# User's instructions

**100 l, one-step, enriching towered distiller, with double-walled water-jacketed cauldron**

## Installing the equipment

In order to use the equipment simply and safely, there is need for proper environment (distilling room). Establish a room or open semi-roof of at least 10 sqm where it is possible to use the equipment safely even in harsh weather conditions. It is reasonable to place the equipment on a fix surface so that it is not required to install it before every distillation session. The distilling environment shall comply with the work-, fire- and accident protection provisions. The equipment shall placed in a well accessible environment (can be walked around). The best solution is a corner / side-wall where the proper infrastructure is available (water, mash drain, the canal that drains the cooling water from the machine.) The foundation shall be horizontal, stable, without slipping, and made possibly of concrete or tiles. The cauldron shall be positioned horizontally.

*figure 1*

*figure 2*

For the horizontal positioning use the setting screw which is welded to the bored bottom. In the starting moment tighten the screw then by unscrewing set the cauldron in such a way that the brim of the cauldron gets into horizontal position, like in the picture. (figure 1*).* Check the horizontality with the 90-degree rotation of the water-level. Having finished the positioning into horizontal bore all three legs so that the cauldron does not swing. (figure *2*)

**ATTENTION: Due to its height the cauldron may turn upside down! Do not forget to drill the holes to fix the legs of the equipment!**

If you'd like a mobile cauldron, then the legs need to be fixed to a rolling stable frame. The rolling frame shall be established according to the site, regarding the details contact us or see the pálinkafőző.hu website. Tighten the nut on the leg-setting screw so that the closed profile gets close to the leg. Proceed with care when transporting or lifting the equipment, making sure the structural elements do not get damaged. With the lifting handles found on the cauldrons two people should perform its moving or lifting. The cauldron needs to be empty during transportation. It is forbidden to move cauldron when it is warm or full. If you intend to move / transport the cauldron, the content of the water-jacket needs to be drained, too.

## Assembling the equipment

**Assembling the equipment according to the enclosed figures.**

**Connection of the column and the dome:**

- Mount the column onto the dome making sure that the gasket and the screws are adjusted as presented in the picture (figures *3 and 4*)
- The assembling requires two people because the column is heavy.
- Do not scratch the surface of the dome when tightening the screws.
- Screw the dome and column together and place the combined fixture onto the cauldron (requires two people).
- Make sure the gasket does not get off the cauldron's neck.
- Having placed the dome and the column onto the cauldron check the proper position of the gasket.

*figure 3*

*fig. 4*

**Head thermometer** *(figures 5, 6, 7, 8):*

- Place the probe of the thermometer into the gland.
- Tighten the gland-fixing nut. (It is sufficient manually)

*fig. 5*


*fig 6*

*fig 7*

*fig 8*

**Establishing the water circuit (water supply /draining, recommended connection, figure *9*):**

- The left hose (marked with a circle) serves to connect the cooling water. Connect the system water with a minimum pressure of 3 and maximum 5 bars, with a uniform pressure.
- The right connection (marked with a circle) serves to drain the warmed-up cooling water. There is need for heat-resistant (100°C) hose (silicon hose or metal tube draining).
- Make sure the cooling water can leave freely along the draining hose.
- It is FORBIDDEN to put the cooling water system (end-cooling water circuit, deflegmating water circuit) under pressure, the free outflow shall be assured. The water connections shall be filled free of drips and flow.
- We recommend to involve a technician to connect the water and establish the drainage system.

*figure 9*

**Filling door** *(figure 10):*

- The below figures show the fixing of the filling door.

