plate**
Drawn:	S. Brand		17-6-2019		
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0004** / Revision: / Format A3
Class:	SSS	StudentNo.			
					Weight: 2228.91 grams / SCALE: 1:5 / SHEET: 1 OF 1

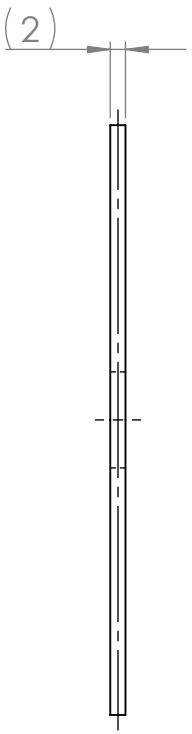


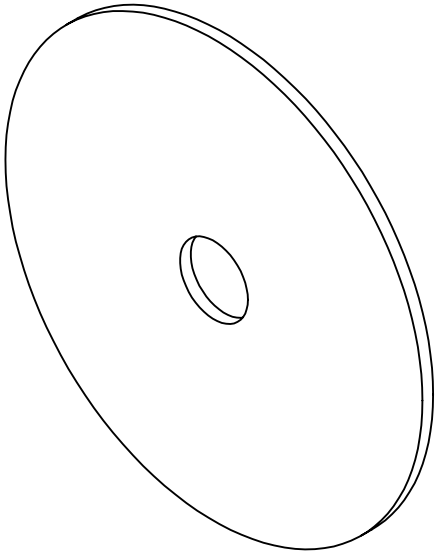




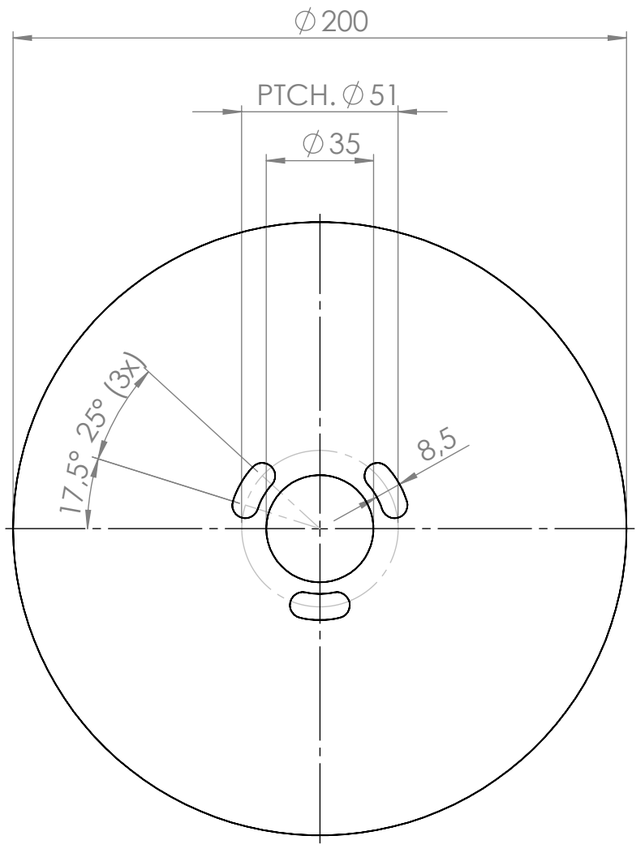
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Material: AISI 304
	Name / Signature / Date	SAXION	Description: **Drain pipe**
Drawn:	S.Brand / 17-6-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0007** / Revision: / Format A4
Checked:			Weight: 235.24 grams / SCALE: 1:2 / SHEET: 1 OF 1
Class:	SSS / StudentNo.		

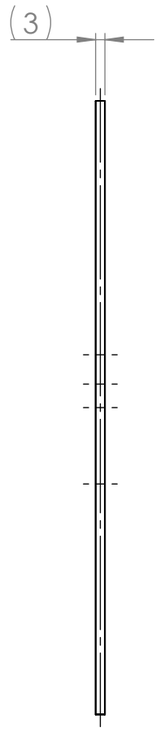


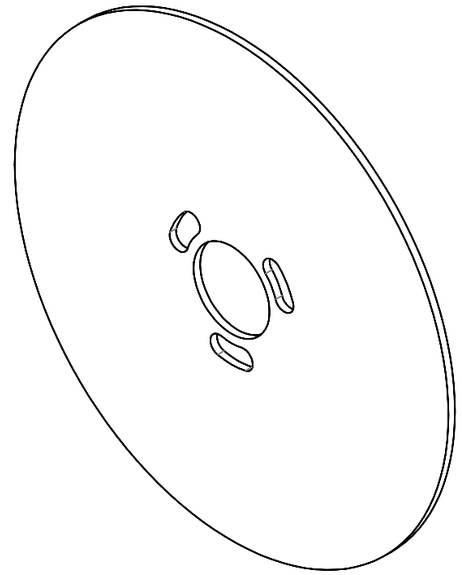




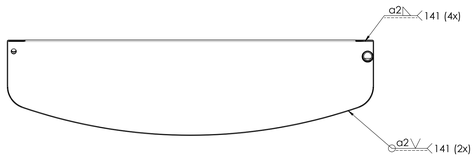
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Material: AISI 304
	Name / Signature / Date	SAXION	Description: **Plate**
Drawn:	S.Brand / 17-6-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0008** / Revision: / Format A4
Checked:			Weight: 74.43 grams / SCALE: 1:1 / SHEET: 1 OF 1
Class:	SSS / StudentNo.		

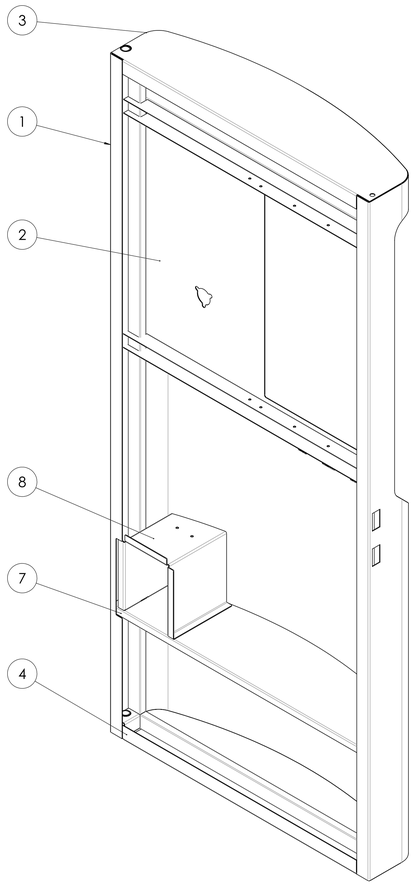


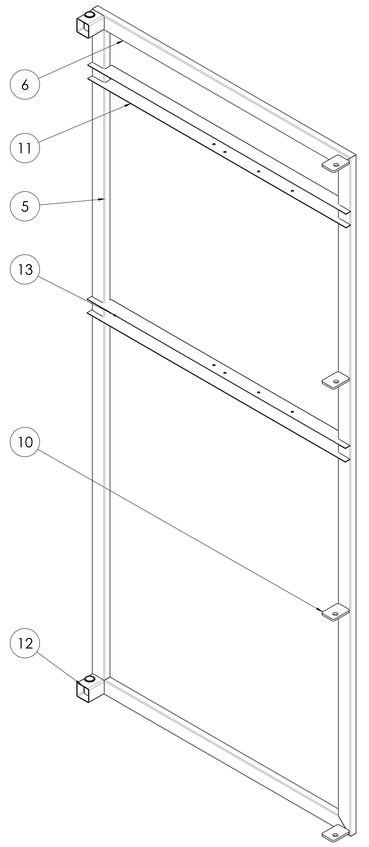


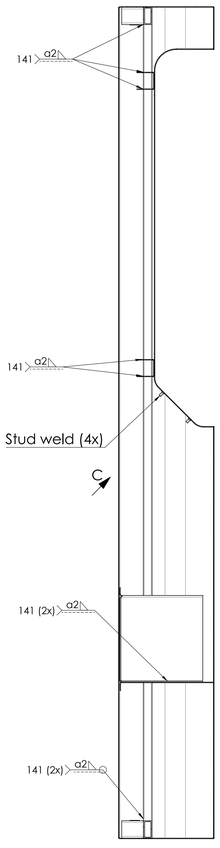


Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:		
				Material: AISI 304		
	Name / Signature / Date	SAXION		Description: **Mouting plate**		
Drawn:	S. Brand / 17-6-2016	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl		Drawing number: **04.0009**	Revision:	Format A3
Checked:						
Class:	SSS / StudentNo.			Weight: 1439.99 grams	SCALE: 1:2	SHEET: 1 OF 1

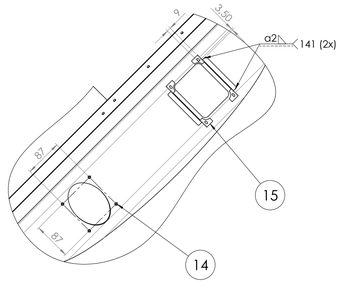




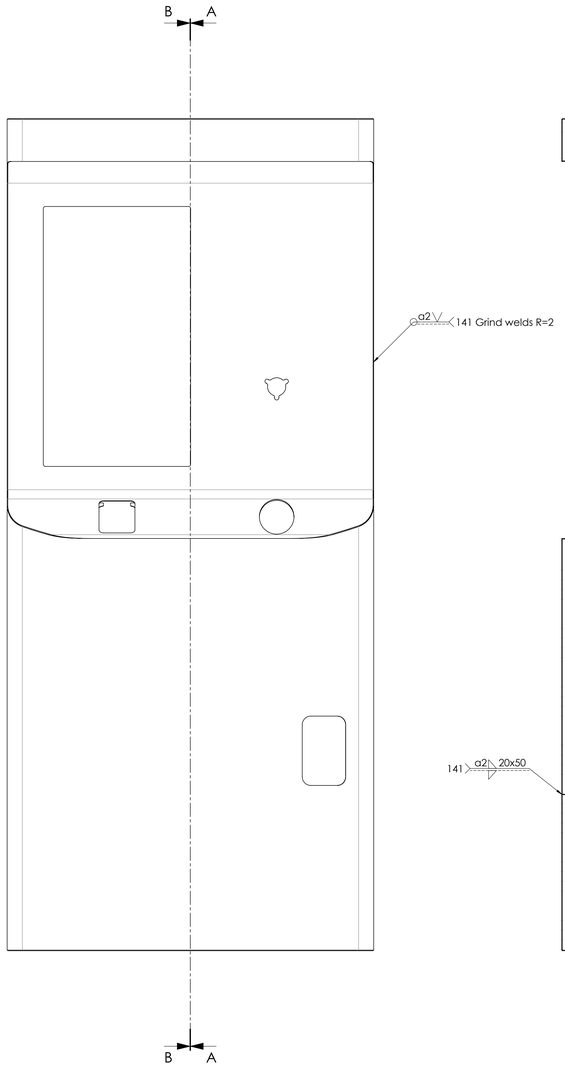


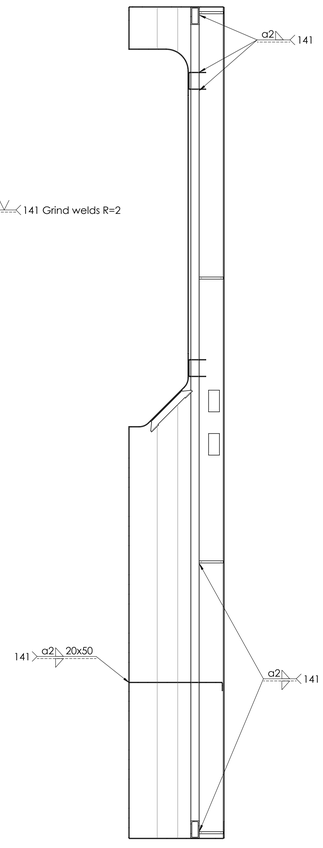


VIEW C



SECTION B-B





SECTION A-A

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
15	2	04.0016	Payter (P66) mount	1.0037 (S235JR)
14	4	WUERTH_44775_20_welded_stud_PT_M5x10_Blank	Welded stud M5x20	Stainless steel A2
13	1	04.0403	Plate	AISI 304
12	2	04.0200	Hinge assembly	
11	1	04.0400	Plate	AISI 304
10	2	04.0305	Plate	AISI 304
9	2	04.0304	Plate	AISI 304
8	1	04.0106	Bottle output	1.0037 (S235JR)
7	1	04.0103	Plate	1.0037 (S235JR)
6	2	04.0102	Tube 40x20x2	1.0037 (S235JR)
5	2	04.0101	Tube 40x20x2	1.0037 (S235JR)
4	1	04.0012	Top plate	1.0037 (S235JR)
3	1	04.0004	Bottom plate	1.0037 (S235JR)
2	1	04.0003	Front panel	1.0037 (S235JR)
1	1	04.0002	Front door plate	1.0037 (S235JR)

Arm. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

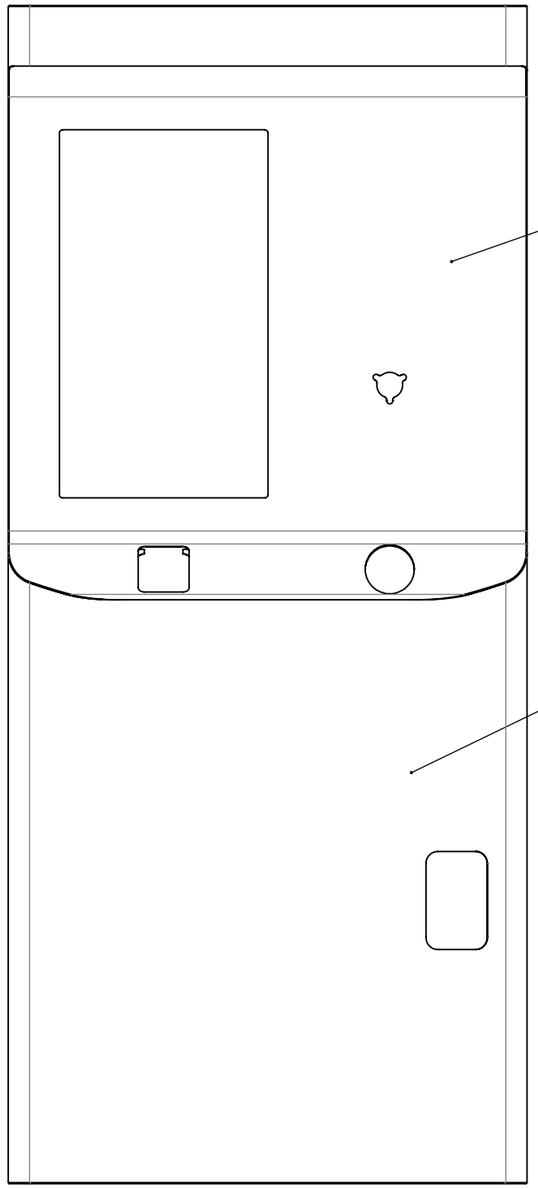
	Name	Signature	Date
Drawn	S. Brand		17-6-2019
Checked			
Class		Student No.	

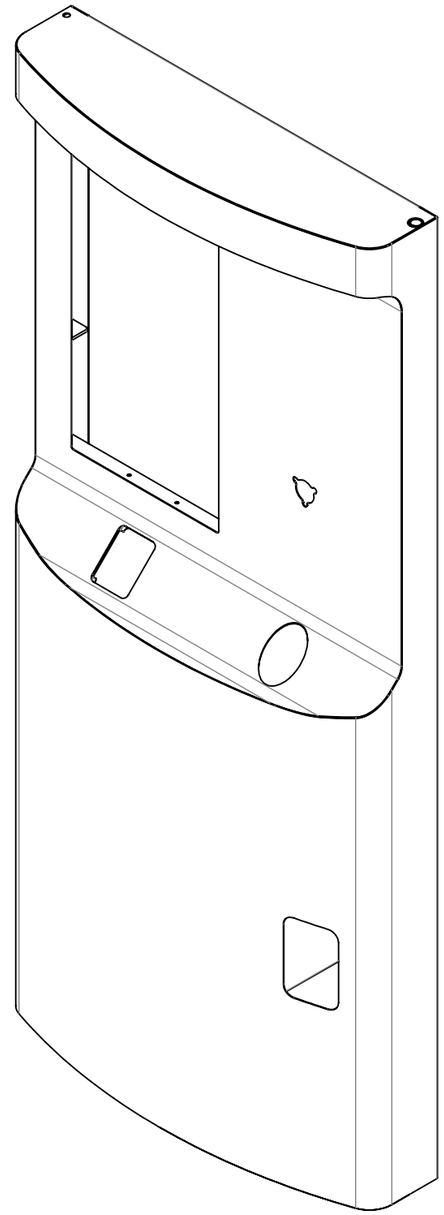
Finish: See sheet
Material:
Description:

Door weld-assembly

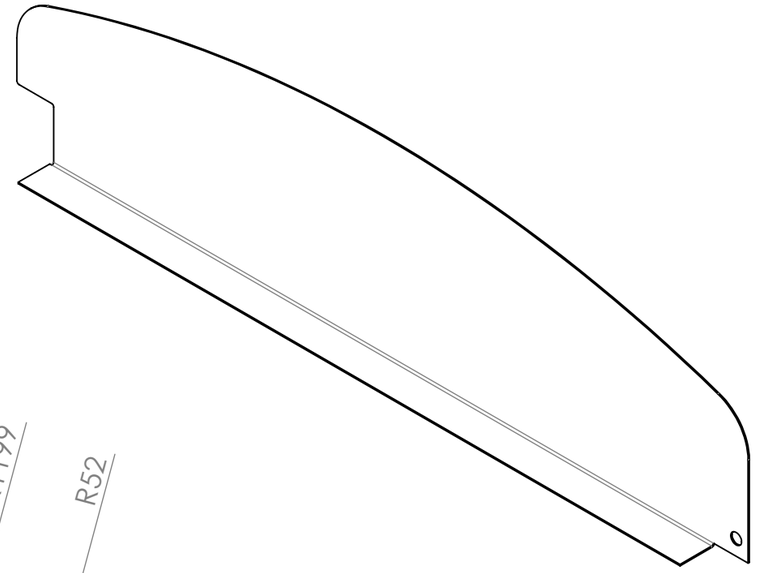
SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 70000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

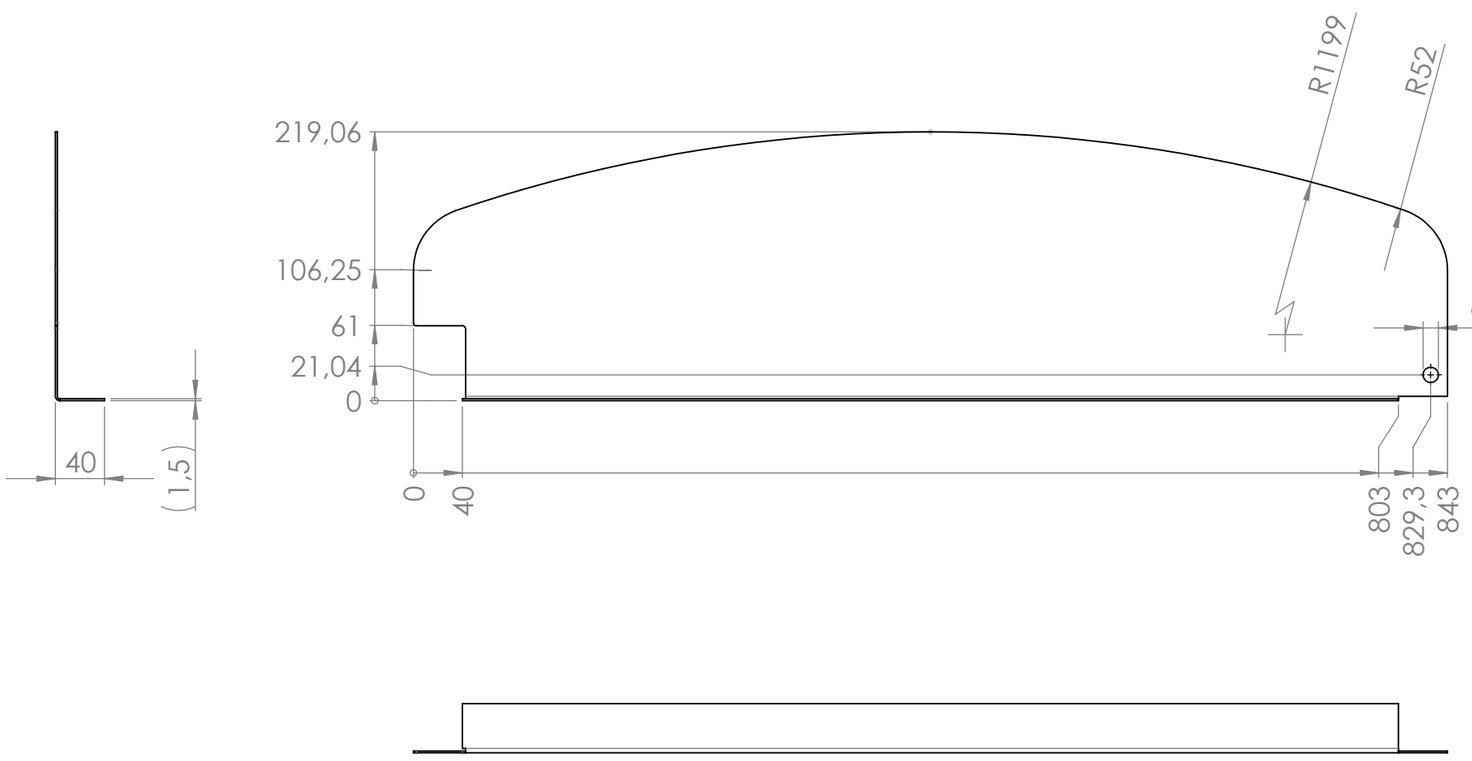
Drawing number: **04.0010**
Revision: AD
Format: A0
Weight: 0.00
SCALE: 1:5
SHEET: 1 OF 2