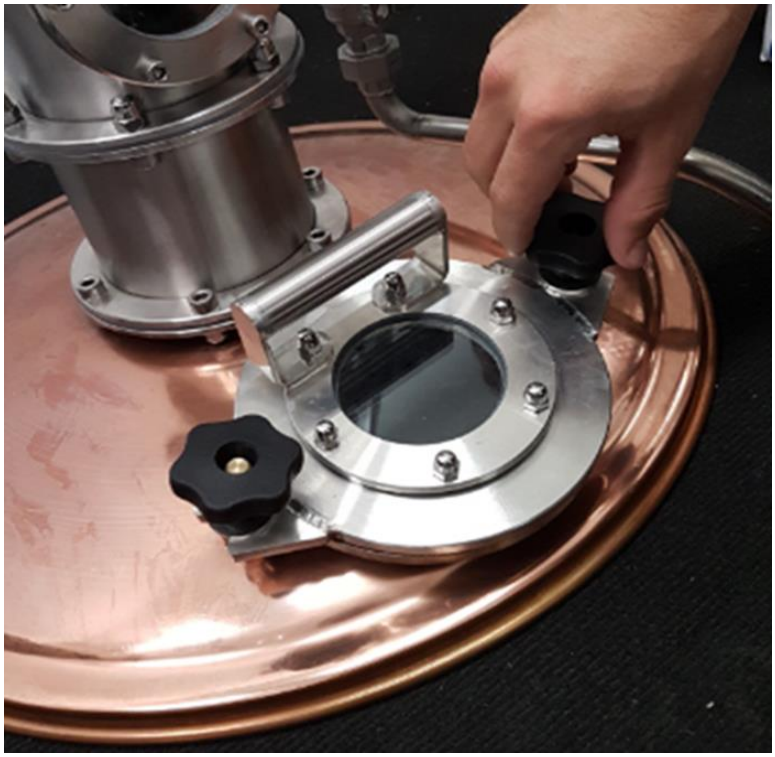

*figure 10*

**Fixing the dome** *(figure 11):*

- The below figures are presenting the connection between the dome-fixing stainless bracket and the fixing brass swinging screw.

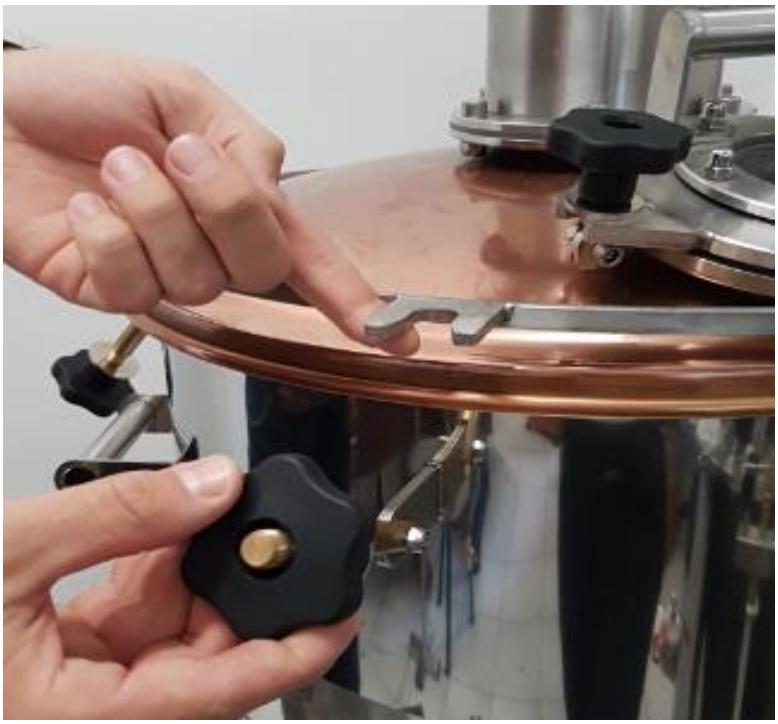

*figure 11*

**ATTENTION:** The distiller can't kept over fire when it is empty! No live coal can remain under the empty cauldron! After removing the wash or sub-alcohol remnant that remained in the cauldron IMMEDIATELY pour liquid (mash, sub-alcohol or water, etc.) into the cauldron. The cauldron must not be heated to make the whole content of the cauldron evaporate.

## Removing the production contamination

**Cleaning the interior of the cauldron and the dome:**

Prepare detergent solution: Dissolve detergent used for kitchen purpose (such as dishwashing agent, trisodium phosphate, soda) in warm water. With a soft (non-scratching) sponge or cloth thoroughly wash the interior of the cauldron and the dome, then rinse it - several times if required - first with warm water then with cold water. Do not use scratching scrubbing agent. If the detergent solution does not remove the soldering traces existing in the interior of the cauldron and the dome, we can remove these salt dissolved in some vinegar (one decilitre vinegar / medium-sized spoon of salt), during the scrubbing with a soft sponge. In the future try to avoid the contact between the brass surfaces and vinegar and other aggressive agents. After some utilisation sessions the inner surface of the dome might get discoloured

**Cleaning boiling:**

Fill the cauldron with potable water up to its half. Proportionally with the quantity of the water put detergent good for kitchen purposes (e.g. kitchen detergent, trisodium phosphate, soda) into the water – in a quantity corresponding to the detergent's instructions (usually a few decilitres or some spoonfuls), then for the dissolving mix the kitchen detergent. Assemble the equipment in the way presented earlier then start heating under the cauldron. **Do not put water into the cooling container!**

Steam will appear at the end of the outflow pipe. For 10-15 minutes from the steam's appearance steam the system, so do not interrupt the heating. During the steaming steam will keep leaving the outflow pipe. **It is not allowed to evaporate the entire quantity of water from the cauldron.**

**Rinsing:**

After the detergent-based steaming it is required to thoroughly rinse the column and the cauldron. For the rinsing of the column, to wash it with clean water use the washing head that can be fixed instead of the outflow pipe.

After having thoroughly rinsed the column, take it off together with the dome and rinse the cauldron, and wash the inner surface of the dome, too. It is recommended to rinse the column after every boiling.

## Heating possibilities

**Electric heating (with simple or double heating rods):**
We are enclosing a separate instruction manual for the equipment with electric heating which contains the details of the position, connection of the switch cabinet and the related instructions.

**Gas (PB or natural gas):**
When using the gas-heated cauldrons it is important whether the equipment is used inside or outside.

**Indoors** (closed building area, distilling room /workshop, cooking room, etc.): in case of the installed equipment it is mandatory to use gas-heated cauldron house. Respectively the cauldron house needs to be connected into a system with the proper smoke exhaust (chimney or side-exhaust). The execution / checking of the smoke exhaust needs to be made with an expert chimney sweeper. The compliance statement related to the installation shall be kept together with the device's documents. The gas burner used indoors shall be supplied with the proper burn-safety system. The burn-security is meant to assure that if the gas-flame burns out due to operational failure / other problem, the gas ceases to flow. The special composition and implementation of the gas-burner that correspond to the given site and installation shall be performed by a gas-fitter expert.

**Outdoors** (in plain air or in a building area that is open along at least two longitudinal sides): in case of these cauldrons it is not mandatory to use the recommended gas-heated cauldron house since it is protecting the gas-flame from the problems caused e.g. by the draught / wind. For the equipment purchased without a cauldron house it is recommended to wall the cauldron house or establish it in any other professional way. The cauldron house contributes with significant heat-energy saving to the economical use of the equipment. The cauldron house can be ordered subsequently, too. In case of the cauldrons installed without the cauldron house one shall make sure the gas flame does not damage the pipes / ducts / fixtures that are connected to the cauldron, such as: electric hating rod connections and cables, water in- and outflow hoses, distillate-collecting devices, level pipe and draining tap, mash-drain tap, gas hose, etc.
The installation of the special gas-burner shall be performed by a professional gas-fitter according to the utilisation circumstances. The compliance statement related to the suitability / installation of the gas-burner shall be kept together with the device's documents. Make the fitter complete and sign the statement. The gas-burner is compliant from technical perspective if it can be regulated well through a sensitive regulatory valve (characteristically with an output of between 5-20 kW), it is required to be installed at a distance from the bottom of the cauldron that corresponds to the flame's intensity. The gas-burner's flame should be vivid blue. The yellowish discolouring is a sign of the imperfect burning. In this case switch off the gas burner and have the system checked with an expert.

**Filling up the double-walled cauldron with water:**
Fill up the water-jacket with tap-water. If the tap-water is not soft (harder than 7-14 nk°) use ion-exchanged water to fill up the water-jacket. The water-jacket has a volume of about 30 litre. *(figures 12,15).* When filling in the water the pressure-regulating valve shall be open so that the air can depart freely. The picture shows the open status of the pressure-regulating valve (unscrewed cover) *(figure 13).* By pressing the plate of the vacuum valve it is possible a similar result. Do not forget to close again the pressure regulating valve if it was opened earlier.
If you are closing again the pressure regulating valve and carefully open the water-filling / draining tap, the pressure gauge will show the increase of the pressure. The weight should blow off between 0.5-0.6 bar. If this

does not happen, then the cauldron can't be used. In this case contact the service department or with authorised expert. The maximum filling level of the water jacket in case of water with a temperature of 15-25°C is shown in the below figure. Make sure the water jacket is filled at the proper level. The filling level of the cold water (15-25°C) should not go significantly under the maximum filling level (max. 10-11 cm). If required, out of operation, perform the refilling of the cauldron that cooled to room temperature.

figure *12*

*figure 13*


*figure 14*

**Maximum filling level of mash** *(figure 16)***:** in the way shown in the figure it is recommended to keep free 8-10 cm from the cauldron's brim (foam area) in case of average mash. If the mash is prone to produce foam (e.g. sour-cherry, cherry, marc, wine lees), it is recommended to fill the cauldron even lower. One shall pay special attention to the foaming. In order to keep the mash inside, before the boiling point the supplied energy should be reduced significantly, the heating must be reduced. Use foam-inhibiting oil.


*figure 15* *figure 16* *figure 17*

**ATTENTION: no pressure higher than 0.5-0.6 bar can be formed in the water jacket. Before using the device perform regular blind checking for the synchronicity of the pressure gauge and the pressure-regulating valve.** *(figure 14)*

**Blind test:**
If through the inflow / drain tap you are carefully out the system under pressure while the pressure-regulating valve is closed, the value shown by the pressure gauge will increase. When the pressure gets between 0.5-0.6 bar, the weight valve should open. Thus it lets the pressure surplus go, with a hissing sound. If the blow-off does not take place, or the blow-off does not take place but the pressure gauge shows an incorrect value, one of the devices is wrong. The bad device needs to be replaced or repaired, and it is forbidden to use the cauldron till the servicing / repair / replacement. Before each use perform a blind test and even during the operation monitor the variation of the pressure. If the pressure increases over 0.6 bar and the pressure-regulating valve still does not open, stop the heating and contact an expert or the service.