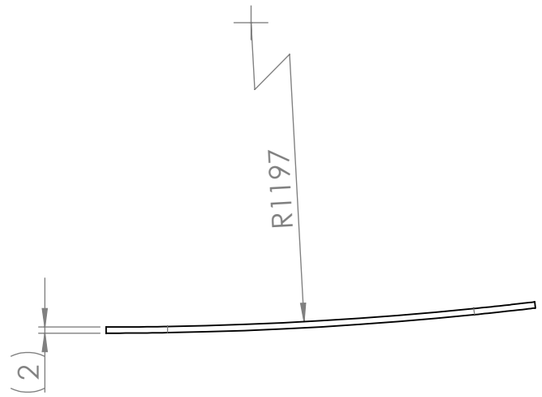


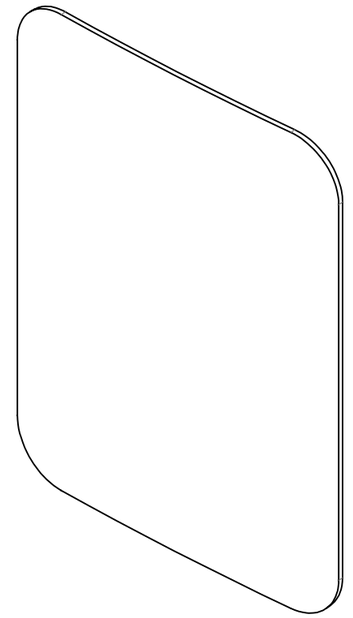
Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: See sheet	
					Material:	
	Name	Signature	Date	SAXION	Description: **Door weld-assembly**	
Drawn:	S. Brand		17-6-2019			
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0010**	Revision: / Format: A3
Class:	SSS	StudentNo.			Weight: 0.00	SCALE: 1:10 / SHEET: 2 OF 2

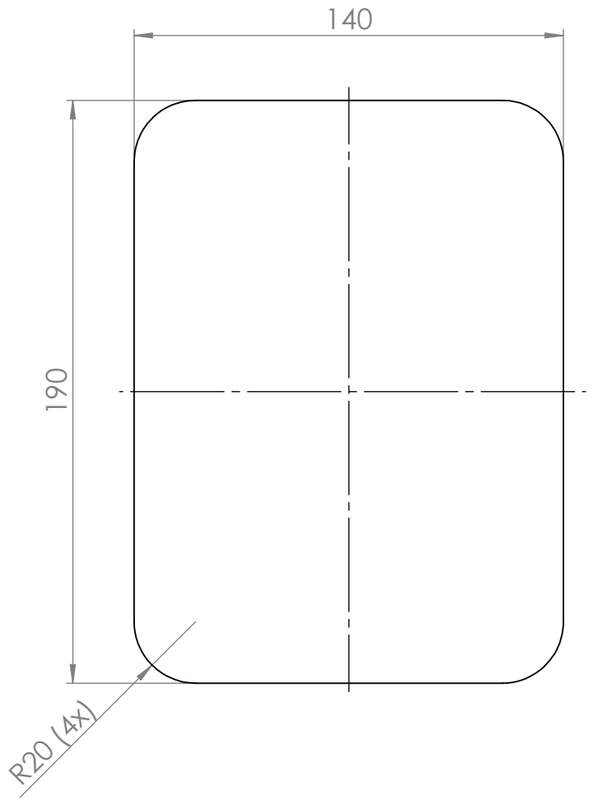




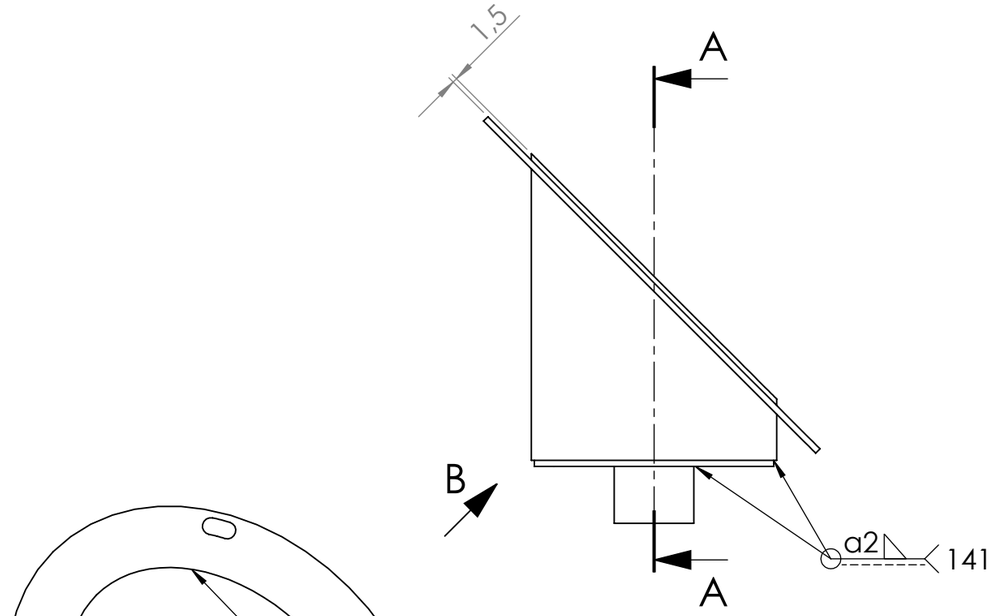
Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
					Material: 1.0037 (S235JR)
	Name	Signature	Date	SAXION	Description: **Top plate**
Drawn:	S. Brand		17-6-2019		
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0012** / Revision: / Format A3
Class:	SSS	StudentNo.			
					Weight: 2206.26 grams / SCALE: 1:5 / SHEET: 1 OF 1

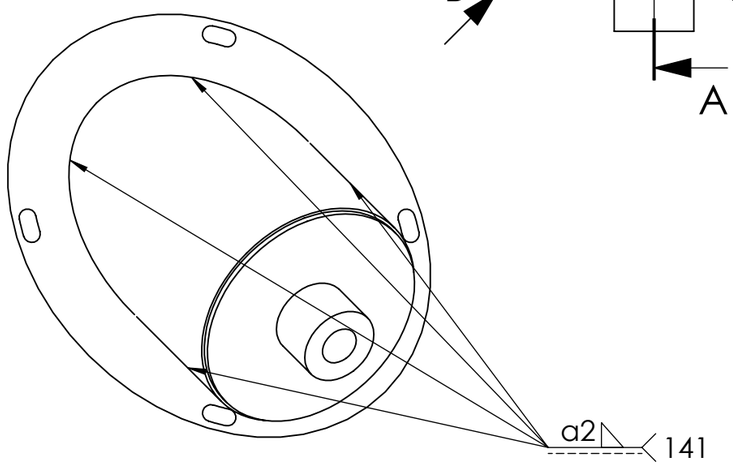




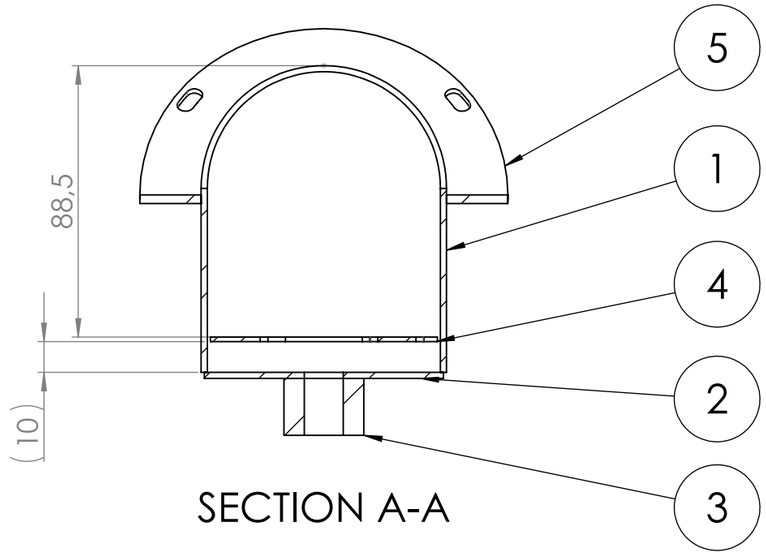


Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
					Material: 1.0037 (S235JR)
	Name	Signature	Date	SAXION	Description: **Plate**
Drawn:	S. Braakman		17-6-2019		
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0013** / Revision: / Format: A3
Class:	SSS	StudentNo.			
					Weight: 410.20 grams / SCALE: 1:2 / SHEET: 1 OF 1

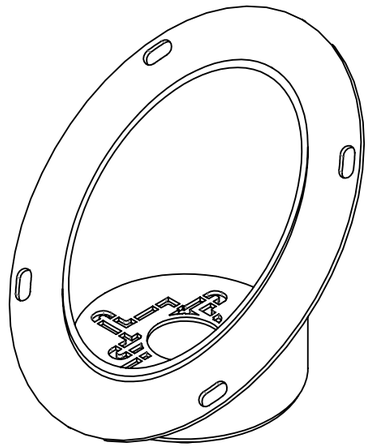




VIEW B



SECTION A-A



ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
5	1	04.0015	Drain mount	AISI 304
4	1	04.0104	Drain plate	AISI 304
3	1	Welding Socket 1_2	Stainless Steel Socket Weld Welding Boss Fitting 347	AISI 304
2	1	04.0008	Plate	AISI 304
1	1	04.0007	Drain pipe	AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish: Chrome

Material:

	Name	Signature	Date
Drawn:	S.Braakman		17-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:

Drain assembly

Drawing number: **04.0014**

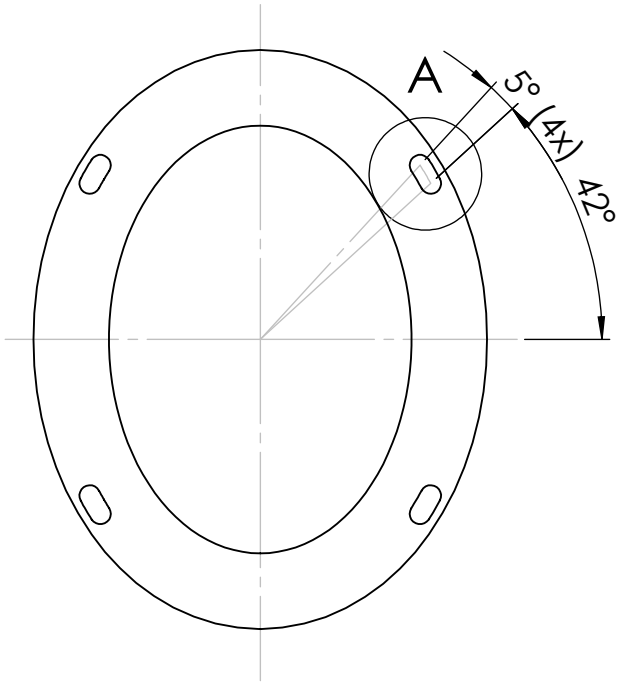
Revision:

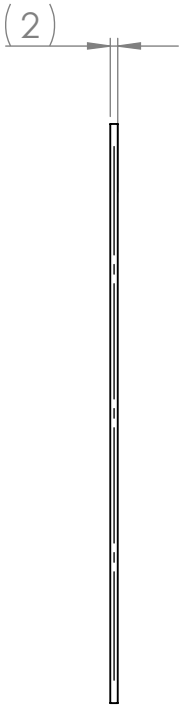
Format: A3

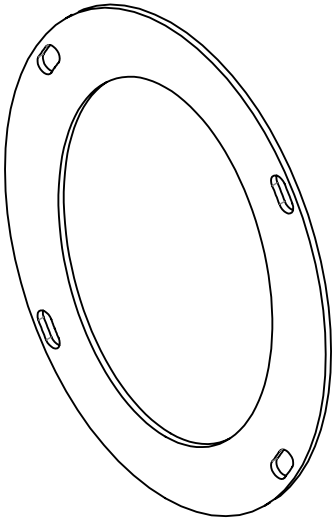
Weight: 522.68

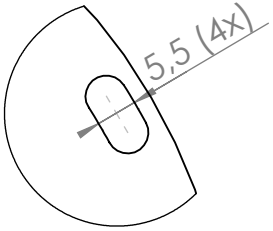
SCALE: 1:2

SHEET: 1 OF 1



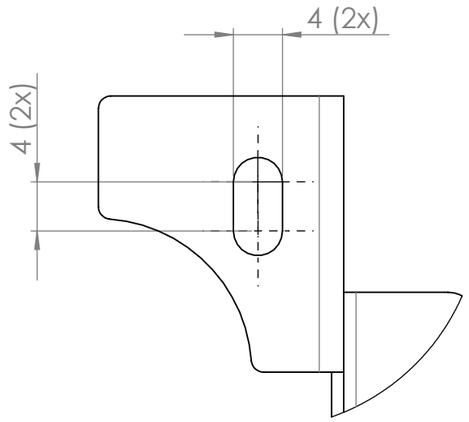




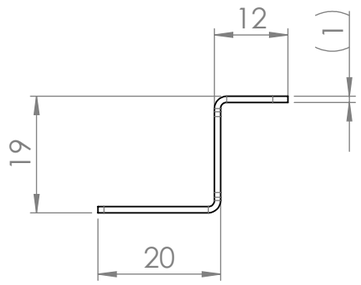


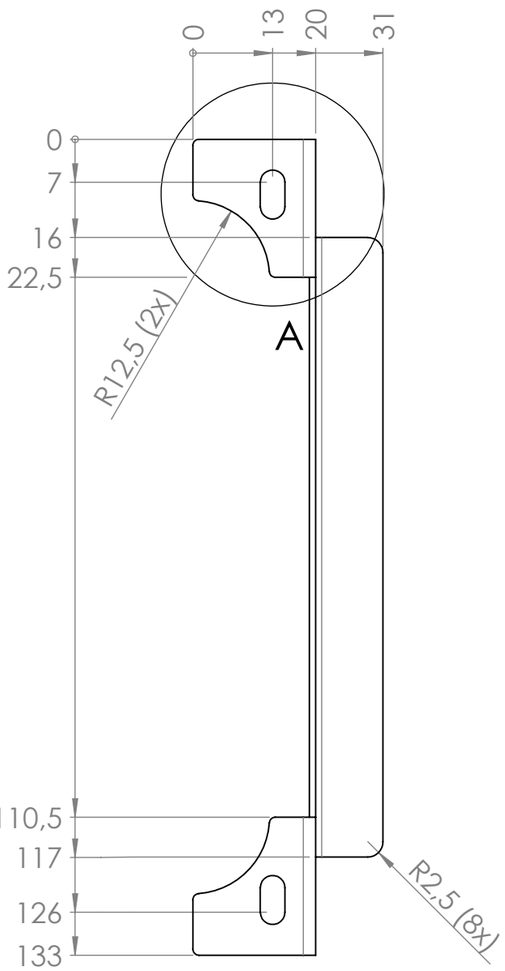
DETAIL A
SCALE 1 : 1

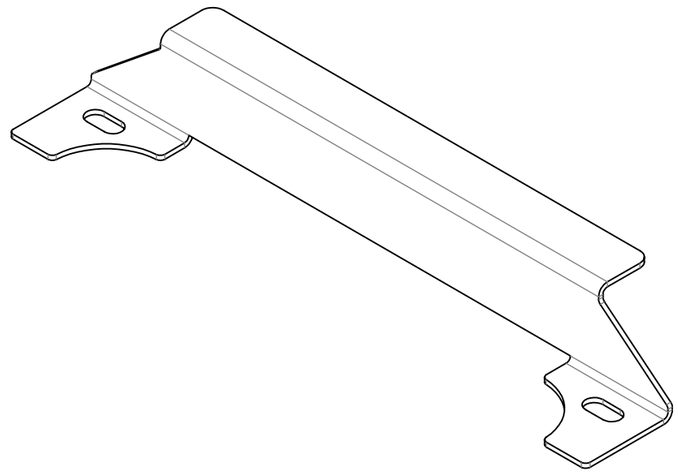
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Material: AISI 304
	Name / Signature / Date	SAXION	Description: **Drain mount**
Drawn:	S.Braakman / 17-6-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0015** / Revision: / Format A4
Checked:			
Class:	SSS / StudentNo.		Weight: 114.43 grams / SCALE: 1:2 / SHEET: 1 OF 1



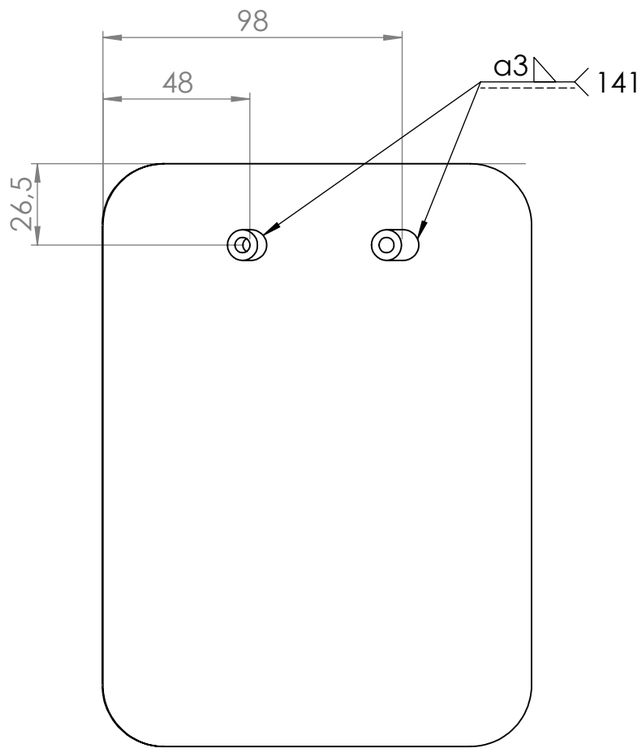
DETAIL A
SCALE 2 : 1

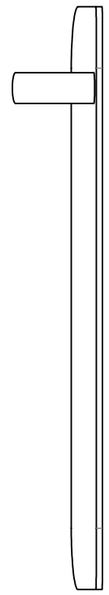


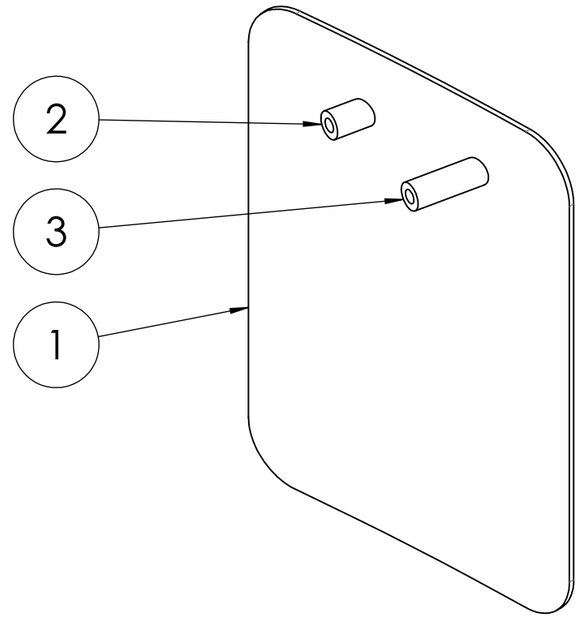




Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
					Material: 1.0037 (S235JR)
	Name	Signature	Date	SAXION	Description: **Payter (P66) mount**
Drawn:	S. Braakman		17-6-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0016** / Revision: / Format A3
Checked:					
Class:	SSS	StudentNo.			Weight: 28.18 grams / SCALE: 1:1 / SHEET: 1 OF 1







ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
3	1	04.0021	Socket	1.0037 (S235JR)
2	1	04.0020	Socket	1.0037 (S235JR)
1	1	04.0013	Plate	1.0037 (S235JR)

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish: Powdercoat (RAL9005)

Material:

	Name	Signature	Date
Drawn:	S. Braakman		17-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:
Bottle door assembly

Drawing number: **04.0019**

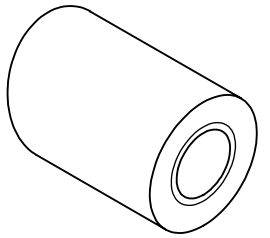
Revision:

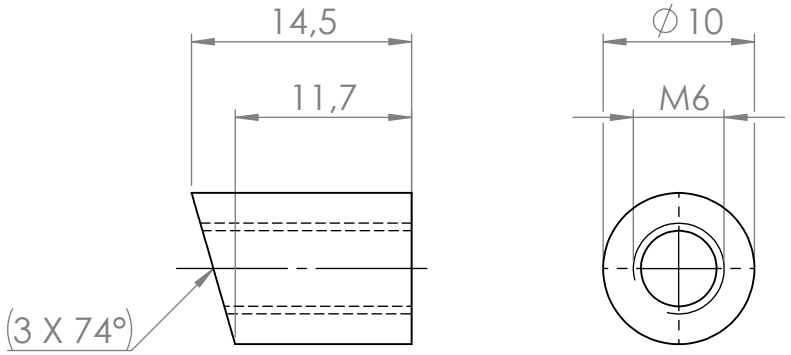
Format A3

Weight: 428.22

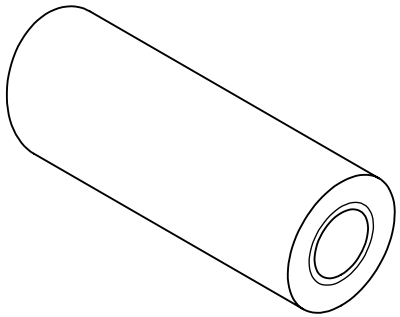
SCALE: 1:2

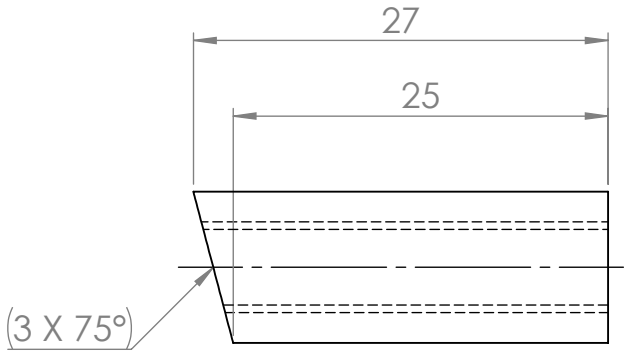
SHEET: 1 OF 1

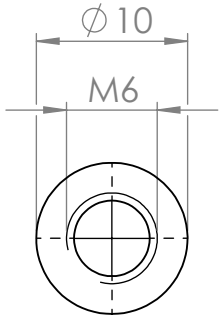




Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Material: 1.0037 (S235JR)
	Name / Signature / Date	SAXION	Description: **Socket**
Drawn:	S. Braakman / 17-6-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0020** / Revision: / Format A4
Checked:			Weight: 6.02 grams / SCALE: 2:1 / SHEET: 1 OF 1
Class:	SSS / StudentNo.		







Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material: 1.0037 (S235JR)

	Name	Signature	Date
Drawn:	S. Braakman		17-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:

Socket

Drawing number: **04.0021**

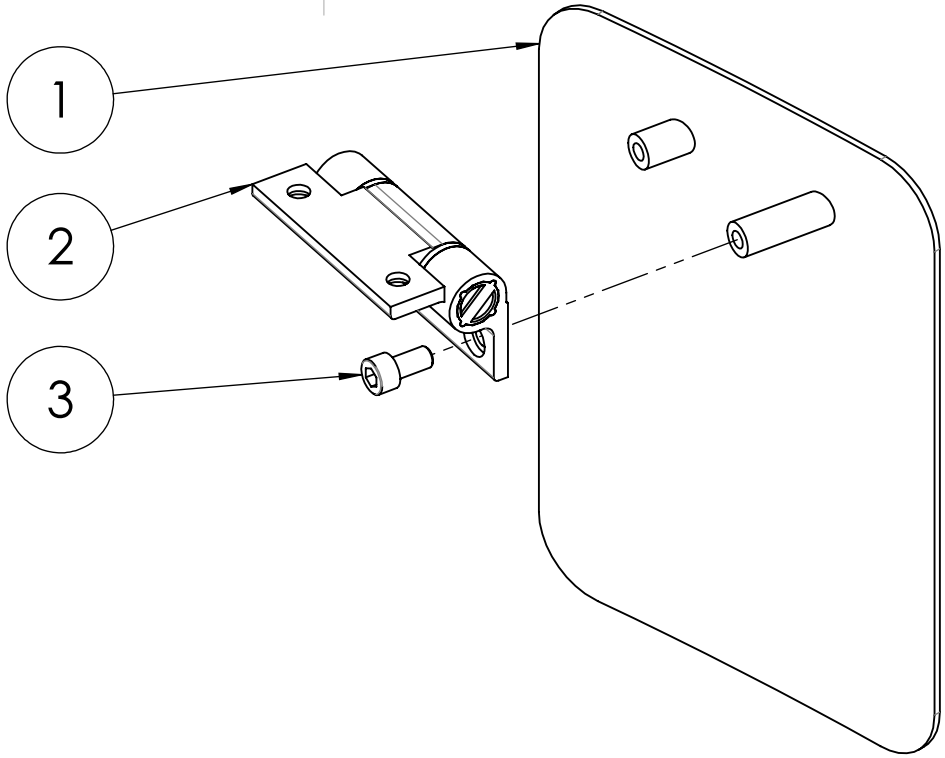
Revision:

Format A4

Weight: 11.99 grams

SCALE: 2:1

SHEET: 1 OF 1



ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
3	2	M6x12 Hex. socket screw A2	51050.060.012	
2	1	71307	Pinet Clear Anodised Aluminium Hinge with a Spring Loaded Pin Screw, 67mm x 55mm x 4.5mm	
1	1	04.0019	Bottle door assembly	

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material:

	Name	Signature	Date
Drawn:	S. Braakman		17-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:

Closing plate assembly

Drawing number: **04.0022**

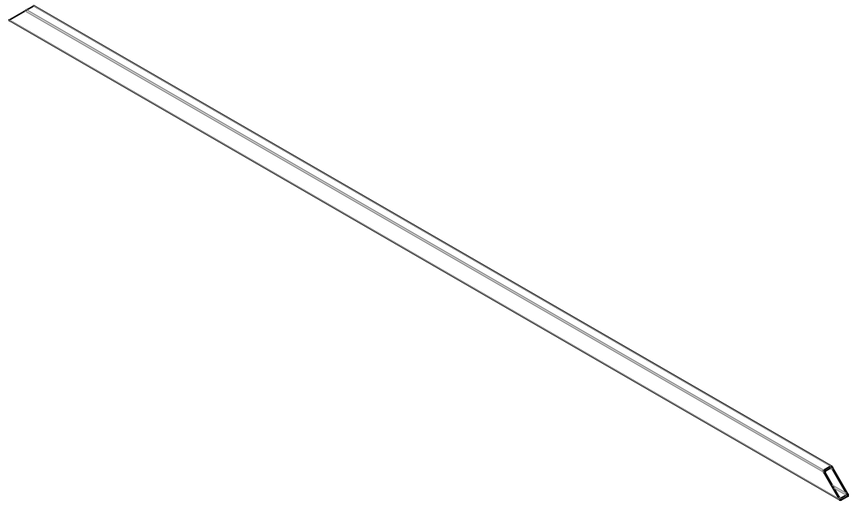
Revision:

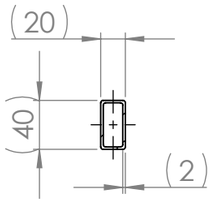
Format A4

Weight: 454.32

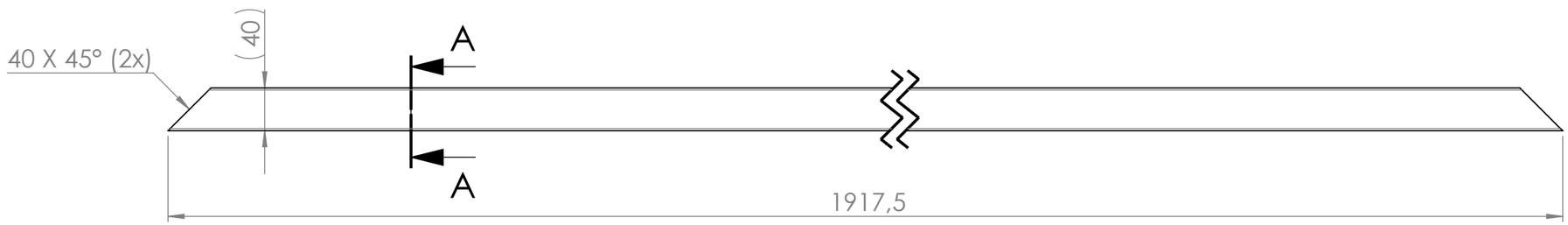
SCALE: 1:5

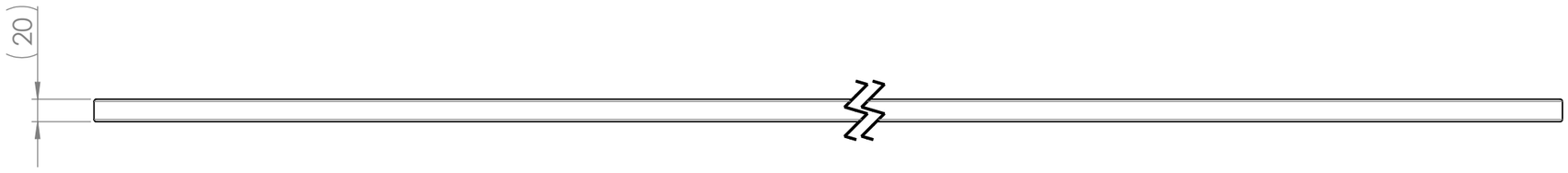
SHEET: 1 OF 1



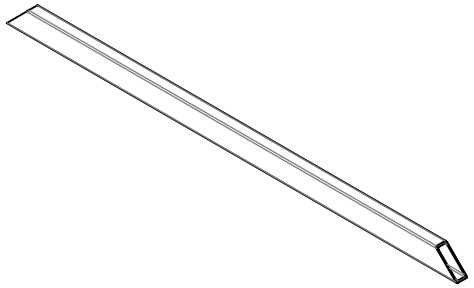


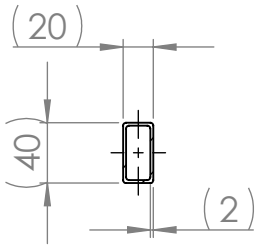
SECTION A-A



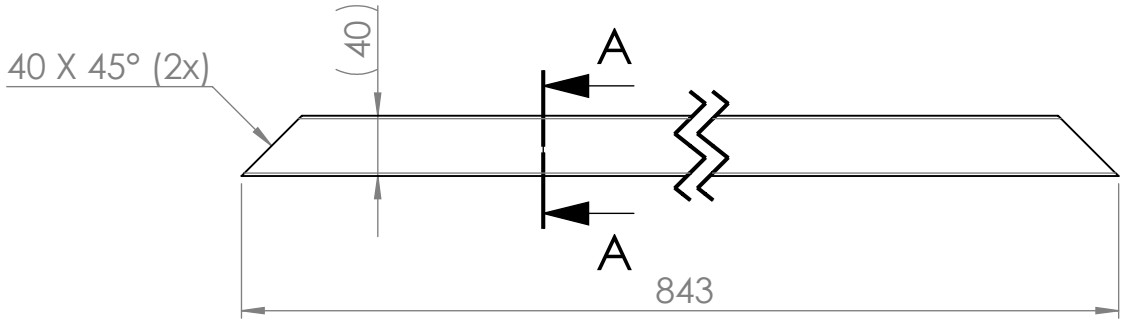


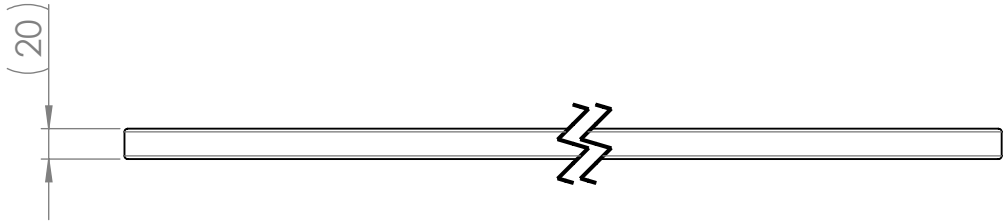
Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
					Material: 1.0037 (S235JR)
	Name	Signature	Date	SAXION	Description: **Tube 40x20x2**
Drawn:	S. Brand		17-6-2019		
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0101** / Revision: / Format: A3
Class:	SSS	StudentNo.			
					Weight: 3280.37 grams / SCALE: 1:5 / SHEET: 1 OF 1



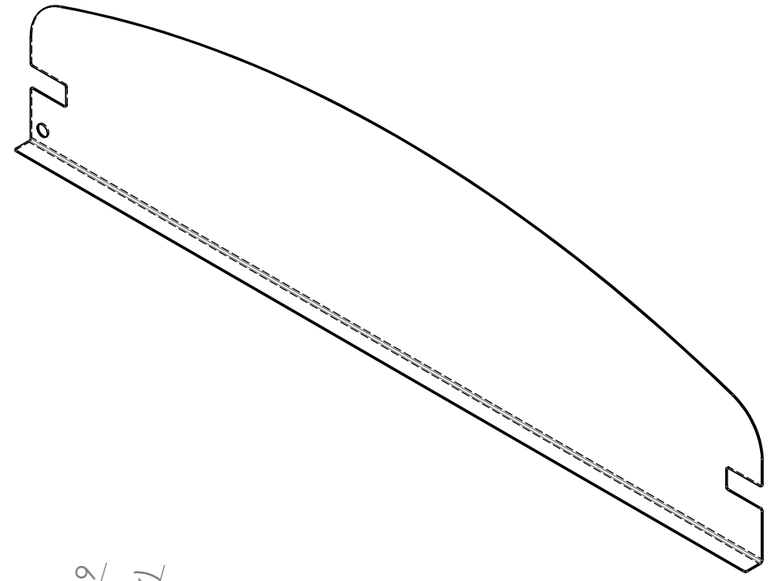


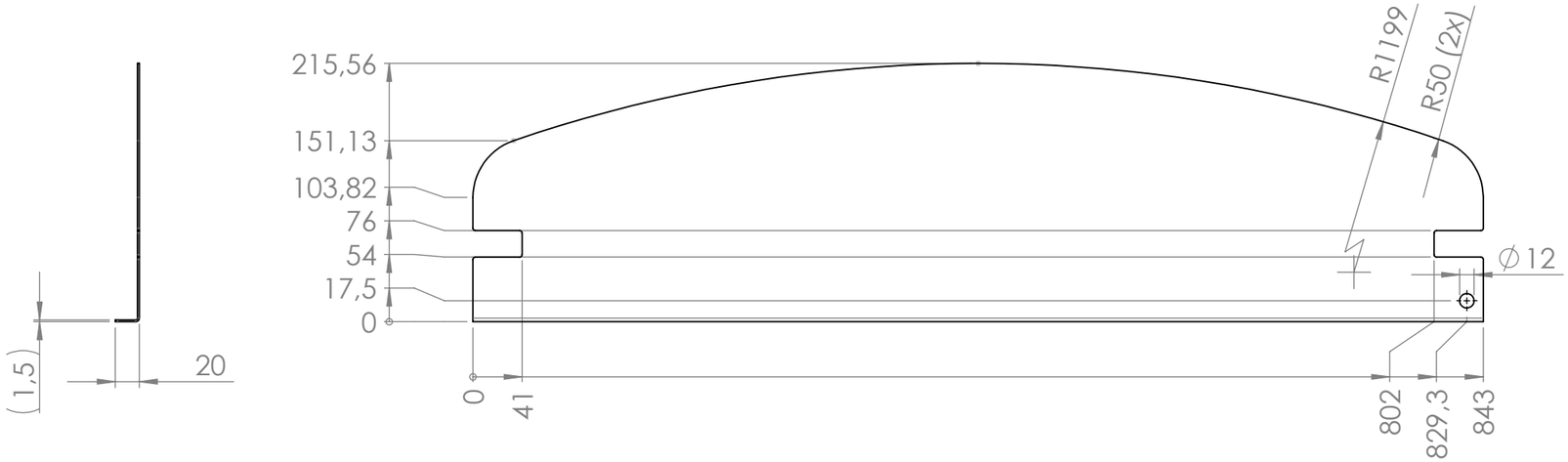
SECTION A-A



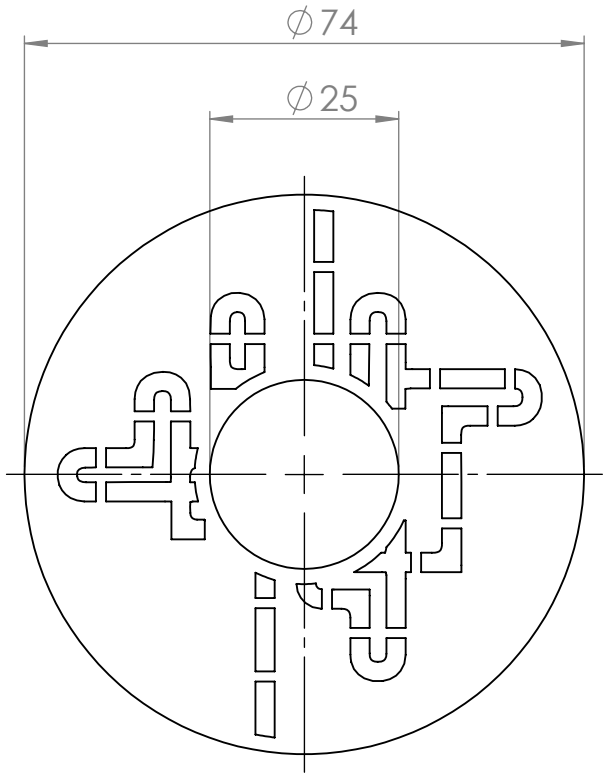


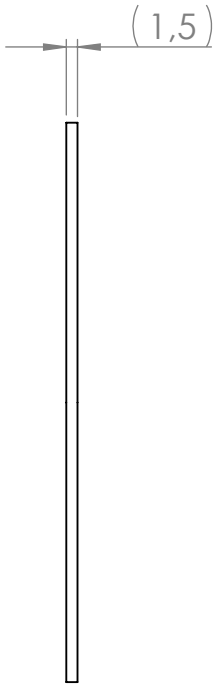
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Material: 1.0037 (S235JR)
	Name / Signature / Date	SAXION	Description: **Tube 40x20x2**
Drawn:	S. Brand / 17-6-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0102** / Revision: / Format: A4
Checked:			Weight: 1403.00 grams / SCALE: 1:5 / SHEET: 1 OF 1
Class:	SSS / StudentNo.		

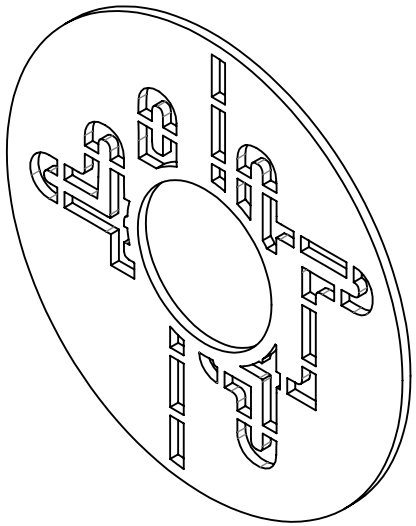




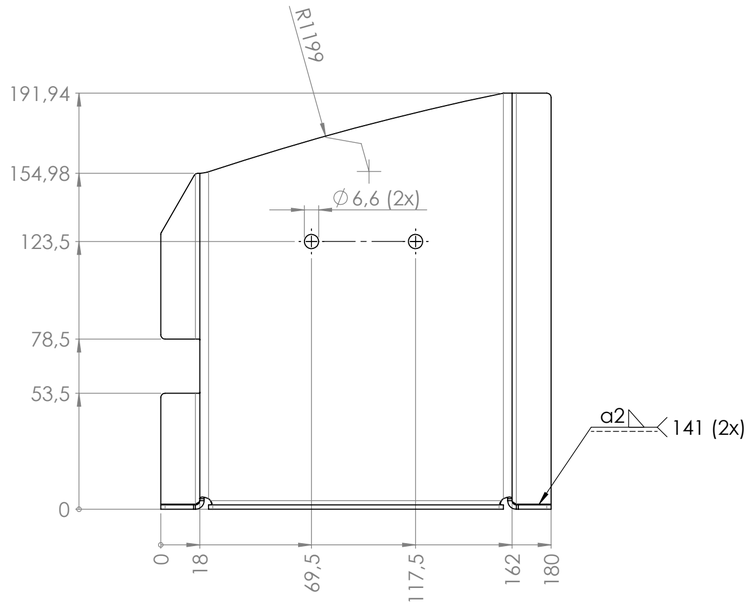
Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
					Material: 1.0037 (S235JR)
	Name	Signature	Date	SAXION	Description: **Plate**
Drawn:	S. Brand		17-6-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0103** / Revision: / Format: A3
Checked:					
Class:	SSS	StudentNo.			Weight: 2022.85 grams / SCALE: 1:5 / SHEET: 1 OF 1

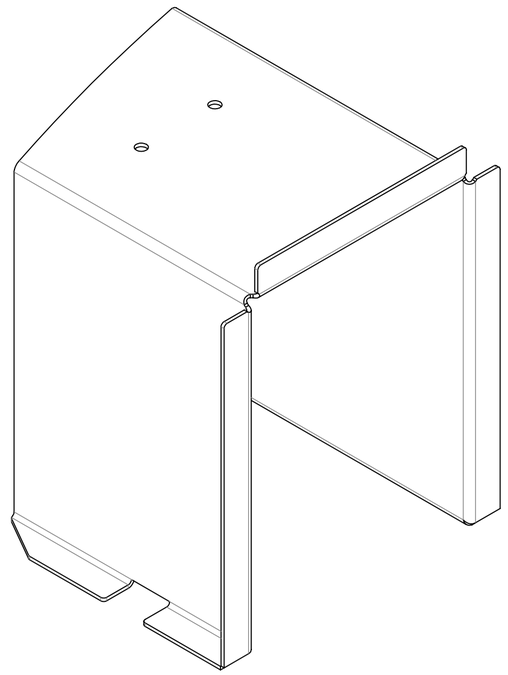


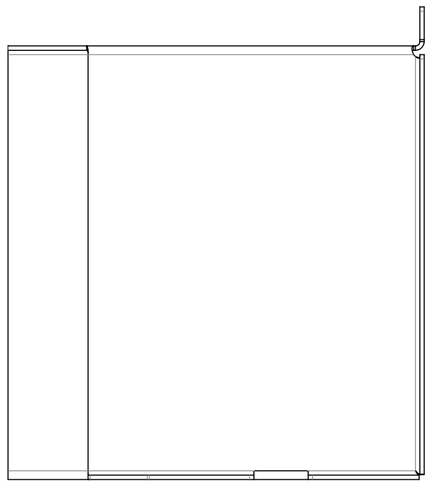


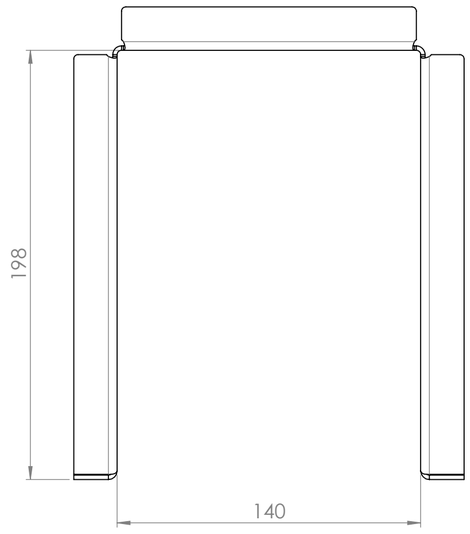


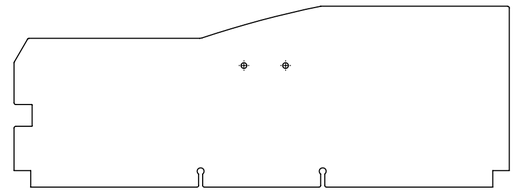
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Material: AISI 304
	Name / Signature / Date	SAXION	Description: **Drain plate**
Drawn:	S. Brand / 17-6-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0104** / Revision: / Format A4
Checked:			
Class:	SSS / StudentNo.		Weight: 38.75 grams / SCALE: 1:1 / SHEET: 1 OF 1