**Frost protection:**
If the machine's environmental temperature falls below the water's freezing point, the liquid should be drained from the water-containing parts, e.g.: column deflegmator, cooler, column's inner overflow parts, cooler and fixtures, cauldron water jacket, etc.

**Required tools:**

- **Water-draining pipe:** For the device's water draining tap (stable pipe resisting to the water's temperature of 80-90°C). The waste water is worth connecting directly to a one-meter high draining pipe, created next to the device. The column's water-cooling circuit can't be placed above a pressure higher than 2 bar.
- **Torch**: To light the parts supplied with sighting slot
- **Mash-emptying device:** E.g. metal bucket, etc. In addition we definitely recommend connecting the machine's mash-draining tap to a draining pipe that resists to minimum 100°C. We draw the attention that the periodical draining (closing the tap after 5-10 litres, then opening it again) has the disadvantage of the much shorter shelf-life of the tap. Primarily due to the many opening-closing,

secondarily when we press seeds or other solid material to the gasket of the ball-end. In such case the tap will start dripping after a while and will require replacement. It can be replaced with a 76.1-mm (2.5 inch) draining tap. If the ball-end is opened only partly to drain the mash, it may happen that the draining pipe gets blocked because of the jamming seeds or other solid items. In this case the contamination should be loosened with a proper tool or running water, and in every case from the cauldron's side (not through the tap), so that the mash does not fall on the person who deals with the blocking. If there is no way to establish a drain for the mash, it is recommended procuring a vessel (flat barrel, other container) with the same volume like the cauldron.

**Required work-protection tools**:

- **Suitable closed clothes**, heat-resistant gloves, suitable work-protection shoes. It is very important to use the device safely and without accidents. Please, be careful when using the device.
- **Spare battery for the head-thermometer:** by intensive use it is recommended procuring 5+ spare batteries
- **Rotameter**: liquid thread filler
- **Mechanic's maintenance set: 13 mm, spanner, etc.**

## Structural parts and their functions:

**Cauldron with pressure-holding double-walled water-jacket:**

The pressure of the water-jacket is regulated by the 0.5 bar spring-valve certified by the TÜV quality assurer. Since the temperature of the water in the water-jacket between the two cauldrons (double-walled area) and the equilibrium steam above the water can't be more than 110°C at 0.5 bar, therefore the materials poured into the cauldron are not getting burnt, scorched (fruit mash, raw material for jam, cereals, etc.), not even in case of intense heating. The water area is reduced, thus the cauldron reacts quickly to the modified heating/heat delivery, thus the distilling process can be controlled easily.

**Mixing motor of 220 V:**

**During heating up:** The heat gets quickly from the water jacket through the sheet of the inner cauldron – through heat-transfer – because metals are adjusting well to heat. The heat delivered by the inner cauldron gets mixed slowly in the mash. It gets slowly from the heat sheet to the centre of the poured material (core temperature). Thus because of the missing heat-difference forming in the cauldron and the mixing the heat gets "accumulated" close to the sheet, and the heating-up process gets slower. The mash can't take over the surplus heat introduced during the heating. If we are mixing mechanically the material poured into the inner cauldron, then the heat-mixing, heat-transporting process within the mash (convection) will result in fast and dynamic heating-up. Due to the mixing the temperature difference in the cauldron's mash area will disappear.

**During the distilling:** At the start of the distilling - without mixing – it can be observed that in certain parts of the inner cauldron there are temperature differences. Close to the sheet the material is overheating and the core temperature will be lower. Thus the boiling will start directly next to the sheet first, and the mid-part of the mash will boil later, and less intensely than along the side-wall heated partly with steam. This phenomenon is damaging for the distilling because the same

components (e.g. pre-distillation components) are released in different intervals in certain parts of the mash due to the temperature differences in the mash area. This phenomenon is distorting the pre-mid-post distilling separation points, it is prolonging them and washing them together. Without mixing we are losing valuable aroma materials in the pre-distilling phase and the earlier arrival of the sour post-distilling components is also a risk. In addition the distilling speed is higher when we mix the mash uniformly. The mixing work is assured by a high-momentum (20-25 Newton-meter) engine and robust mixing blade. The mixing blade can be taken out by releasing one screw, not to obstruct during the jam pasteurisation. With the mixing the temperature distribution of the mash is homogeneous, and the steam released during the distilling is uniform.

**Mash thermometer:**

Since the probe gets directly into the mash area of the inner cauldron, we can monitor the temperature rising during the heating-up phase. A settable sound signal warns if we are approaching the boiling point (90°C). The boiling point is visible on the thermometer from which we can deduce the alcohol content of the mash (e.g. the boiling point of 95°C, alcohol content of 5%). When the mash temperature is approaching to the water's boiling point, the distilling can van be finished, because the alcohol content is already minimal. With the mash temperature manually it is possible to monitor the beer-brewing heat-sustaining cycle, too. The characteristic accuracy of the mash thermometer is +- 0,5 C°, in the temperature range that is important for us. It is also very important that we have a properly fast updating. The displayed value is being updated every second both for the head and the mash thermometer. The min/max warning sound signal can be set.

**Mash draining arch with backwash:**

A 90-degree arch of 76 mm assures that the remaining warm mash can be drained safely from the cauldron into a canal. In order to keep the draining tap unblocked, respectively the to cool the wash (remaining mash), we can connect the utility system's water to the 90-degree water. The water jet is directed toward the centre of the ball-end, thus it is loosening the eventual blocking.

**Filling door:**

There is a massive filler with a 110-mm inner diameter that assures the filling of the mash into the cauldron through a funnel or with a pump. The 6-mm thick heat-resistant hardened glass with a diameter of 76 mm assures the visibility of the inner area.

**Copper filling:**

It aims that the steam released during the distilling has to travel among the 340 copper rings, in the 300-mm long column section. The copper surface is binding a part of the high-energy (heat, motion) steam molecules hitting the copper surface. The copper absorption (surface binding) is reducing the quantity of the polluting materials getting into the distillate, such as sulphurs, cyanides, etc. In addition the copper surface is catalysing the creation of the new distilling aroma materials. It secondary beneficial effect of the copper filling is that the reflux flowing down the twisted surface of the rings creates a film with which the upbound steam gets in contact. As a positive result of the process the alcohol content gets concentrated, the separability of the useful and useless components gets better since the process is similar to the material transfer on the sieve-plates.

**Test-tube with draining tap:**

The test-tube or the continuous grader is assisting in measuring the momentary status of the outflowing alcohol. It is required to place a classical alcohol grader (alcohol aerometer) into the measuring tube. The outflow through the U pipe is ongoing, the alcohol content can be checked every moment during the distillation. Since it is made of acid resistant and stainless steel, the liquid distillate can't dissolve copper from it. The copper – getting in contact with the liquid distillate-parts – is harmful since the copper dissolving into the distillate is causing metallic break. For the copper concentration dissolved in the distillate the food-safety law is stipulating a limit value. The stainless tap at the bottom of the test-tube, in open condition – is easing the pre-distillate collection respectively the test tube can be cleaned and drained without dismounting it.

**Through-flow meters, rotameters:**

The through-flow meters serve for the accurate regulation of the flow rate (flowing quantity per hour) of the cooling water coming from the system with a stable pressure of 3-6 bar. When opening the valve the rotameter floater is rising, and in case of closing the valve it gets lower. The value can be read at the upper line of the floater – on a clear scale – given in litre per hour. Without the accurate regulation of the flow rate the easy and user-friendly utilisation of this sophisticated distillation-technical method is impossible since the steam released from the intensity of the incoming cooling water and the heat should be continuously in balance. If there is much cooling water along the deflegmator branch, the distillate outflow is very slow or it is stopping, if there is too little cooling water, then the required alcohol content or the excellent sensational characteristics can't be kept.

**Column backwash:**

Between the distillations and without disassembling the device it assures that (in case of connecting the water of potable quality) we can wash out in full the sour components that remain after the distillation in the end-cooling and distilling column. At the end of the distillation by turning the 3-way tap the distill's outflow branch is closing and the washing water is flooding the end-cooler and the column. In addition to the thorough rinsing it is cooling and thinning the wash (remaining mash) in the cauldron. This is easing the draining of the remnants in the cauldron and when opening the door it reduces the quantity of the disturbing steam that gets into the distilling area. Through the joint utilisation of the backwash tap /filling door /mash-draining arch connected to the draining canal we can perform safely, without smell, steam and heavy work, the filling of the base material and the emptying of the remnants.

**Sieve plate level regulation** *(figure 18):*

From the operation principle of the rectifying column results that the deeper the liquid's level on the sieve-plates (and in parallel the higher the volume), thus the uniform heating with stable steam-flow, the more difficult for the components to "run over" the plates and get to the next level. In certain phases of the distillation this so-called column retaining can be set according to the various needs. When separating the pre-distillate we strive for as big retaining as possible (high level of liquid) so that only the lightest (and as a result the most volatile) components can get into the end-cooler. Thus in the pre-distillate phase with the liquid-level regulators we are setting the spillways to the highest position. When we have finished the collection of pre-distillate, there will be a vapour rich in useful aroma components and alcohol and we would like to realise their getting through in full. The liquid level and in parallel the column's resistance can be reduced to a third. With the increase of the mash

temperature – in the second half of the distillation - we have to increase again the plate levels so that no harmful, sour post-distillate materials get through to the useful distillate area, into the mid-distillate. With the level-regulating mechanism one can avoid that the one-step rectifying column overfills the finished distillate (little aroma, vodka-like). The regulation of the liquid's level may result that useful and heavier components – that contain flavours – get through to the distillate. In this way during the ripening the distillate does not become uncharacteristic. Regarding its flavours it will be similar to the stills, with a character, but regarding its smell it will be characterised by a perfume that can be produced with the one-step technique only.