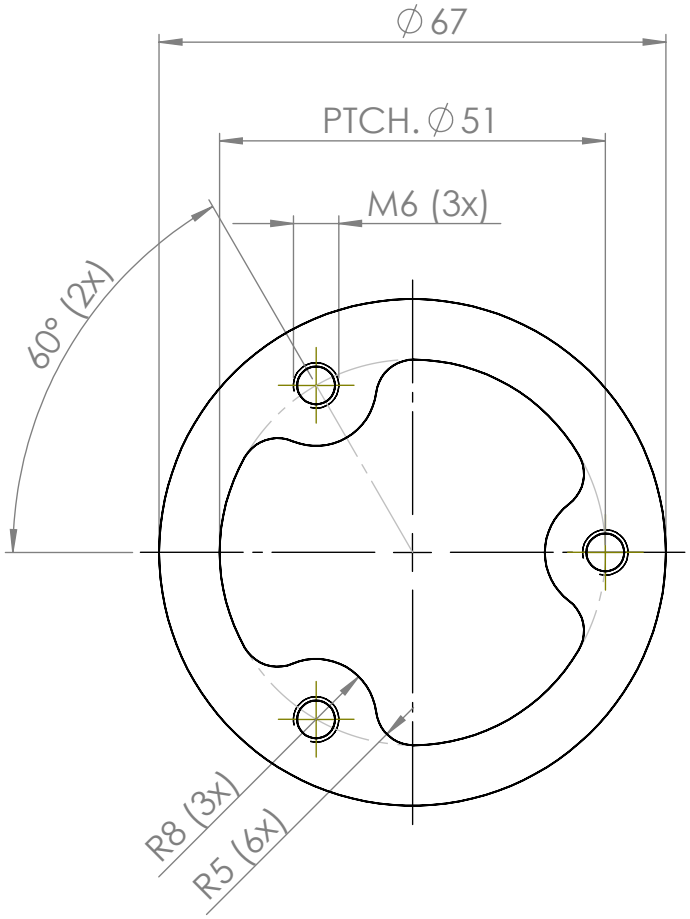


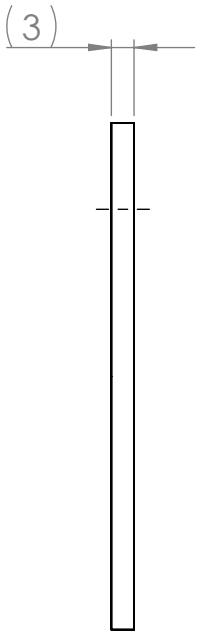


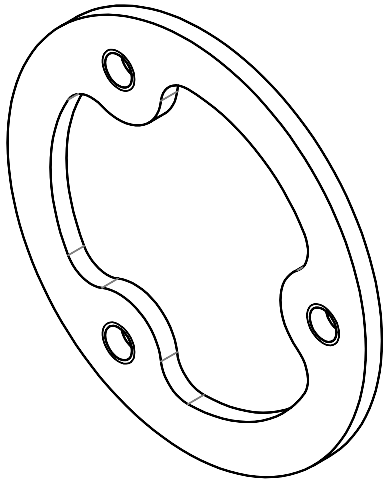


For information (1:5).

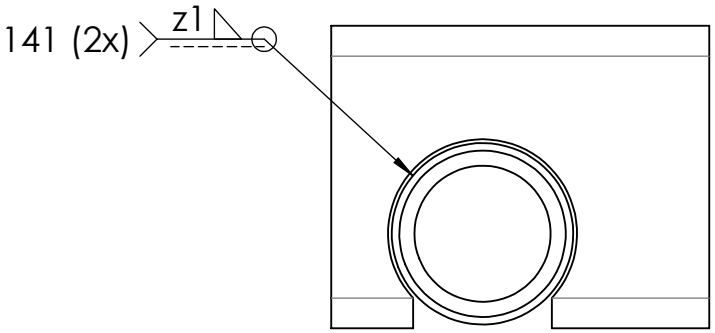
Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
	Name	Signature	Date		Material: 1.0037 (S235JR)
Drawn:	S. Braakman		18-6-2019	SAXION	Description: **Bottle output**
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0106** / Revision: / Format A2
Class:	SSS	StudentNo.			Weight: 1669.40 grams / SCALE: 1:2 / SHEET: 1 OF 1

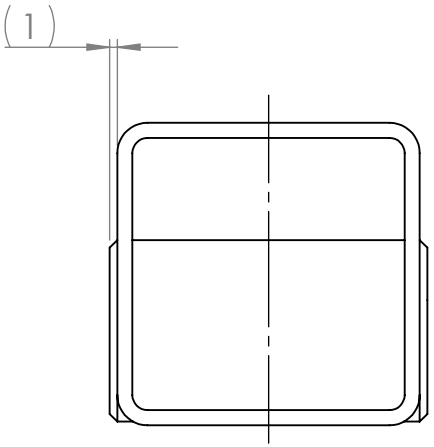


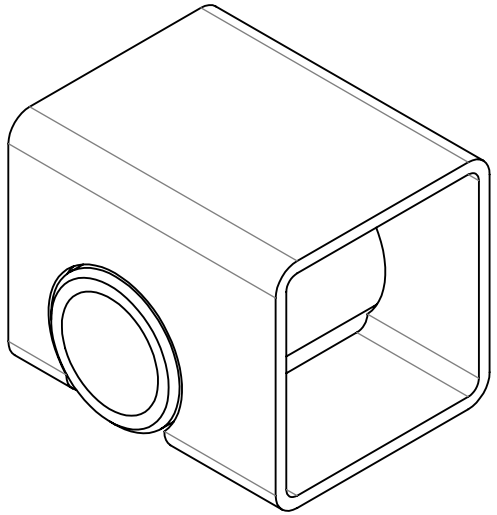




Am. Projection		DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:	
				Material: AISI 304	
	Name	Signature	Date	SAXION	Description: **Mounting plate**
Drawn:	S. Brand		14-5-2019		
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0108** / Revision: / Format A4
Class:	SSS	StudentNo.			
				Weight: 83.23 grams	SCALE: 1:1 / SHEET: 1 OF 1

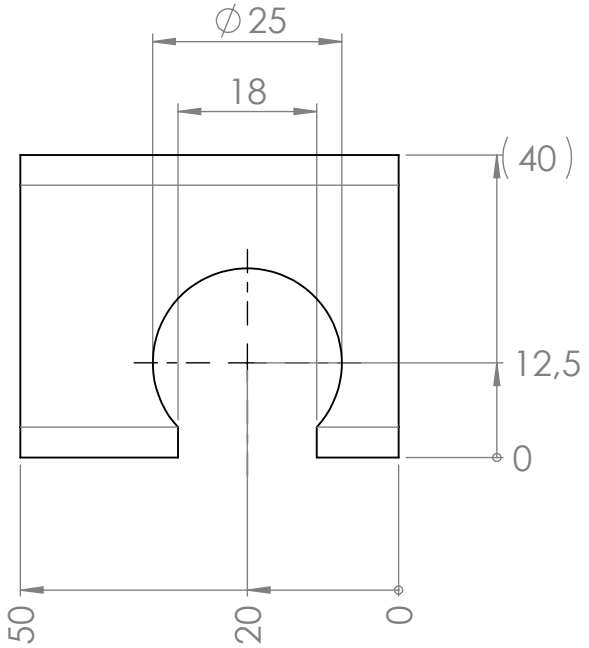


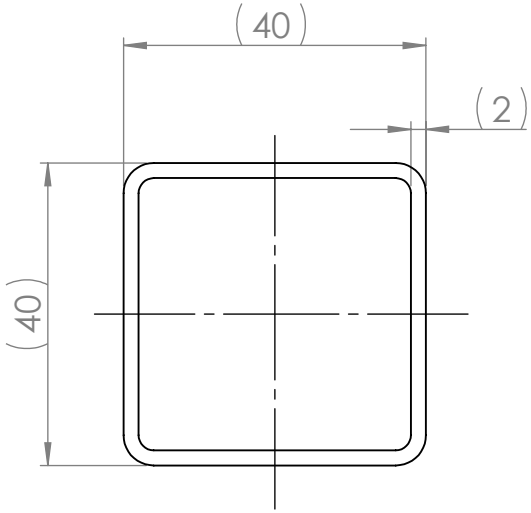


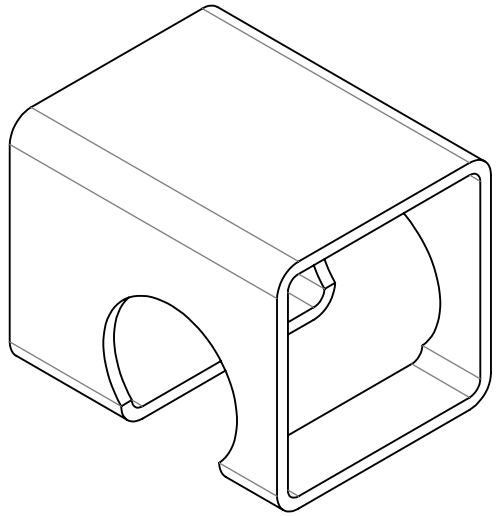


Am. Projection		DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:	
				Material:	
	Name	Signature	Date	Description:	
Drawn:	S. Brand		18-6-2019	**Hinge assembly**	
Checked:				Drawing number: **04.0200**	Revision:
Class:	SSS	StudentNo.		Weight: 153.23	SCALE: 1:1
				Format A4	SHEET: 1 OF 1

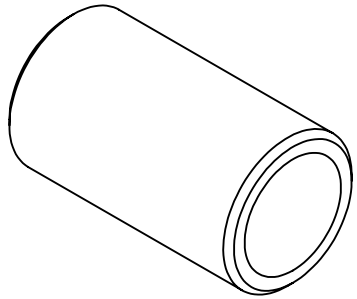
SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

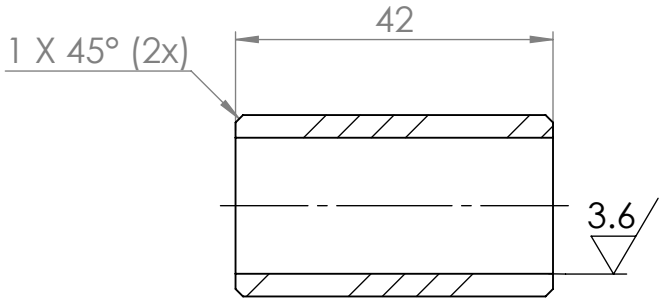




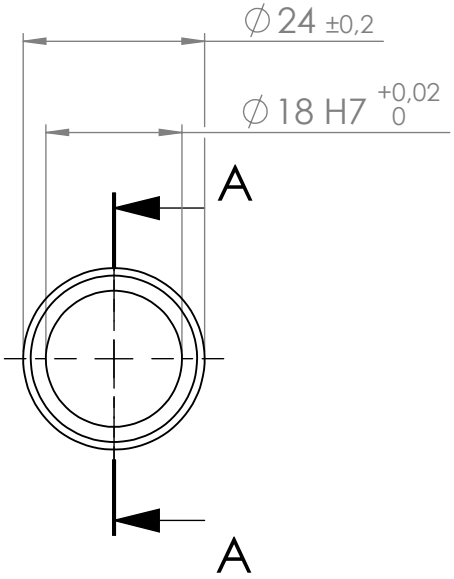


Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Material: 1.0037 (S235JR)
	Name / Signature / Date	SAXION	Description: **Hinge sleeve 40x40x2**
Drawn:	S.Brand / 18-6-2019		
Checked:		Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0202** / Revision: / Format: A4
Class: SSS	StudentNo.		Weight: 88.96 grams / SCALE: 1:1 / SHEET: 1 OF 1





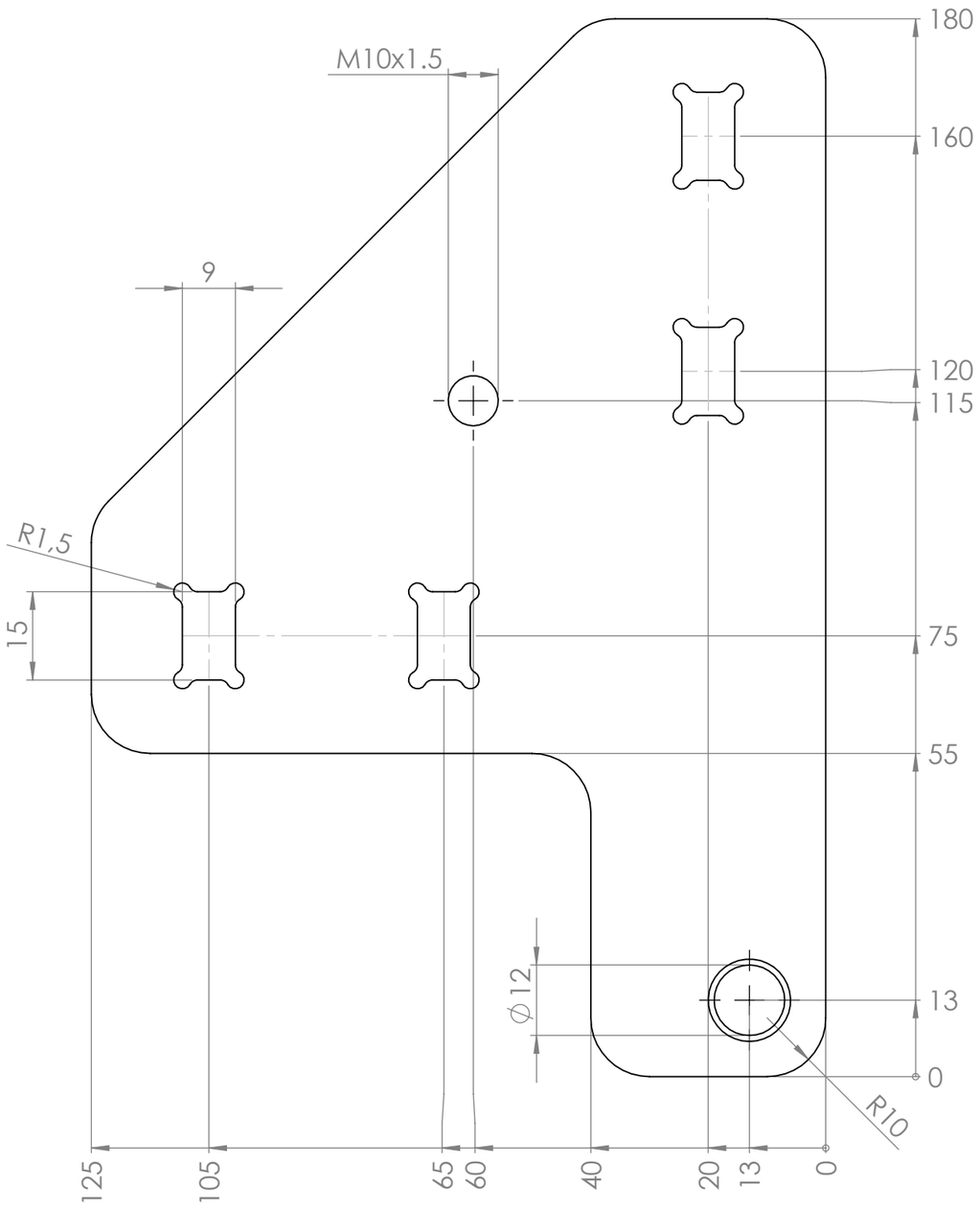
SECTION A-A

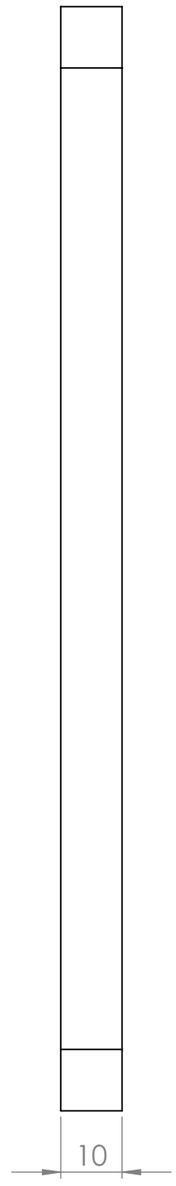


Am. Projection		DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:	
				Material: 1.0037 (S235JR)	
	Name	Signature	Date	Description:	
Drawn:	S. Brand		14-5-2019	**Axle-bearing**	
Checked:				Drawing number: **04.0203**	Revision: / Format: A4
Class:	SSS	StudentNo.		Weight: 64.27 grams	SCALE: 1:1 / SHEET: 1 OF 1

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl





Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material: 1.0545 (S355N)

	Name	Signature	Date
Drawn:	S. Braakman		17-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:
Plate

Drawing number: **04.0205**

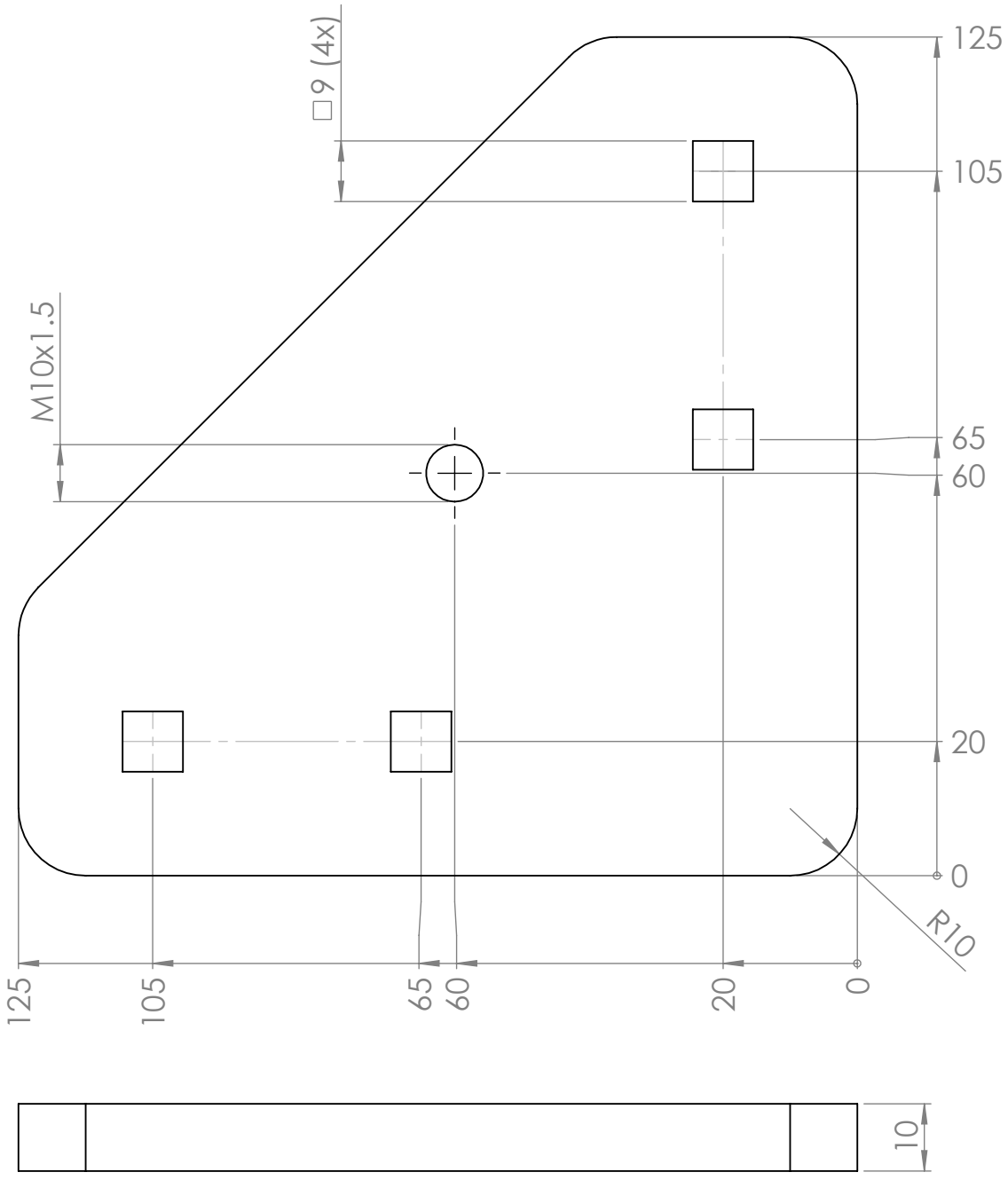
Revision:

Format: A3

Weight: 1040.47 grams

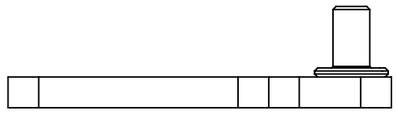
SCALE: 1:1

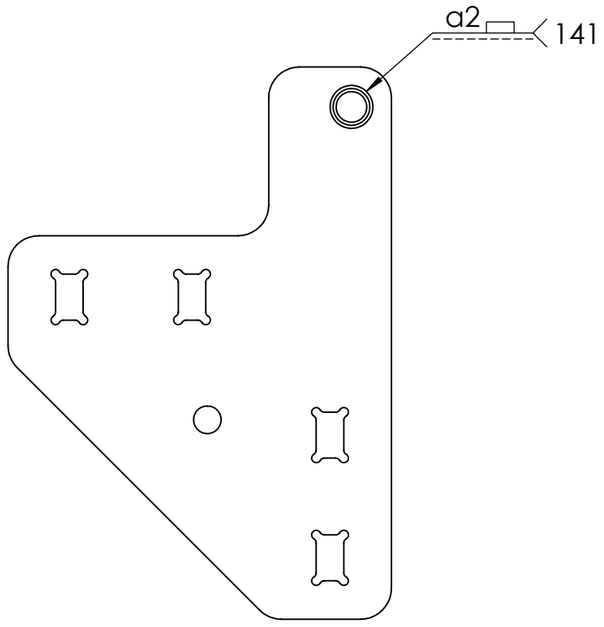
SHEET: 1 OF 1

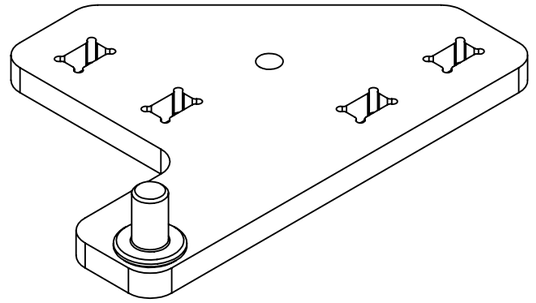


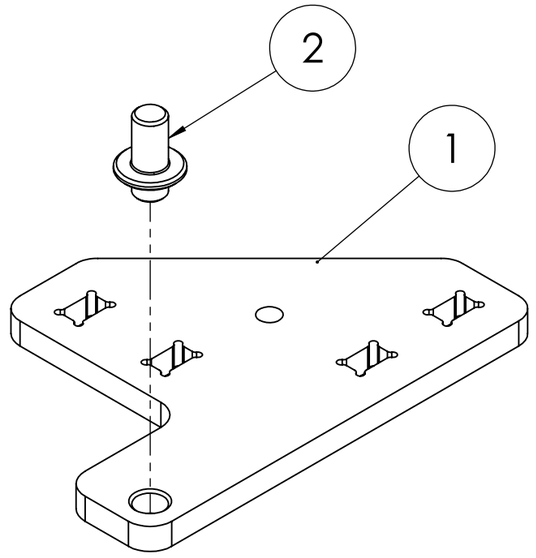
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish: Soda blasting	
				Material: AISI 304	
	Name	Signature	Date	Description:	
Drawn:	S. Braakman		18-6-2019	**Plate**	
Checked:				Drawing number: **04.0206**	Revision:
Class:	SSS	StudentNo.		Weight: 925.05 grams	SCALE: 1:1
					Format A4
					SHEET: 1 OF 1

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl









2	1	04.0204	Shaft	1.0545 (S355N)
1	1	04.0205	Plate	1.0545 (S355N)
ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

	Name	Signature	Date
Drawn:	S. Braakman		18-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Finish: Soda blasting

Material: Material <not specified>

Description:

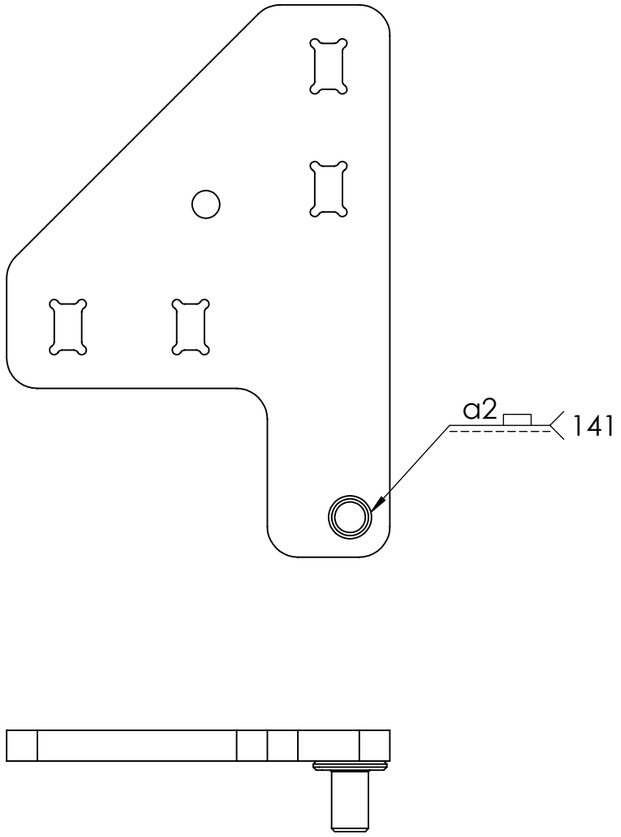
Hinge plate

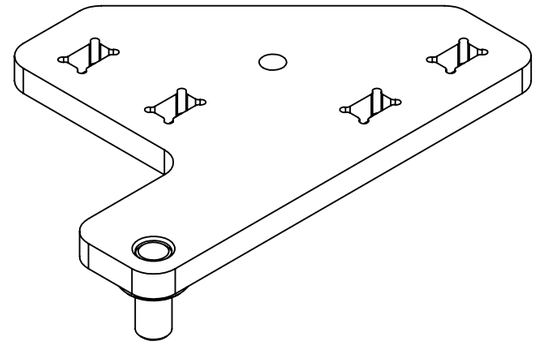
Drawing number:	Revision:	Format
04.0207		A3

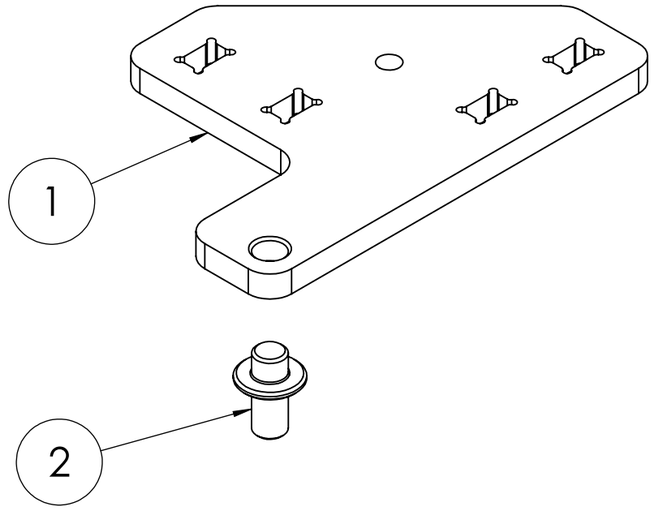
Weight: 1075.33

SCALE: 1:2

SHEET: 1 OF 1







2	1	04.0204	Shaft	1.0545 (S355N)
1	1	04.0205	Plate	1.0545 (S355N)
ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish: Soda blasting

Material: Material <not specified>

	Name	Signature	Date
Drawn:	S. Braakman		18-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:

Hinge plate

Drawing number: **04.0208**

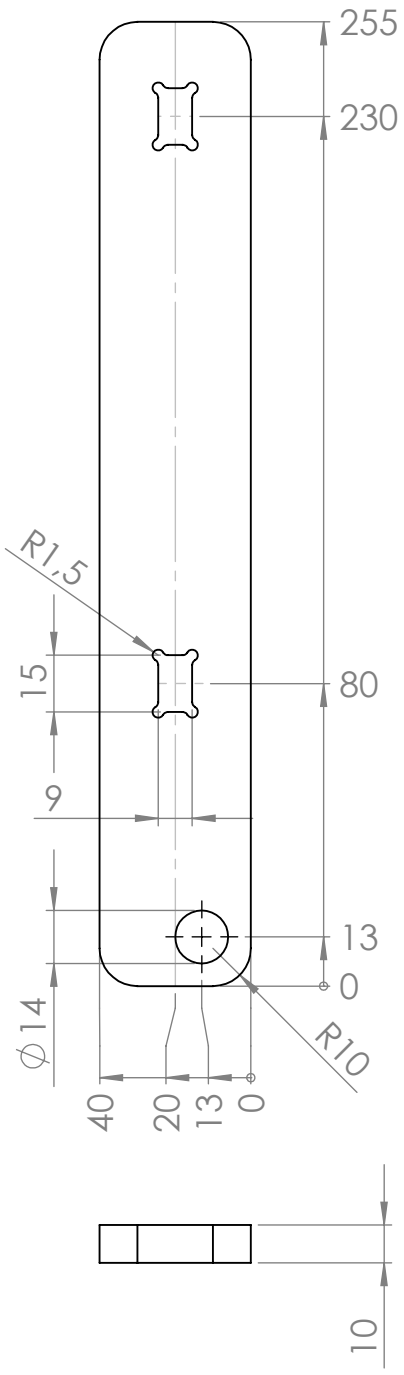
Revision:

Format A3

Weight: 1075.33

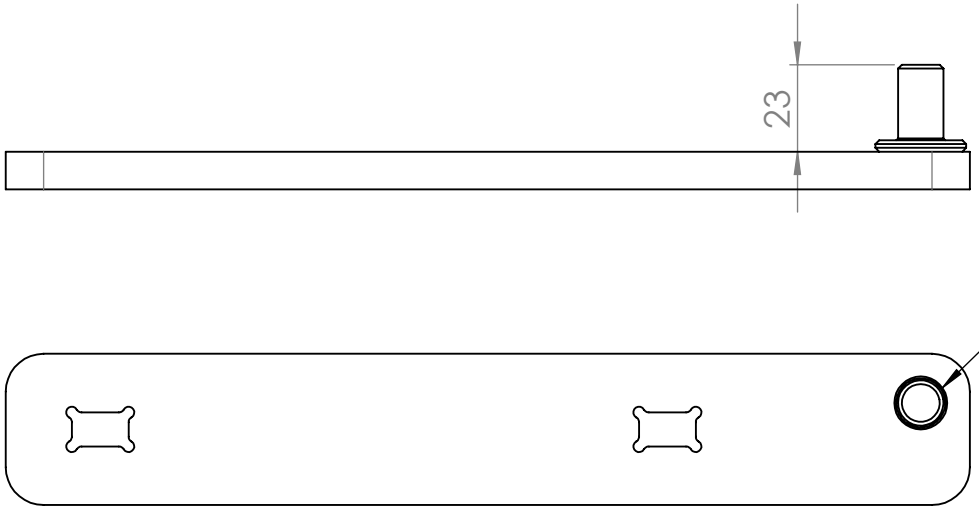
SCALE: 1:2

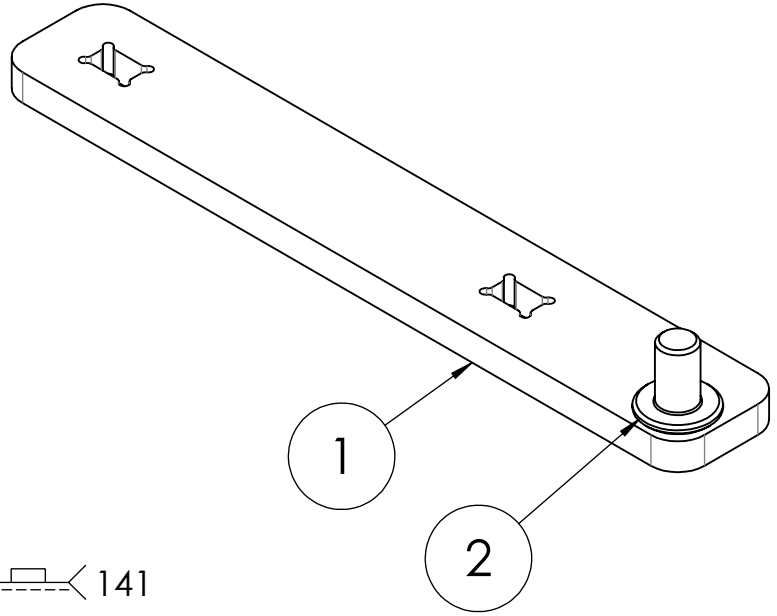
SHEET: 1 OF 1



Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
				Material: AISI 304	
	Name	Signature	Date	Description:	
Drawn:	S. Braakman		17-6-2019	**Plate**	
Checked:				Drawing number: **04.0209**	Revision:
Class:	SSS	StudentNo.		Weight: 771.59 grams	SCALE: 1:2
					Format A4
					SHEET: 1 OF 1

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl





ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
2	1	04.0204	Shaft	1.0545 (S355N)
1	1	04.0209	Plate	1.0037 (S235JR)

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material: Material <not specified>

	Name	Signature	Date
Drawn:	S.Braakman		18-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:
Hinge assembly

Drawing number: **04.0210**

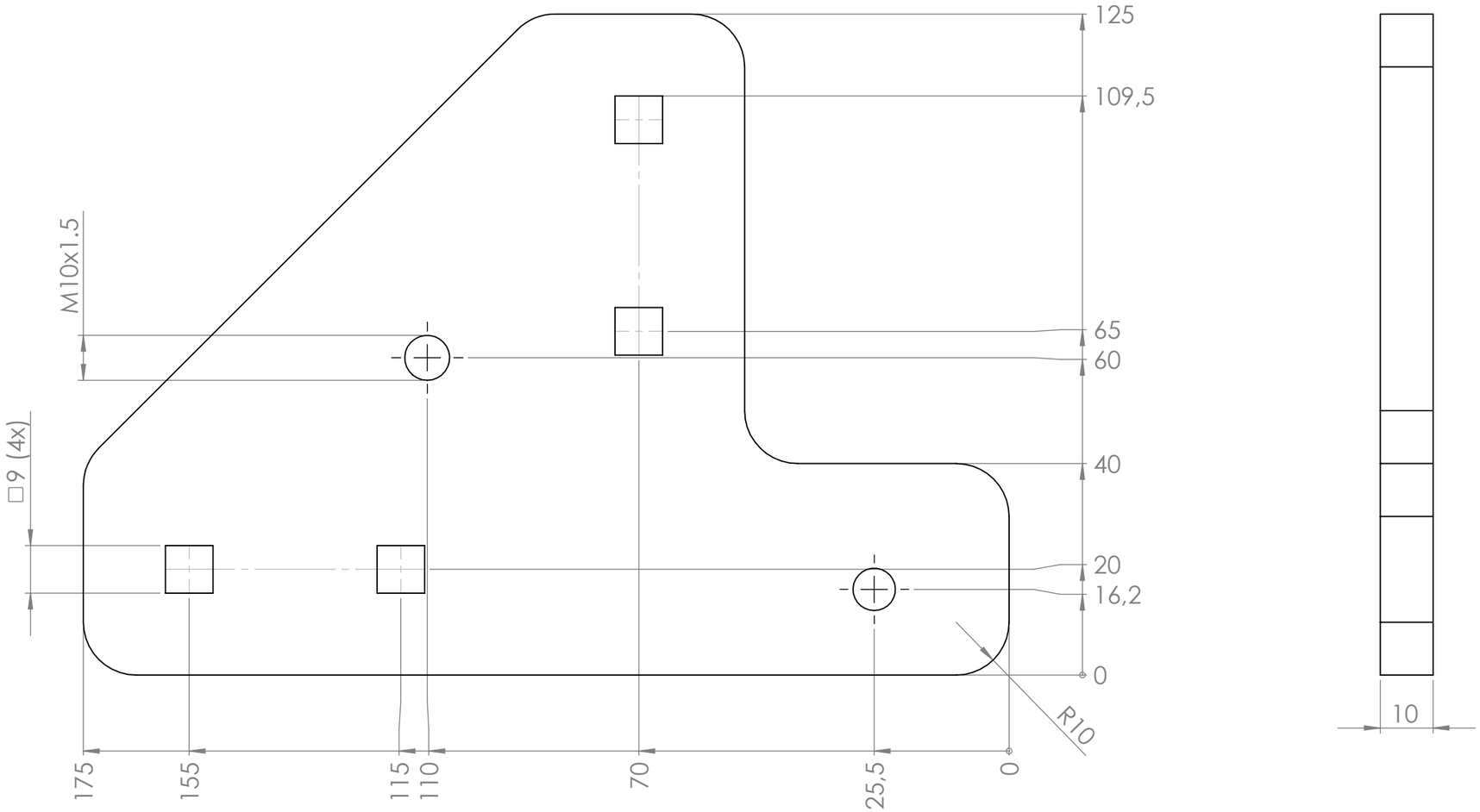
Revision:

Format A4

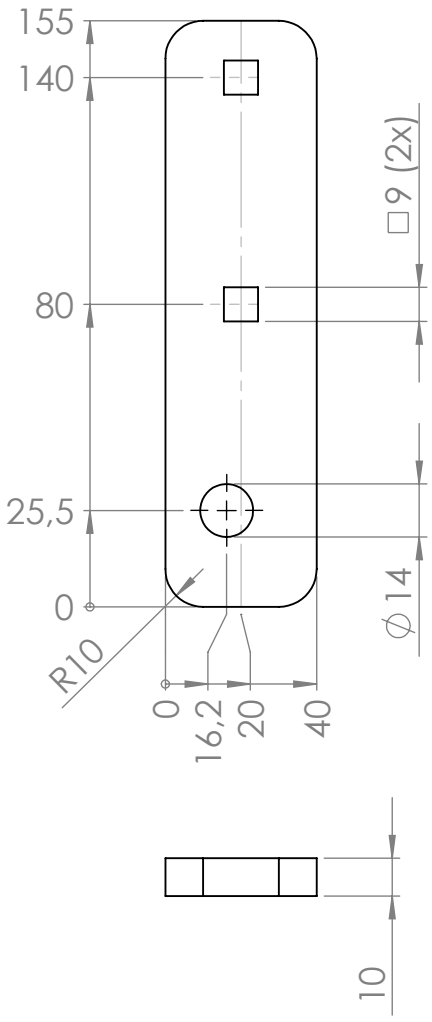
Weight: 787.70

SCALE: 1:2

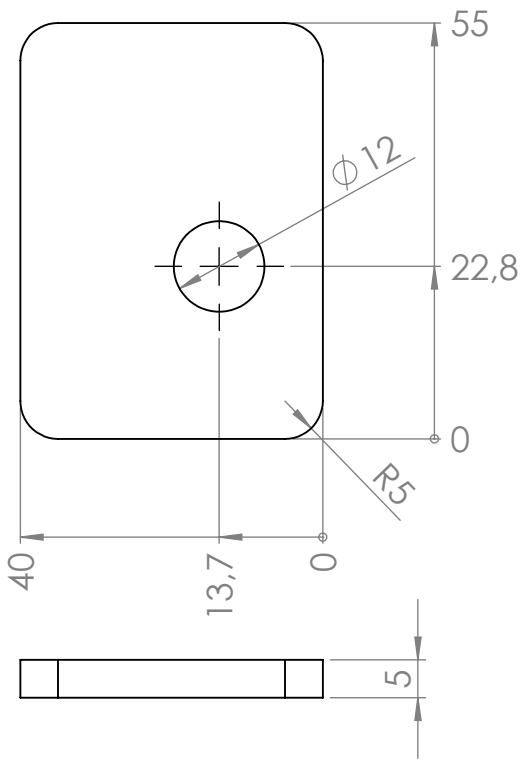
SHEET: 1 OF 1



Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Soda blasting
					Material: AISI 304
	Name	Signature	Date	SAXION	Description: **Plate**
Drawn:	S. Braakman		17-6-2019		
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0211** / Revision: / Format: A3
Class:	SSS	StudentNo.			Weight: 1081.02 grams / SCALE: 1:1 / SHEET: 1 OF 1

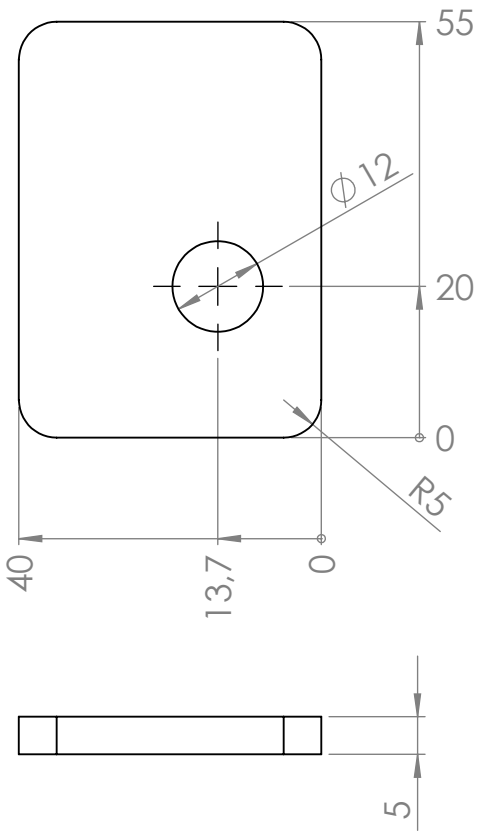


Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish: Soda blasting	
				Material: AISI 304	
	Name / Signature / Date	SAXION		Description:	
Drawn:	S. Braakman / 17-6-2019			**Locking plate**	
Checked:		Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl		Drawing number: **04.0212**	Revision: / Format: A4
Class:	SSS / StudentNo.			Weight: 463.86 grams	SCALE: 1:2 / SHEET: 1 OF 1