**Lighting the eye-piece:**

When lighting the eye-piece has an aesthetic function since the result of the level regulation and the eventual anomalies (flooding, reflux, foaming) are well visible with the lighting, they can be observed easily. And the vivid blue (or other selectable) light of the eye-piece improves a lot the rather beautiful composition of the 100-120 kg copper and acid-proof steel. The lighting panel is a LED panel developed in 2018. There are water-proof LED module trios cast into false resin within the fully stainless frame assuring the long-term shelf-life (spare). The regulation of the light takes place through the radio-frequency remote control and the main functions are as follows: brightness regulation (dimming), RGB colour combination selected on a dynamic circular sheet, red, white, blue, green pre-programmed push-buttons

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**Checking the column's proper wadding:**

Before the first starting of the equipment check whether the flange screws that connect the column parts (4-6 pieces per level) respectively the eye-piece screws (6 pieces) are tightened. If during the trial cooking there is dripping or flowing, stop the distillation and tighten the screws (mostly the screws of the eye-piece) carefully and moderately so that they remain stable but do not crack the glass. The flange screws need to be tightened manually first, in opposite pairs then tighten them with the proper tools (winch, Allen key) in such a way that the opposite pairs are tensed in several steps. It is incorrect to tense the screws if the flange pairs are oblique, they do not run in parallel. Thus on one side the screws are tightened more. In this case perform the adjustment.

**Checking the wadding of the cauldron and the dome:**

Keeping at distance the ducts and pipes from the hot surfaces and open flame.
Stable stand for the electric box, or proper console for fitting onto a fix surface (e.g. wall).
The electric parts may not in contact with water.
Spare visor glass and wadding package
During the filling and cleaning cover the engine and the electric parts with proper water-resistant insulation material and assure their waterless condition.
The mixing engine can be put into operation after the dome has been placed onto the cauldron. Before taking off the dome the engine needs to be switched off and the device needs to be taken off power. It is forbidden to reach into the cauldron when the engine is operating. It is forbidden to touch any rotary part during the operation. Put the engine into operation after the column has been placed onto the cauldron.
Draining the mash: make sure the hot mash is flowing into a collecting vessel or a direct heat-resistant canal in such a way that no scalding accident can take place. If his can't be assured one shall wait until the mash's temperature decreases below 40°C. After the dome has been removed the mash can be thinned with cold water for the simpler outflow.

**Wadding:** make sure that after placing the dome the wadding can't move. Check the proper adjustment

**Removing the dome:**

If you are removing the dome manually from the cauldron, install near the cauldron a framed stand / table, other temporary support of a height identical with the cauldron, so that the dome can be lifted over easily. The manual removal of the dome and placing it onto the ground is not a proper solution, it may damage the dome. Before the removal cool off the system with the backwash head and drain the water in the deflegmator and end-cooler with the ball-ends. Before the removal drain the mash through the outflow. If you think the dome is too heavy to your physical capacities, ask somebody to help with the removal. Drain the water "blocked" in the deflegmator and the cooler with the taps before removing the dome.

**Lifting device to remove the dome:**

With an intense use we definitely recommend creating a lifting structure to remove the dome and the tower. There are two manufactured lifting devices for the machine (with a support adjusted onto a safety fixing-rod lifting sliding path, and the fork-based column lifter), and by getting connected to the lifting point found on the top of the tower it is possible to establish a special but authorised and suitable lifting system (e.g. chained lifting device, lifting winch, etc.)

**Draining the mash:**

While the mash is being drained form the system, air is going to replace the leaving mass. This is possible if the outflow pipe is free or the tightening swinging screws have been loosened. If the outflow pipe is replaced with the backwash head and its end its closed by connecting the hose, the system can't suck in the air. In case of sudden mash draining the process may cause damage to the system because of the occurring vacuum. Connect the wash-head only after the mash has been drained!

**Cooking technique:**

The cooking room needs to be ventilated during the operation with draught or a ventilator. It is forbidden to leave the distiller unattended. After heating up the device requires significantly less energy during the distilling phase (when the distillate is already flowing through the outflow pipe) than during the heating up. Example: During the heating up when the upbound steam begins to warm up the lowermost eyepiece (there will condensation liquid stripes and drops), we are switching off the heat-delivering units that help with the warming-up. In case of electric heating this means that we are switching off one of the heating rods (e.g. switch of 6 kW). If we don't do this and we do not supply sufficient cooling water for the end-cooler, the alcohol vapour will get into the air, it does not get condensed. Since the high quantity of alcohol vapour getting into the closed space is rather inflammable and prone to explode, this a high risk. Pay special attention to the end of the heating-up section, the beginning of the distilling phase. Start the circulation of the water into the end-cooler when the lower eye-piece gets damped (e.g. with a through-flow speed of 40-60 l/hour). Fill up the deflegmator with water through the rotameter and provide sufficient reflux quantity for the operation of the column, so that the plates can bubble uniformly. If you are feeding too much water to the deflegmator, the outflow is stopping since all the vapour flows back as reflux to the lower parts of the column.
The head-thermometer on the top of the column is measuring the temperature of the vapour that enters the neck. Try to regulate the quantity of water getting onto the deflegmator so that the head thermometer does not increase over 85 °C when the mid-distillate gets collected. In this way you can prevent the getting of the post-distillate components into the useful distillate-area. You may experience that at the beginning of the distillation when still there is much alcohol in the mash and the steam area, it is sufficient to deliver less water into the deflegmator so that the head thermometer does not exceed 85°C. With the approaching of the post-distillate phase it will be more difficult to "maintain" the temperature of the head thermometer since it will try rising and more and more water will be required for the deflegmator. In parallel the outflow speed of the distillation is slowing, too. These signs show that the useful distillate-part, the collection of the mid-distillate is closing to end. In parallel with this if we smell the outflowing distillate, it is neutral or "sour". This is definitely the sign of the post-distillate phase. The characteristic momentary alcohol grade of the mid-distillate, which can be measured with the test-tube: is initially 85-90 V/V % alcohol, later on it is 70-80 %.

During the collection of the mid-distillate it is possible (but useless) to prepare a distillate with disproportionally high (e.g. 85-95 alcohol grade) distillate. In order to "let through" the aroma materials it is sufficient to "fine-tune" the mid-distillate to an alcohol content of 75-85%.

**Process of distillation by steps (it is mandatory before every distillation):**

1) check the fixtures of the equipment and check the following list whether everything is okay:
    - The surroundings of the device (flammable things, sign of error)
    - Intactness / quantity of heat-delivering units (PB bottle, fixtures, power source)
    - Water inlet, water supply
    - flange screws
    - Eye-piece screws
    - Niveau, jacket's filling level
    - Cauldron-brim wadding
    - Mash-releasing tap (closure)
    - Blind test, pressure regulating fixtures
2) Take off the dome of the cauldron and fill in the fermented mash, mind the maximum (70-80 l) minimum (40-50 l) filling level.
3) Spread the foam-blocking oil on the top of the mash
4) Place the dome and visually check whether the flange-wadding of the cauldron has moved
5) Connect and check the water-inlet fixtures by trying
6) Fill up the cooler and the deflegmator with water
7) Check the proper functioning of the rotameters and valves (open the valves alternately and check whether the water is flowing properly from the draining pipe)
8) In case of gas-heating check the smoke-exhaust system and the position of the butterfly regulator
9) In case of electric heating check the intactness of the cable sand the electric box
10) Check the condition of the mixing engine and the manual mixer
11) Switch on the main gas tap or the electric main switch and start the heating and the mixing motor.
12) In the heating-up phase regularly check the warming of the cauldron
13) At the beginning of the heating-up start the end-cooler with a through-flow of 40-60 litre/hour (this is required because if you forget starting the end-cooling before the beginning of the distillation, alcohol vapour will get into the air which is inflammable and explosion-prone)
14) During the heating up the mash will keep warming up. After reaching the boiling point of the mash (depending on the alcohol content, in average it is 90-95 °C) there will be intense forming of steam.
15) Getting closer to the boiling point the heating performance needs to be reduced. Approximately to the half, third of the recommended maximum output.
16) the warming of the column and the damping of the lower eye-piece signal that we are approaching to the boiling point.
17) The steam forming in the cauldron keeps going upward and vapour and condensation will appear on the column and the upper eye-piece.
18) In this phase we start the circulation of the water in the deflegmator with a through-flowing of 40-60 l/hour. The goal is that no steam should get through the deflegmator until the column-parts do not "bubble" uniformly. The column-parts get bubbling when the proper liquid level gets formed on the plates and the spillways get filled with liquid. The first to get filled is always the plate, then the reflux goes downward the column. In this phase there is for an electric output of about 4 kW in case of a full cauldron.
19) When each column-part is bubbling, slowly we can let the pre-distillate go. We can realise this by reducing the quantity of water circulated into the deflegmator.