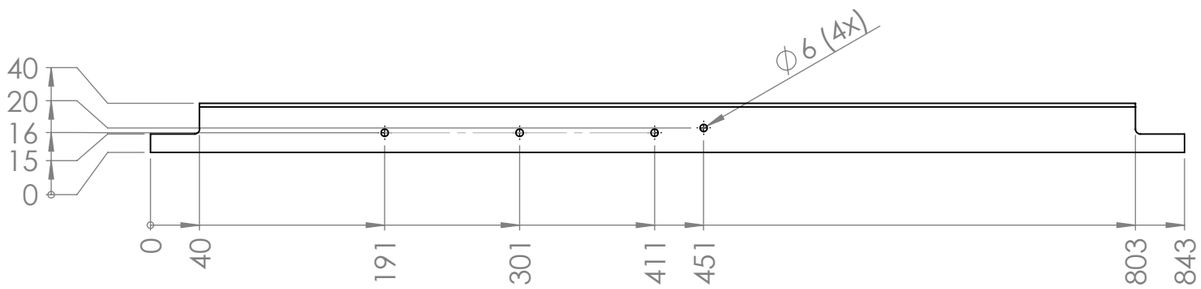
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
				Material: AISI 304	
	Name	Signature	Date	Description:	
Drawn:	S. Wiggers		17-6-2019	**Plate**	
Checked:				Drawing number: **04.0304**	Revision:
Class:	SSS	StudentNo.			Format A4
				Weight: 82.62 grams	SCALE: 1:1
					SHEET: 1 OF 1

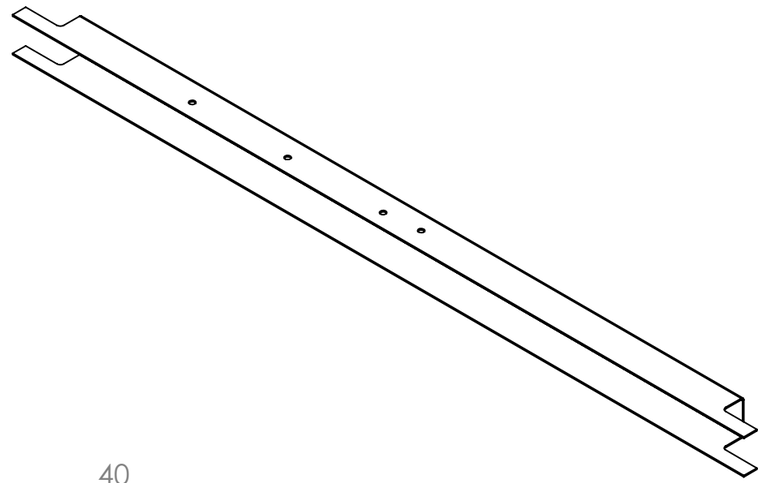
SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

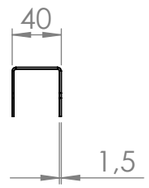


Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
				Material: AISI 304	
	Name	Signature	Date	Description:	
Drawn:	S. Wiggers		17-6-2019	**Plate**	
Checked:				Drawing number: **04.0305**	Revision:
Class:	SSS	StudentNo.			Format A4
				Weight: 82.62 grams	SCALE: 1:1
					SHEET: 1 OF 1

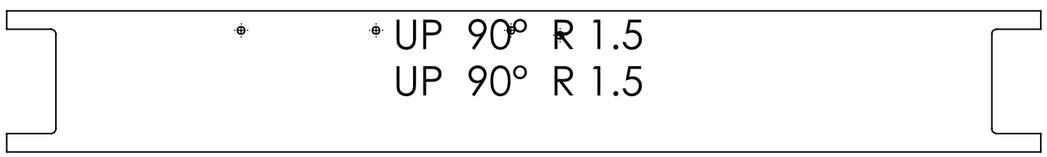
SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl



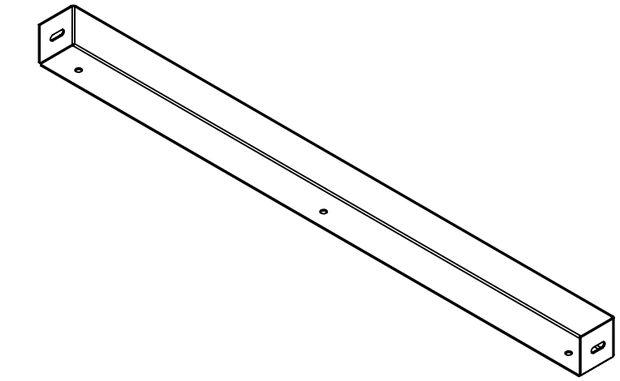


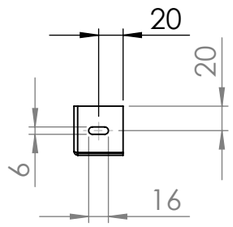


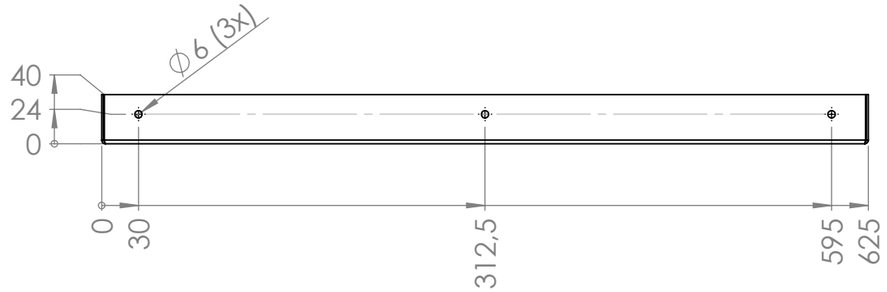
For information



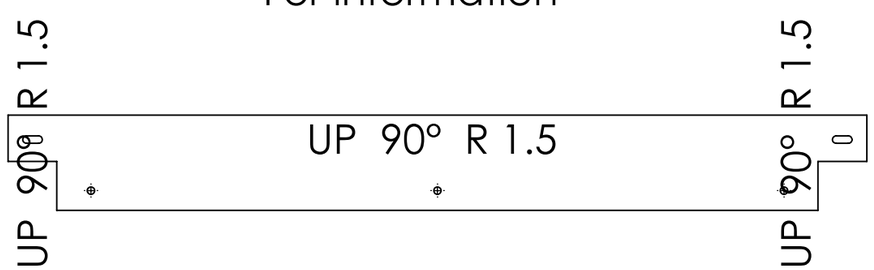
Am. Projection		DIMENSIONS IN MILLIMETERS		DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
					Material: AISI 304
	Name	Signature	Date	SAXION	Description: **Plate**
Drawn:	S. Wiggers		17-6-2019		
Checked:				Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0400** / Revision: / Format A3
Class:	SSS	StudentNo.			Weight: 1081.18 grams / SCALE: 1:5 / SHEET: 1 OF 1



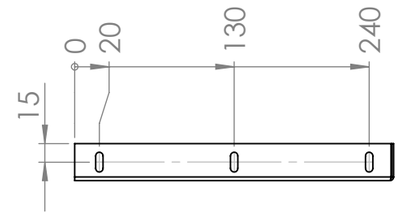


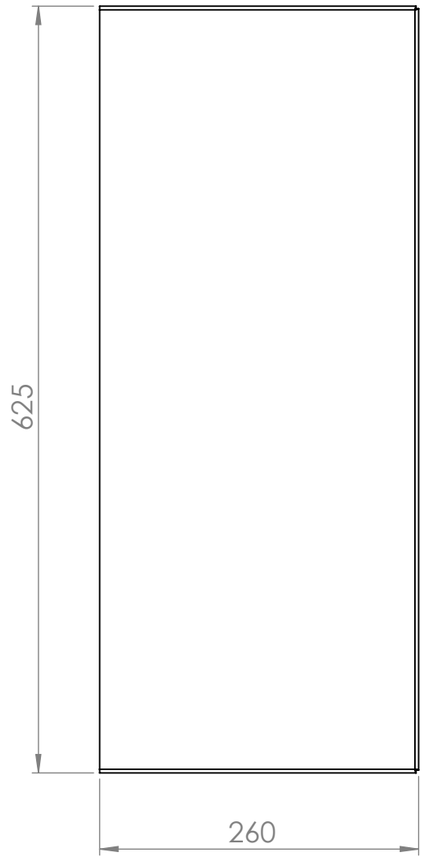


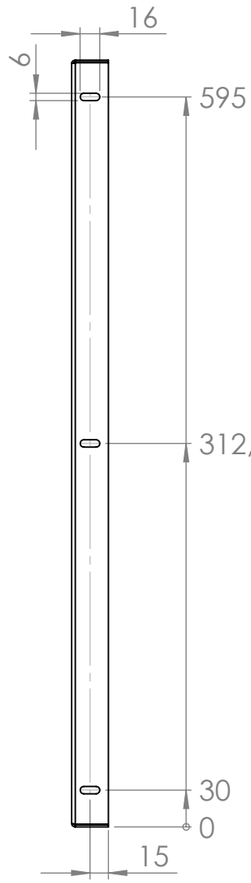
For information

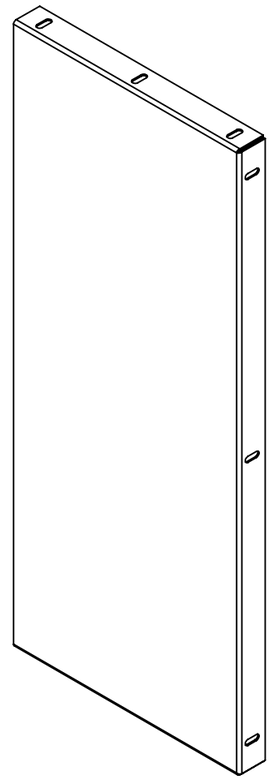


Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish: Soda blasting		
				Material: AISI 304		
	Name	Signature	Date	SAXION	Description: **Plate**		
Drawn:	S. Wiggers		17-6-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0401**	Revision:	Format A3
Checked:							
Class:	SSS	StudentNo.			Weight: 610.25 grams	SCALE: 1:5	SHEET: 1 OF 1

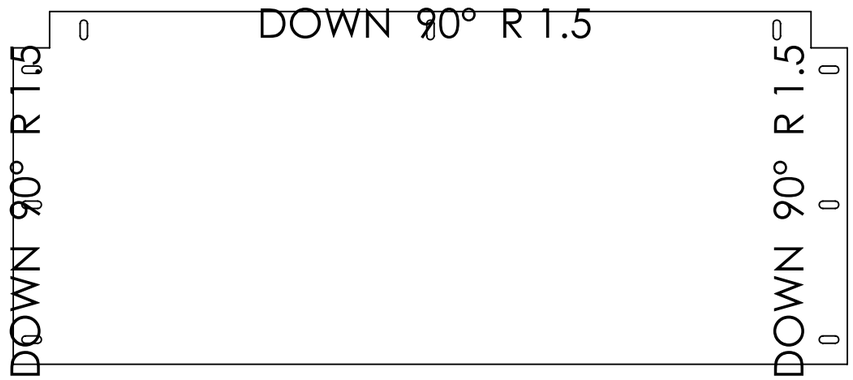








For Information



Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
				Material: AISI 304	
	Name	Signature	Date	Description: **Plate**	
Drawn:	S. Wiggers		17-6-2019		
Checked:				Drawing number: **04.0402**	Revision:
Class:	SSS	StudentNo.		Weight: 2315.68 grams	SCALE: 1:5
					Format A3
					SHEET: 1 OF 1

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
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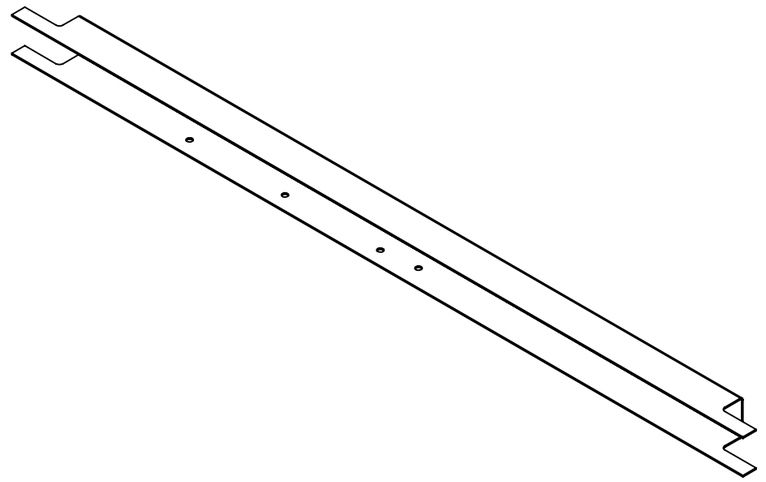
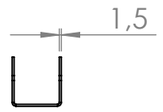
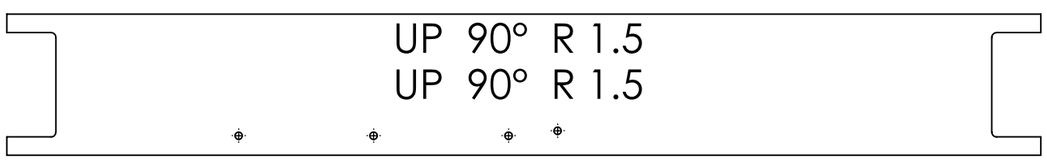
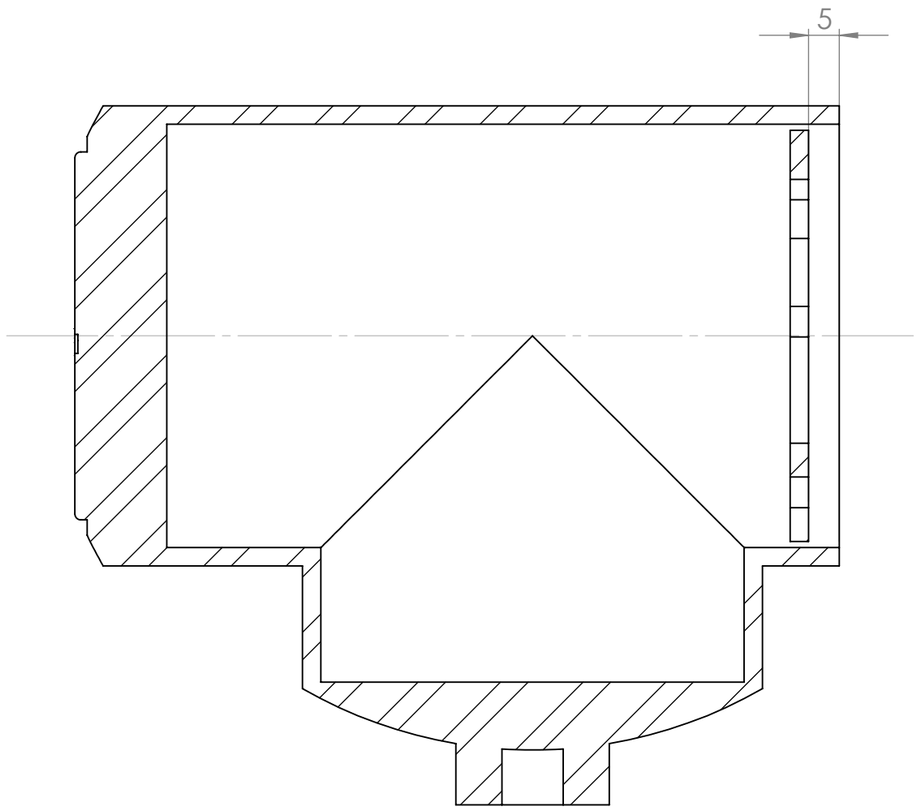




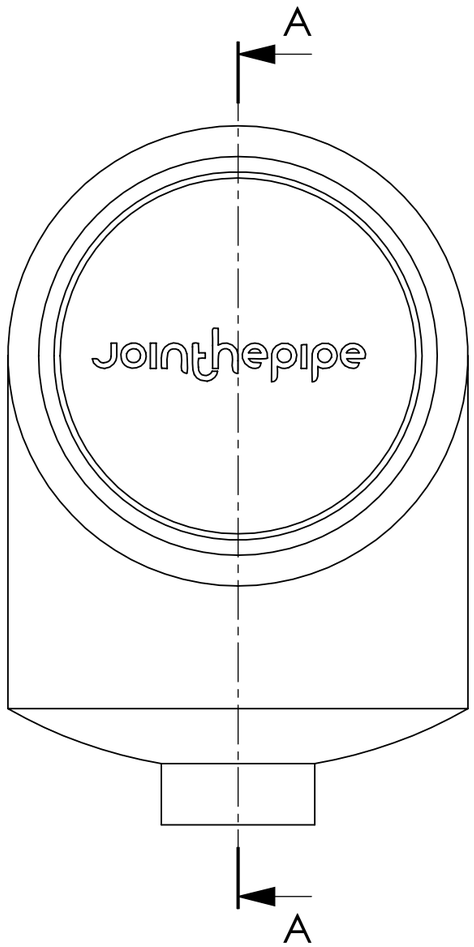
For information

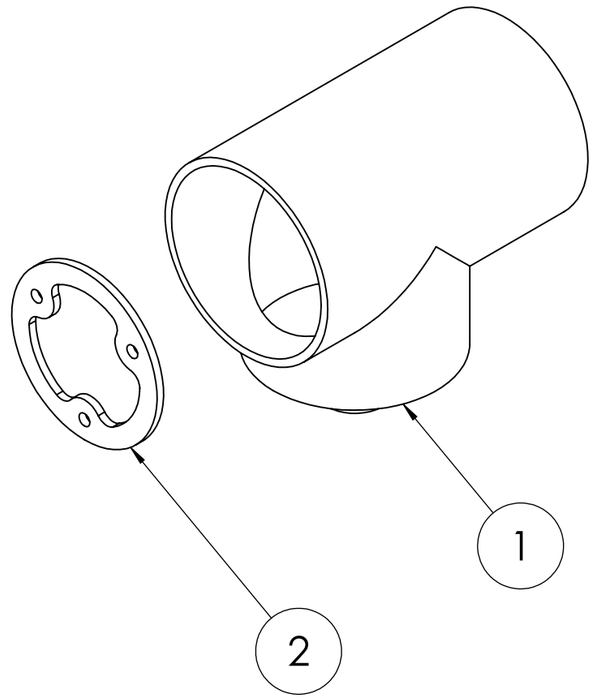


Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish:
			Material: AISI 304
	Name / Signature / Date	SAXION	Description: **Plate**
Drawn:	S. Wiggers / 17-6-2019		
Checked:		Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **04.0403** / Revision: / Format A3
Class:	SSS / StudentNo.		Weight: 1081.18 grams / SCALE: 1:5 / SHEET: 1 OF 1



SECTION A-A





ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
2	1	04.0108	04.0108	AISI 304
1	1	04.0903	Inkoop JoinThePipe kraan	

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish: Chrome

Material:

	Name	Signature	Date
Drawn:	S. Brand		14-5-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:
JTP Kraan assembly

Drawing number: **04.0901**

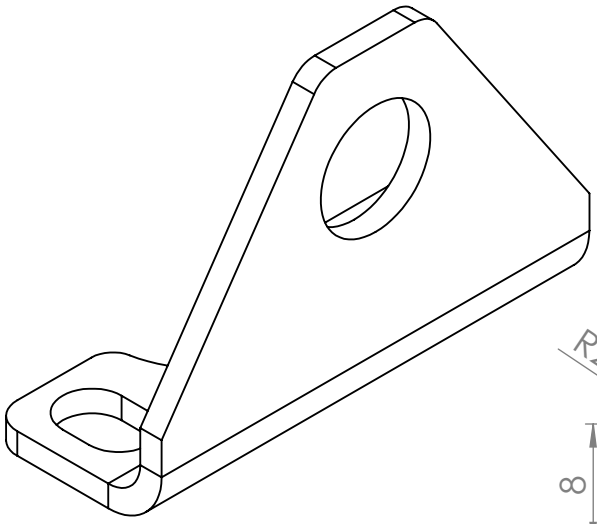
Revision:

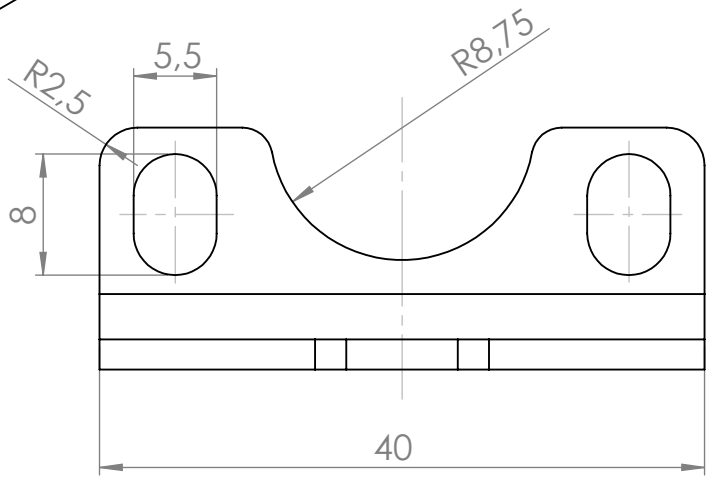
Format: A3

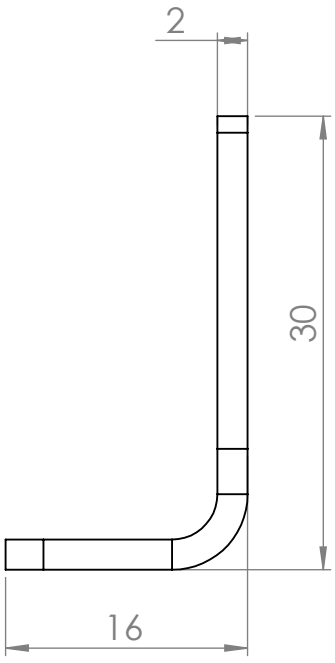
Weight: 1436.11

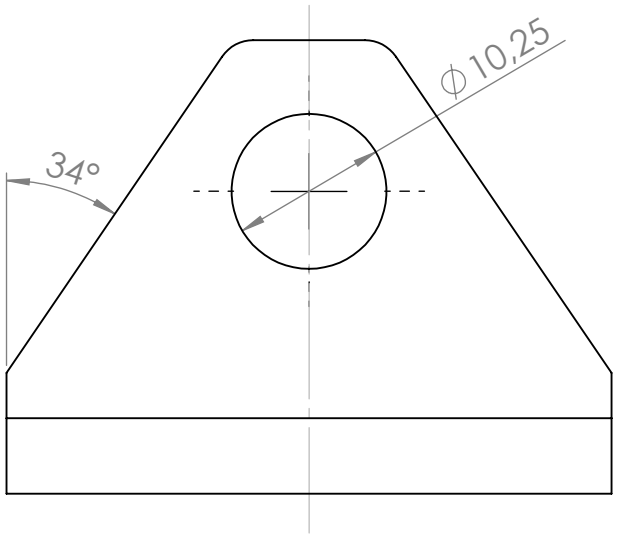
SCALE: 1:1

SHEET: 1 OF 1

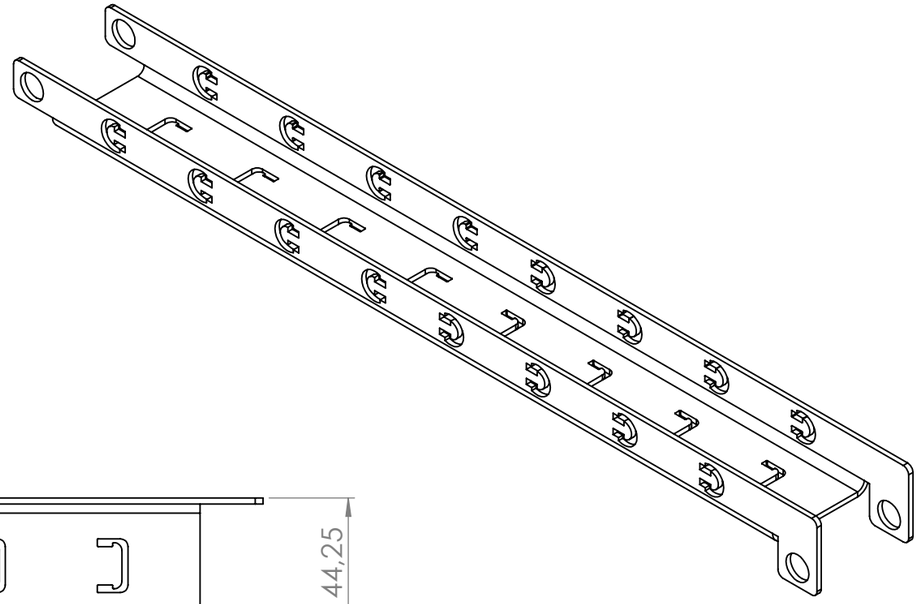


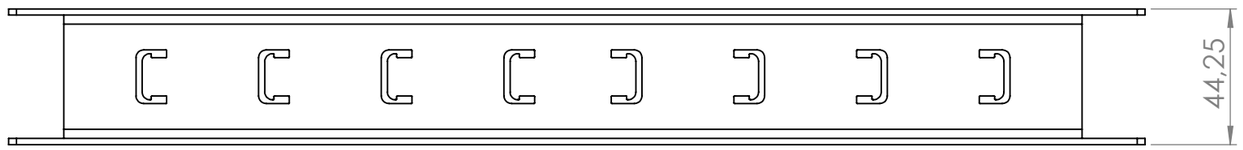


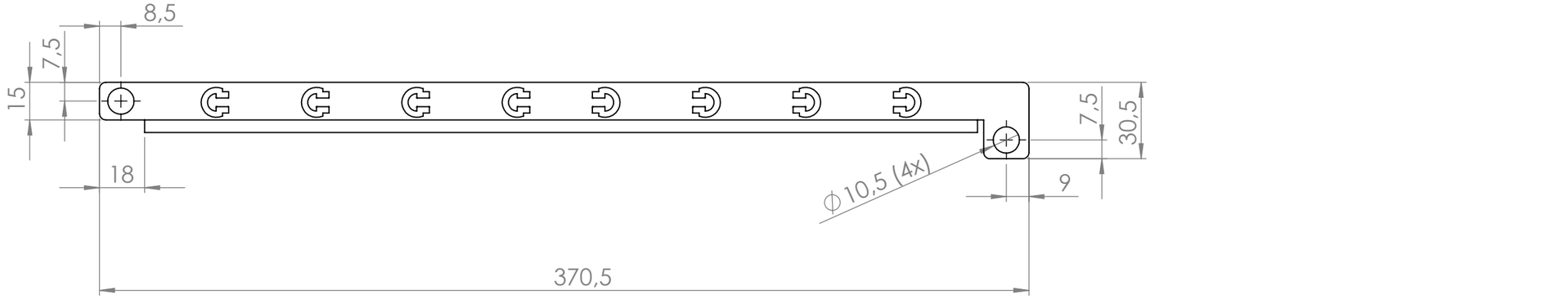




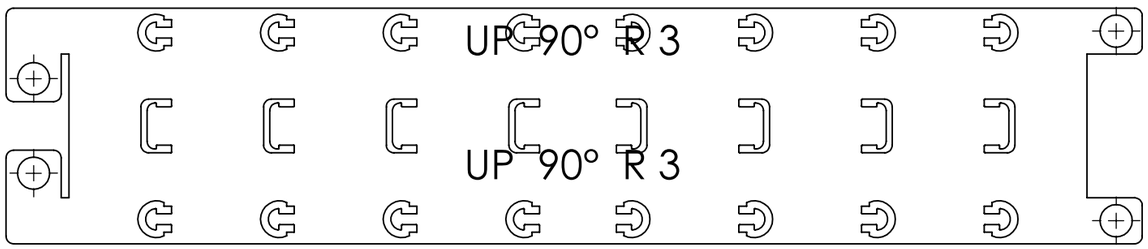
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Soda Blasting Material: AISI 304
	Name / Signature / Date	SAXION	Description: **Plate**
Drawn:	S. Braakman / 17-6-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **05.0008** / Revision: / Format A4
Checked:			
Class:	SSS / StudentNo.		Weight: 17.26 grams / SCALE: 2:1 / SHEET: 1 OF 1



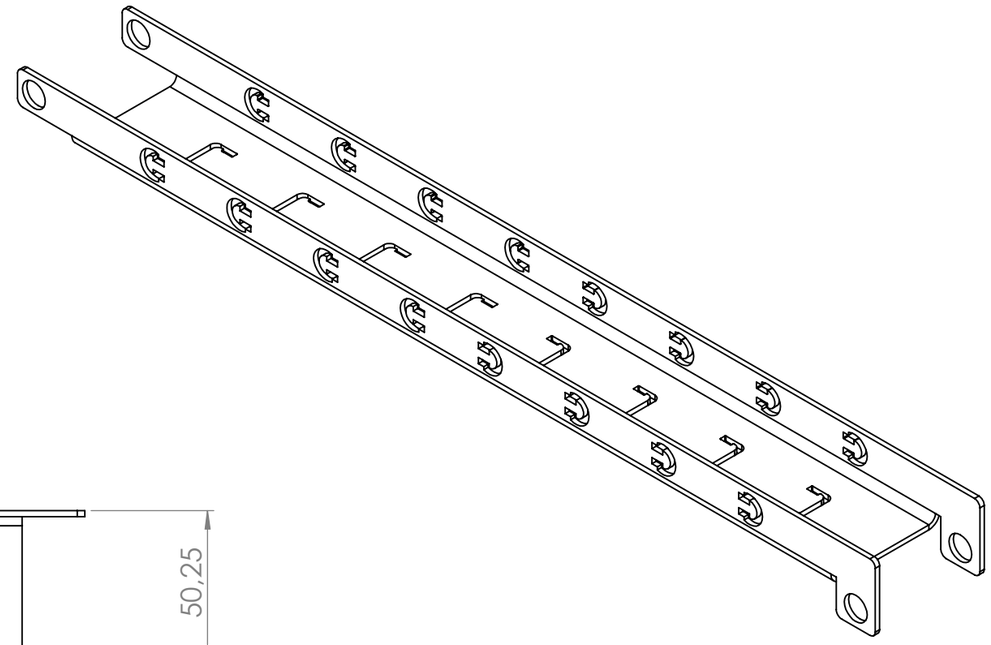


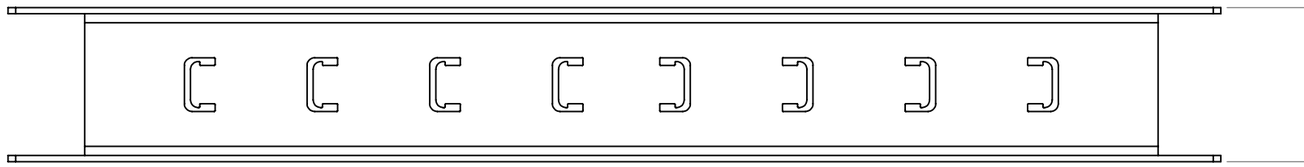


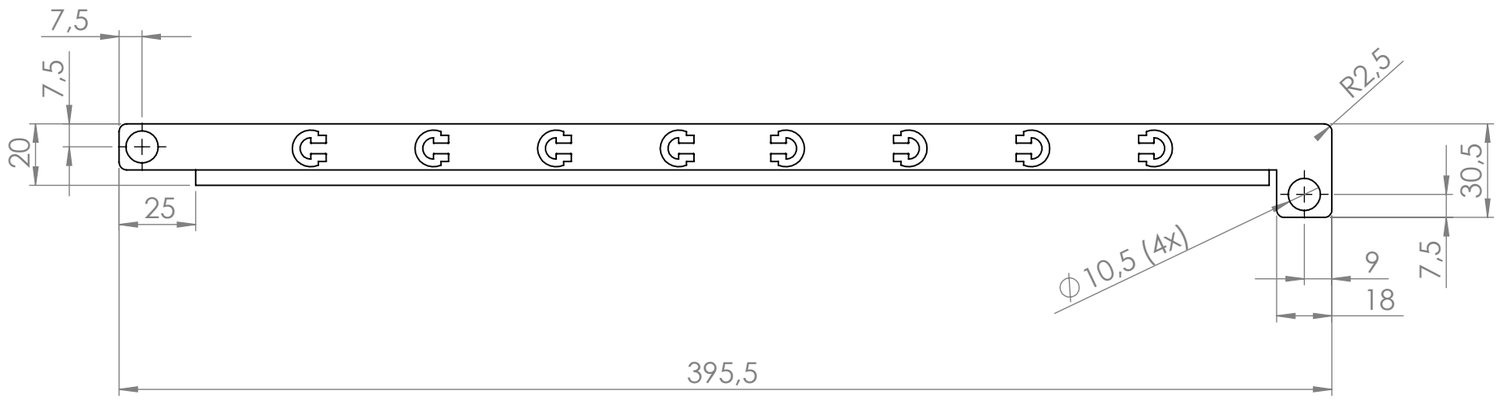
For information



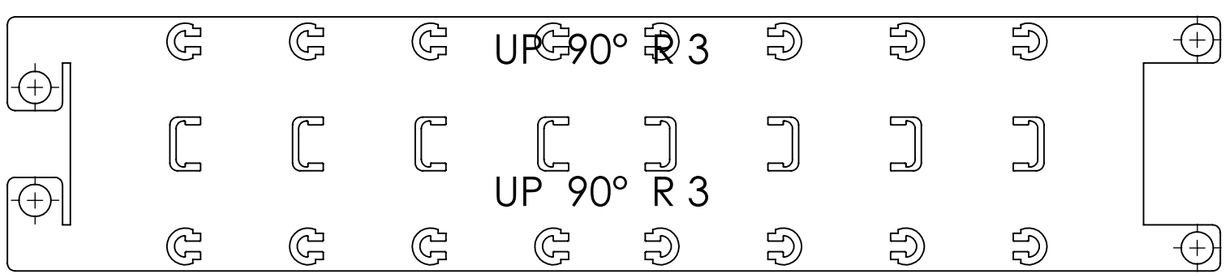
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish: Soda blasting	
				Material: AISI 304	
	Name / Signature / Date	SAXION		Description: **Cable bracket**	
Drawn:	S. Braakman / 17-6-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl		Drawing number: **05.0005**	Revision: / Format A3
Checked:				Weight: 403.11 grams	SCALE: 1:2 / SHEET: 1 OF 1
Class:	SSS / StudentNo.				







For information



Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Soda blasting Material: AISI 304

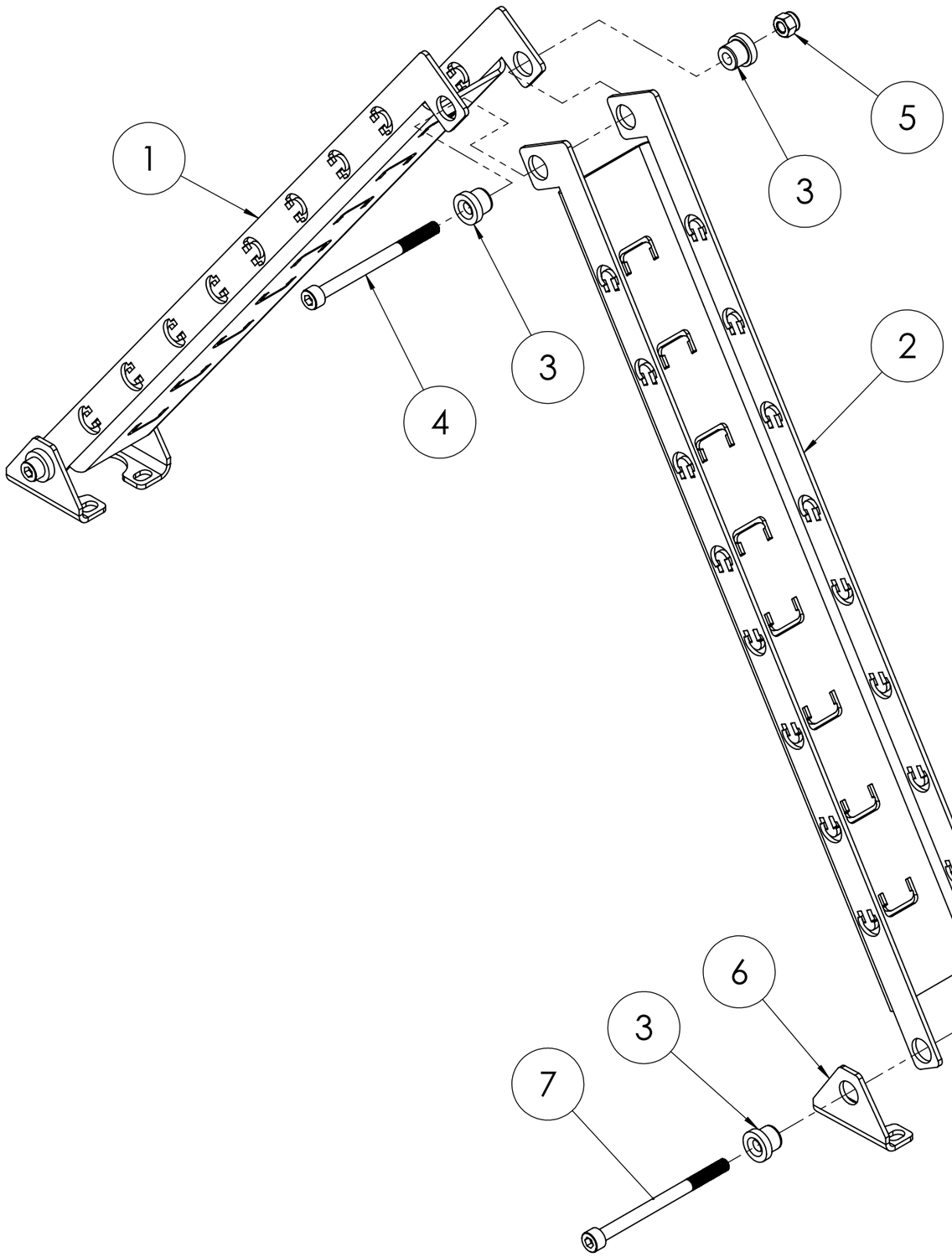
	Name	Signature	Date
Drawn:	S. Braakman		17-6-2019
Checked:			
Class:	SSS	StudentNo.	

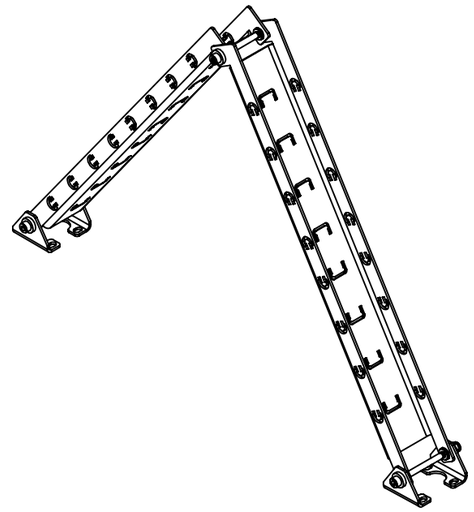
SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description: **Cable bracket**

Drawing number:	Revision:	Format
05.0006		A3

Weight: 462.19 grams | SCALE: 1:2 | SHEET: 1 OF 1





ITEM NO.	Fixed/QTY.	PART NO.	DESCRIPTION	MATERIAL
7	1	M5 x 70 Hex. socket screw A2		
6	4	05.0008	Plate	AISI 304
5	3	M5 Hex lock nut A2	51730.050.001	
4	2	M5 x 65 Hex. socket screw A2		
3	6	bb0585		Steel
2	1	05.0006	Cable bracket	AISI 304
1	1	05.0005	Cable bracket	AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material: Material <not specified>

	Name	Signature	Date
Drawn:	S. Braakman		17-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:
Cable bracket assembly

Drawing number: **05.0007**

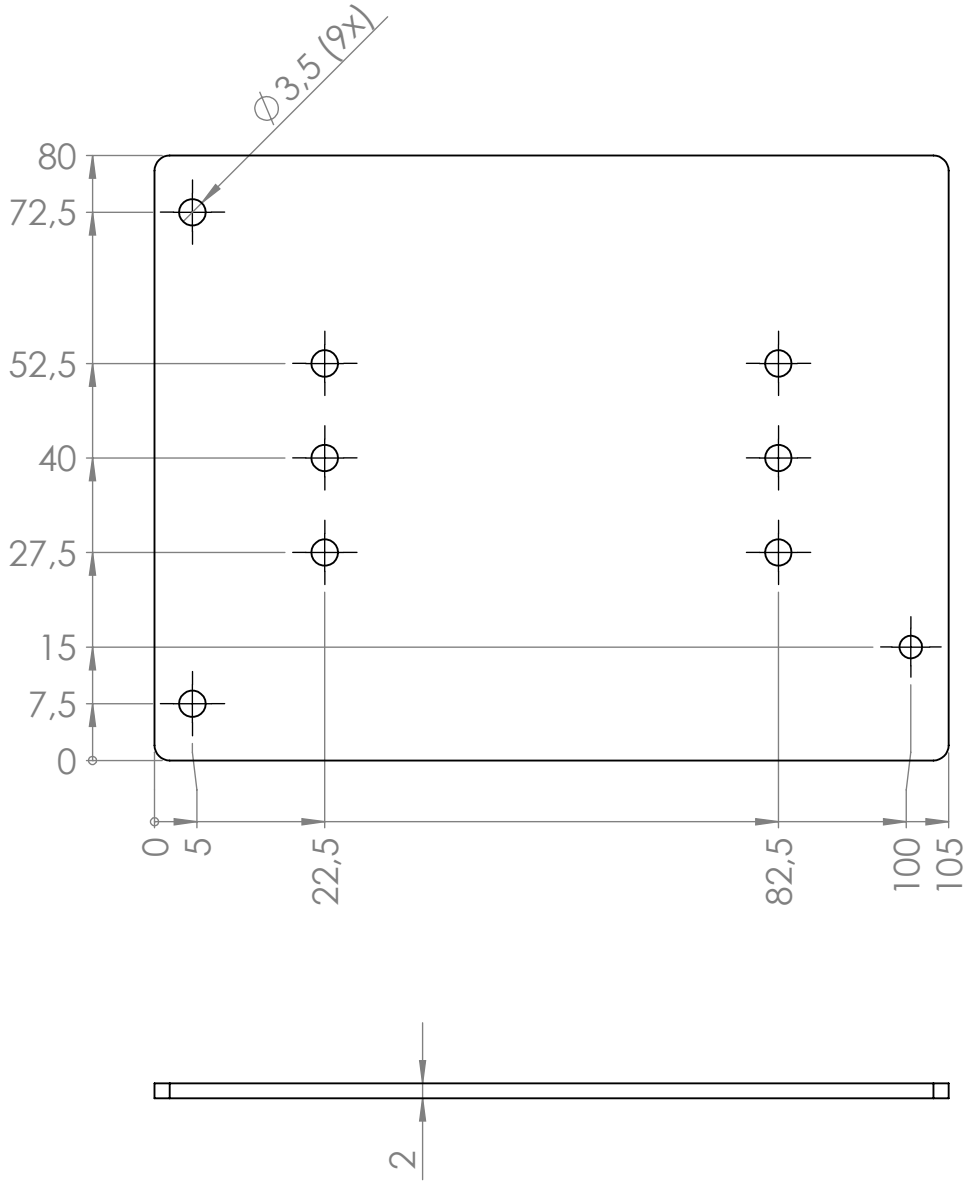
Revision:

Format: A3

Weight: 944.00

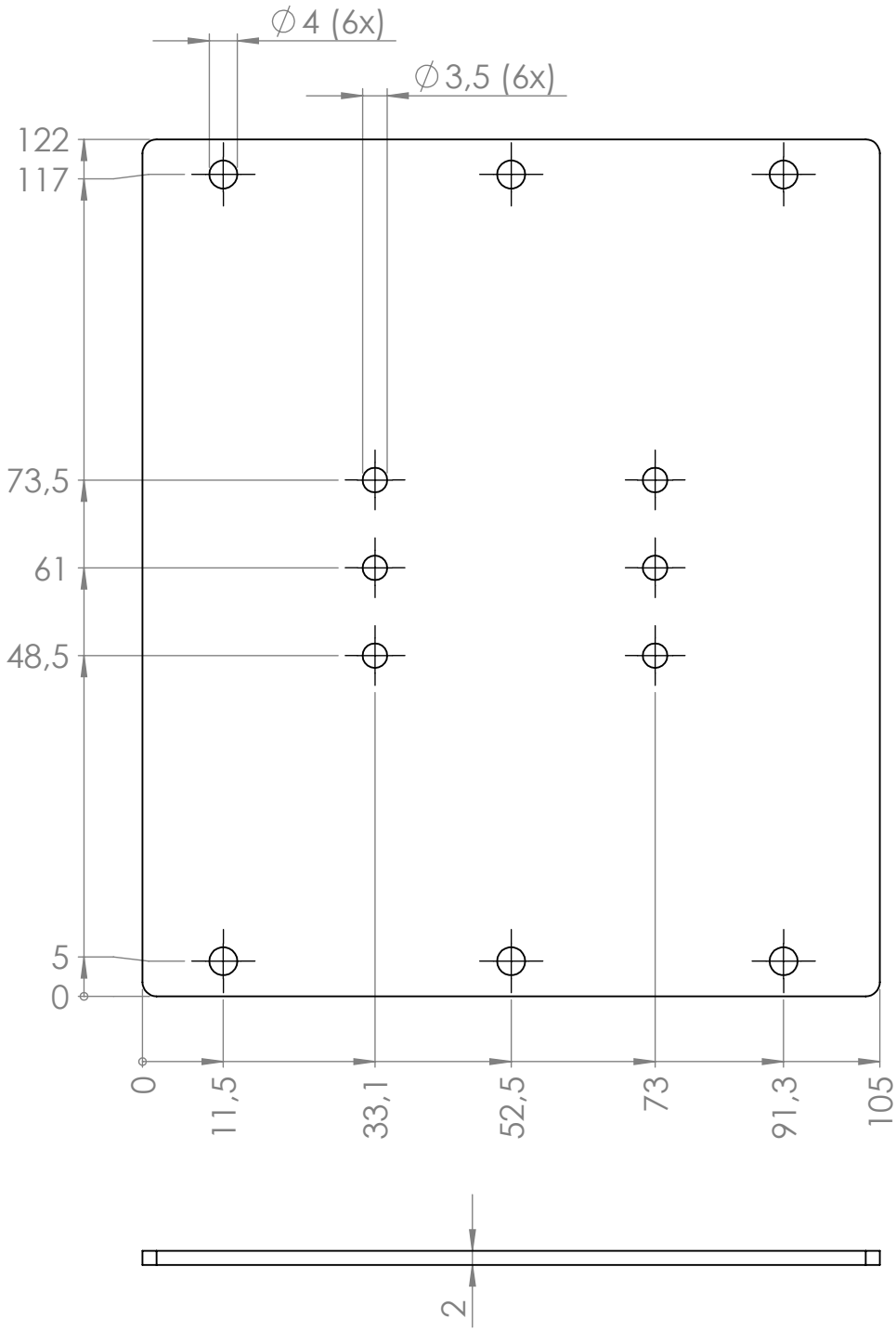
SCALE: 1:5

SHEET: 1 OF 1



Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish: Soda Blasting	
				Material: AISI 304	
	Name	Signature	Date	Description:	
Drawn:	S. Brand		17-6-2019	**Plate**	
Checked:				Drawing number: **06.0007**	Revision:
Class:	SSS	StudentNo.		Weight: 133.00 grams	SCALE: 1:1
					Format A4
					SHEET: 1 OF 1

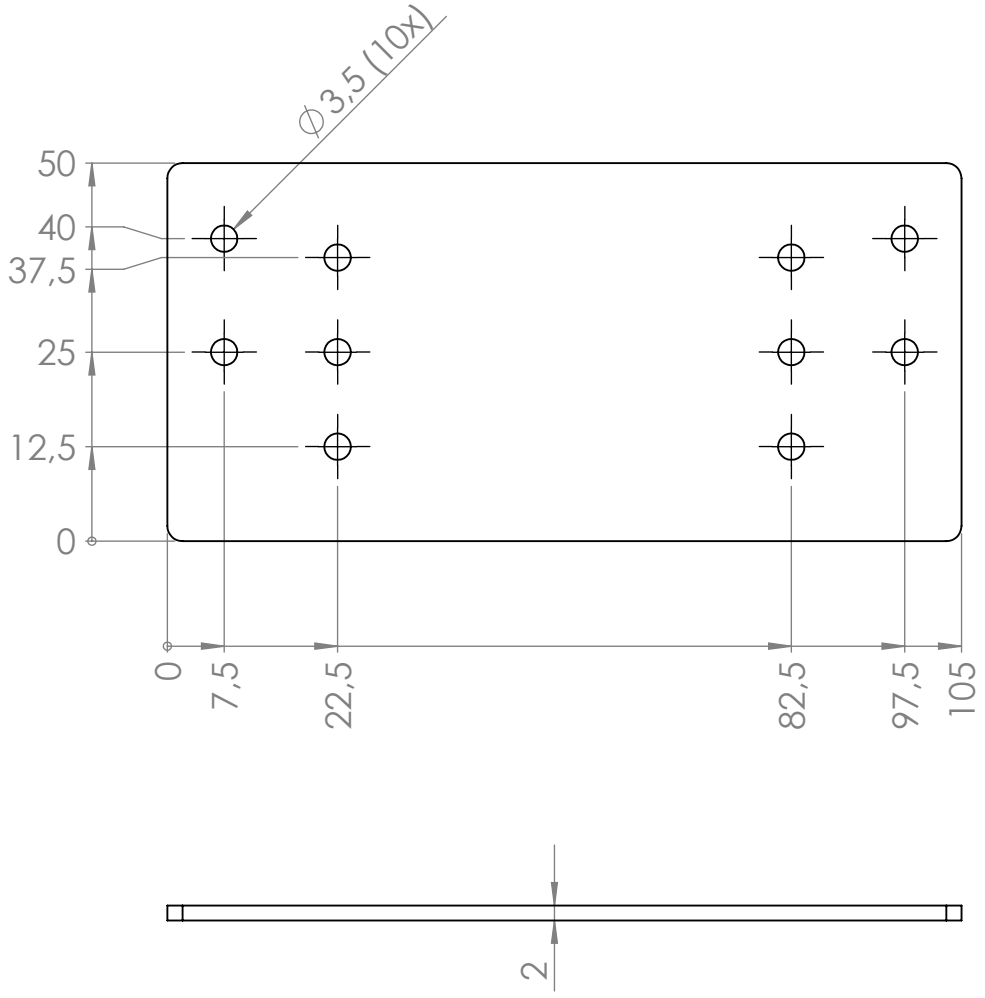
SAXION
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl



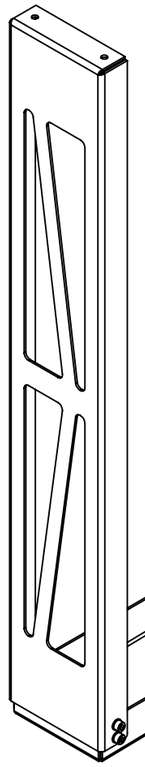
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish: Soda blasting	
				Material: AISI 304	
	Name	Signature	Date	Description:	
Drawn:	S. Brand		17-6-2019	**Plate**	
Checked:				Drawing number: **06.0002**	Revision:
Class:	SSS	StudentNo.		Weight: 202.78 grams	SCALE: 1:1
					Format A4
					SHEET: 1 OF 1

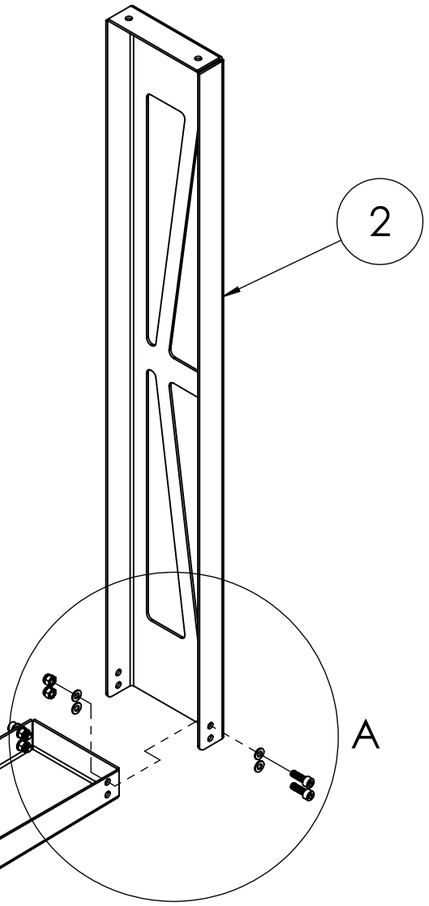
SAXION

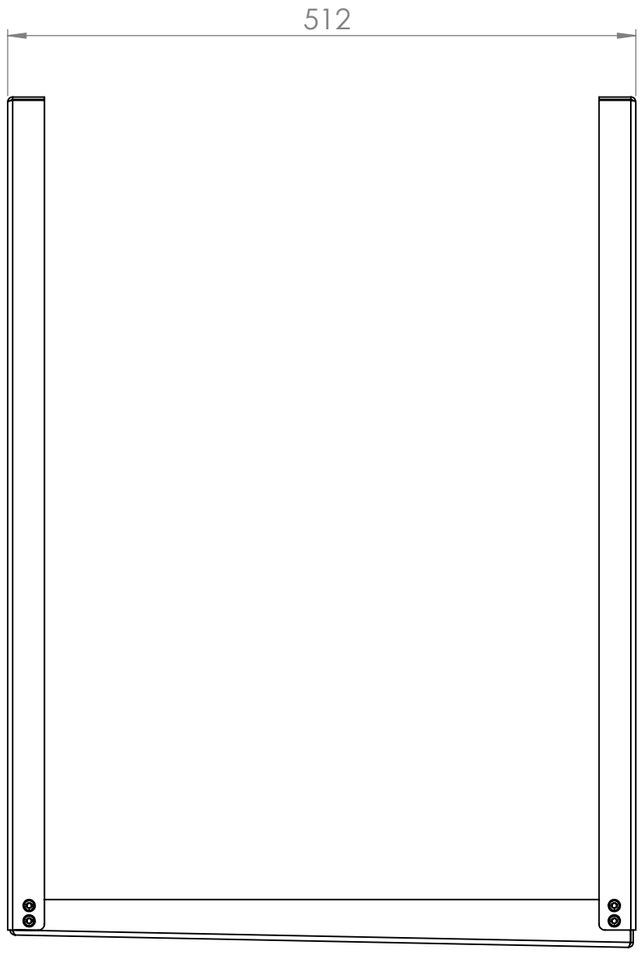
Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

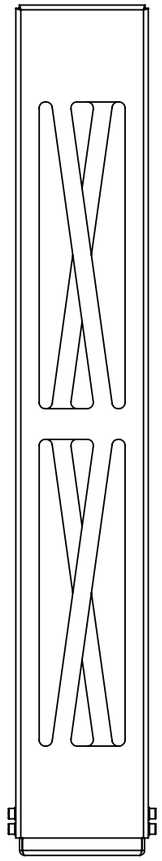


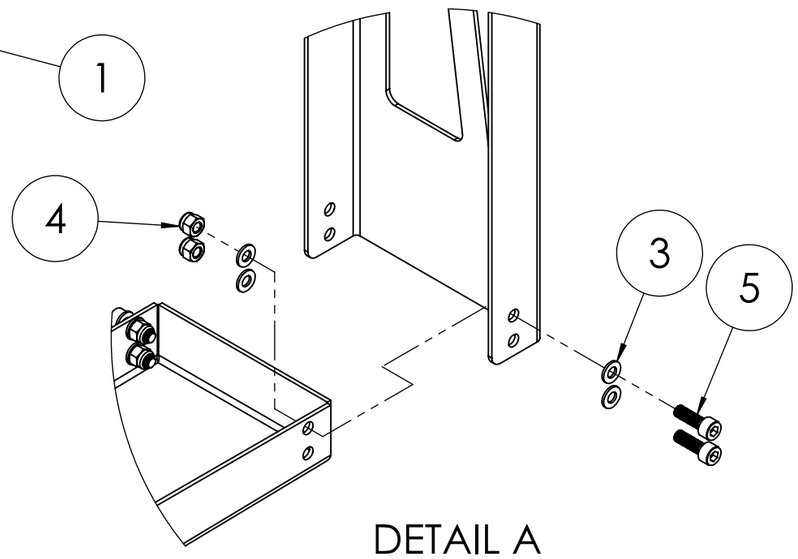
Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK		Finish:	
				Material: AISI 304	
	Name / Signature / Date	SAXION		Description: **Plate**	
Drawn:	S. Brand / 17-6-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl		Drawing number: **06.0005**	Revision: / Format: A4
Checked:				Weight: 82.41 grams	SCALE: 1:1 / SHEET: 1 OF 1
Class:	SSS / StudentNo.				











DETAIL A
SCALE 2 : 5

ITEM NO.	QTY.	PART NO.	DESCRIPTION	MATERIAL
5	8	M5 x 16 Hex. socket screw A2	51050.050.016	
4	8	M5 Hex lock nut A2	51730.050.001	
3	16	M5 Washer A2	51420.050.001	
2	2	07.0003		AISI 304
1	1	07.0002		AISI 304

Am. Projection

DIMENSIONS IN MILLIMETERS

DEBUR AND BREAK SHARP EDGES
TOLERANCES ACCORDING TO: ISO 2768-mK

Finish:

Material: Material <not specified>

	Name	Signature	Date
Drawn:	S. Braakman		17-6-2019
Checked:			
Class:	SSS	StudentNo.	

SAXION

Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands
Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands
Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl

Description:
Bracket evaporator

Drawing number: **07.0001**

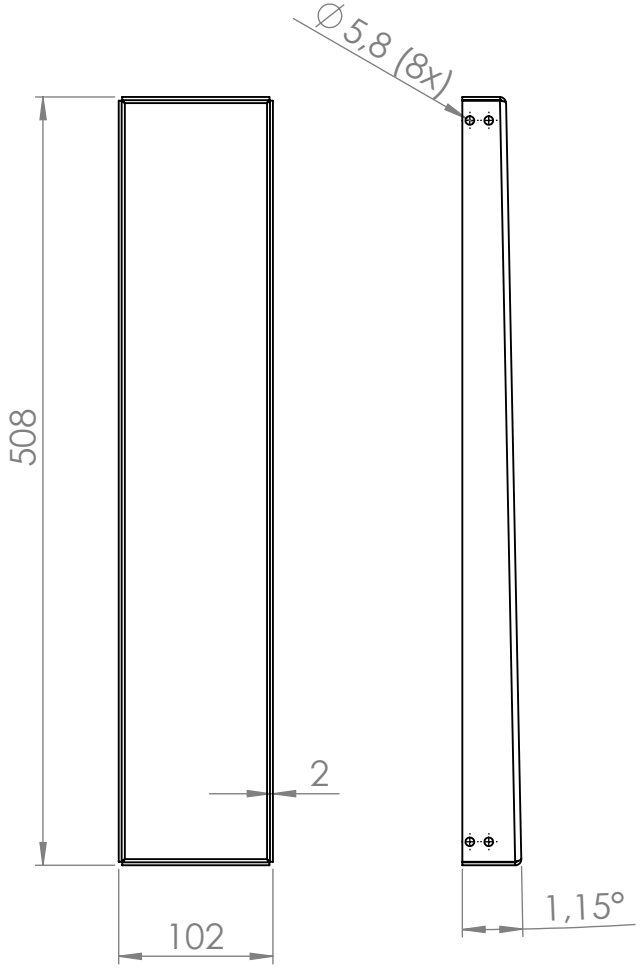
Revision:

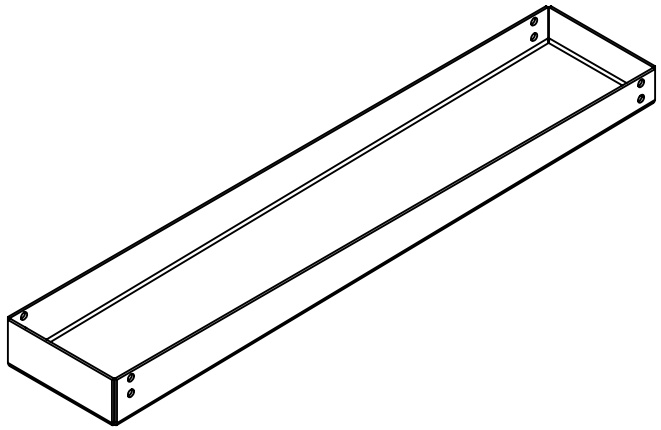
Format A3

Weight: 4131.92

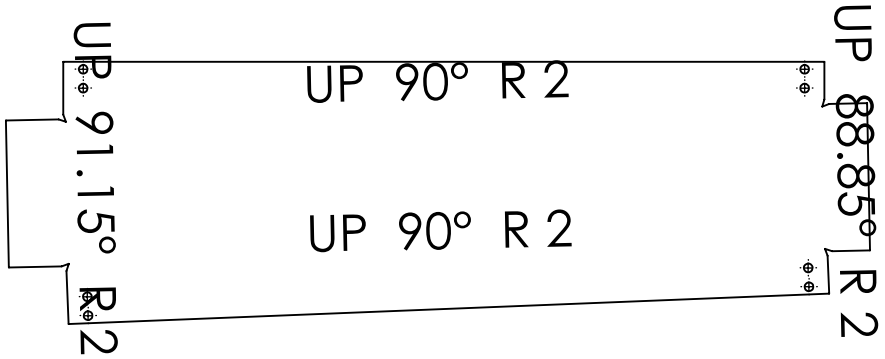
SCALE: 1:5

SHEET: 1 OF 1

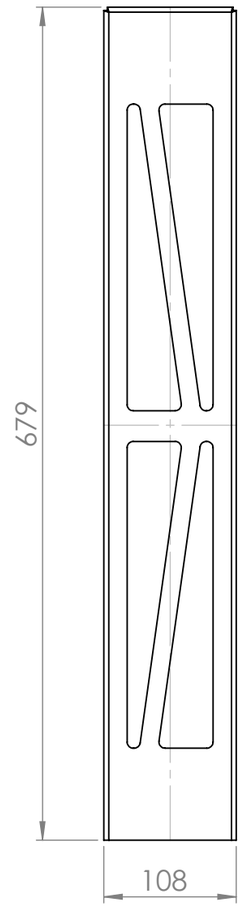


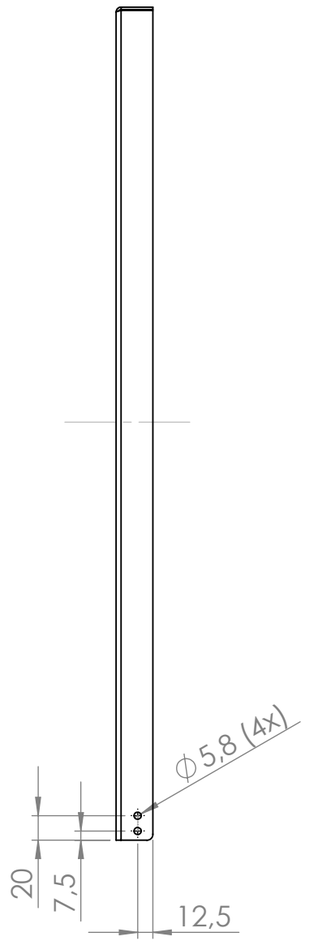


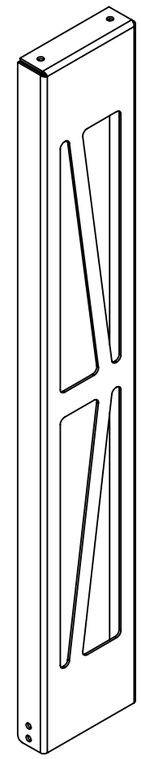
For information

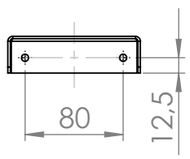


Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Soda Blasting Material: AISI 304
	Name / Signature / Date	SAXION	Description: **Plate**
	Drawn: S. Braakman 17-6-2019	Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **07.0002** / Revision: / Format A4
	Checked:		Weight: 1415.38 grams / SCALE: 1:5 / SHEET: 1 OF 1
	Class: SSS StudentNo.		

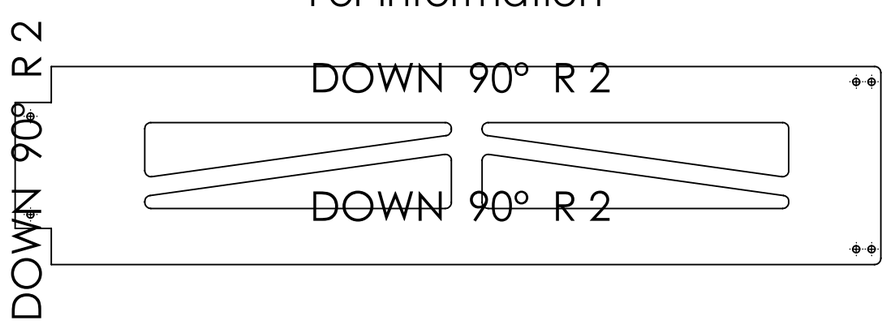








For information



Am. Projection	DIMENSIONS IN MILLIMETERS	DEBUR AND BREAK SHARP EDGES TOLERANCES ACCORDING TO: ISO 2768-mK	Finish: Soda Blasting		
			Material: AISI 304		
	Name / Signature / Date	SAXION	Description: **Plate**		
Drawn: S. Braakman 17-6-2019		Address: M.H. Tromplaan 28, 7513 AB Enschede, The Netherlands Postal address: P.O. Box 75000, 7500 KB Enschede, The Netherlands Phone: +31 53 4871111 Fax: +31 53 431 2233 Web: www.saxion.nl	Drawing number: **07.0003**	Revision:	Format A3
Checked:					
Class: SSS StudentNo.			Weight: 1354.72 grams	SCALE: 1:5	SHEET: 1 OF 1