20) The distillate should start slowly, by dripping. The head thermometer should show a low temperature of 78-80°C.
21) Prepare 5-6 numbered glasses and by draining the tap of the test-tube contain the pre-distillate by every 1-2 dl. After the distillate's smell is clean (no pre-distillate solvent feature can be felt), start collecting the mid-distillate.
22) During the collection of the mid-distillate it is recommended keeping the head-temperature below 85°C. If the temperature is higher, more water needs to be let into the deflegmator.
23) The heating performance needs to be regulated uniformly or rising slowly. In case of electric heating there is need for a heating output of 4-6 kW for the dynamic cooking of mid-distillate.
24) During the distillation we regulate the water getting into the end-cooler in such a way that the temperature of the outflowing distillate remains below 25°C. The thermometer of the end-cooler may reach maximum 50-60°C.
25) When from the filled mash we obtained a sufficient quantity of distillate and the sensitivity feature of the outflowing distillate switches to post-distillate (sour unpleasant smell and taste), then do not add the distillate to the mid-distillate. At the post-distillate level it is difficult to keep the head temperature below 85°C and the outflowing speed of the distillate gets slower.
26) It is recommended collecting the post-distillate therefore after the collection of the mid-distillate switch off the heating and the mixing engine. In case of electric heating switch off one-by-one the switches of the heating rods and switch off the engine then the main switch.
27) In case of the gas-based cauldron close the main closer respectively the valve of the gas burner.
28) Place the mash-draining container under the outflow chunk or check whether the draining connection is corresponding.
29) Loosen the dome-fixing swinging screws.
30) Open the mash-draining tap, fully if possible, so that the mash-stuff can leave without getting blocked.
31) When the mash stuff flew out, keep the tap open and connect the flowing washing head. At the end of the wash-head – in the default situation - there should be an open quick-connector end.
32) Rinse the column. Connect the quick-connection hose originating from the system's water and 1-2 minutes circulate the water through the washing head.
33) Release the quick-connector and put back the distillate outflow pipe.
34) Lift off the dome and if it is still required, wash the cauldron and the inner surface of the dome.

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# Work- and accident-protection instructions, important information!

- No inflammable objects, materials can be around the equipment.
- During operation the cooking equipment shall not remain unattended by the operator and no children should have access to it.
- The distilling equipment can be operated by adults only who are prepared for the professional and safe use.
- The equipment can be operated by a properly trained person only who – during the work - is using non-flammable protection equipment (gloves, shoes, protective clothes, goggles).
- During the use the distilling equipment shall not remain unattended by the operator and no children may have access to it.
- The distilling equipment shall be placed on smooth and solid ground, no flammable materials shall be around.
- It is forbidden to use a failed distiller!

- During the distilling do not wear inflammable clothes.
- After having finished the distillation never leave mash in the cauldron.
- Should you encounter any problem during the operation (e.g. foaming), immediately stop the heating of the equipment.
- The cauldron can be filled up to maximum 80%.
- During the use every part of the distilling equipment may be hot. Pay special attention to avoid the burning accidents! It is recommended wearing protective clothes and equipment.
- When transporting and placing the cauldron bear in mind that the equipment is heavy, ask for help, use work-protection gloves and shoes to avoid the injuries (there is no guarantee for the damages incurring during transportation)
- Before using the equipment check its technical condition. When putting the equipment into operation ask for the assistance of a plumber-gas fitter, electrician or other expert if required. Always ask the expert for a written statement.
- The cooler may contain hot water, pay attention when routing the spillway.
- If using in closed area the room shall be ventilated properly and continuously!
- During the operation open flame and smoking are strictly prohibited.
- The cooler can be filled up with as much water that the spillway can route away.
- If the equipment gets (may get) in contact with electric devices, earth it with an expert.
- In case of operational failure wait for the cooling of the equipment, and then it is possible to troubleshoot!
- It is prohibited to use the equipment in an inflammable or explosion-prone environment!
- The equipment filled up with water can be store in frost-free area only
- In order to avoid the eventual emergency situation proceed according to the circumstances.
- It is strictly prohibited to consume alcohol during the operation of the equipment!
- If you would like to operate the equipment with a gas-burner, in every case ask for an expert to help with the commissioning and to perform the circumstance-related changes. One shall always pay attention to the flame of the gas-burner, it is goes out, the gas tap needs to be closed immediately and the room needs to be ventilated! Comply with the warnings related to the use of the gas burner. Do not use gas-burner in a close area without burning-security.
- Comply with the fire- and work-protection rules related to the heating of the equipment!
- Pay special attention to the proper guiding of the burning products and the ventilation of the distiller.
- The parts of the equipment that are getting hot during the utilisation may cause burns if not being careful.
- Lightning risk! Do not use the equipment during lightning!
- Be careful when emptying the cauldron. Only the cooled-off cauldron can be emptied (with a temperature lower than 50 Celsius).
- The equipment should get in contact with caustic materials.
- It is forbidden to store alcohol-containing liquid in the device.
- The water from the cooler can be removed only through the draining opening, respectively it can be filled through the same opening.
- During the utilisation on must comply with the brandy-making-related general fire- and work-protection rules.
- During the operation the capsizing of the equipment may cause accidents and fire!
- During the utilisation there is need for a proper fire-extinguisher in the premises.
- During the distillation
    - do not prop anything to the cauldron,
    - do not put anything on it
    - do not open it
    - do not pour anything into the cauldron, and do not pour out anything from it