50 ltr.

Operating and brewing instructions for *Speidel´s Master Brewer*

Updated July 2008

1 General

Dear Customer,
You have acquired a new device from our company. We thank you for choosing it. We give priority to the quality and functionality of our products.

Use:
The Master Brewer is designed and produced to brew small quantities of beer (approx. 50 litres).

Operating instructions:
We have written these operating and brewing instructions in order to ensure that the Master Brewer is commissioned and operated reliably and safely from the start. Please read them through carefully and completely, before you start to brew for the first time. Your Master Brewer will work to your full satisfaction and have a long service life, if you have followed this advice and instructions precisely.

Advice about safety:
Please follow the advice about safety.

Declaration of conformity:
We, SPEIDEL Tank- und Behälterbau GmbH, of Krummenstrasse 2, D-72131 Ofterdingen, declare ourselves to be solely responsible for the product - which is named in these instructions as 'Speidel's Master Brewer' and to which this declaration refers - complying with the regulations of the following European Guidelines: 89/336/EWG and 72/73/EWG.

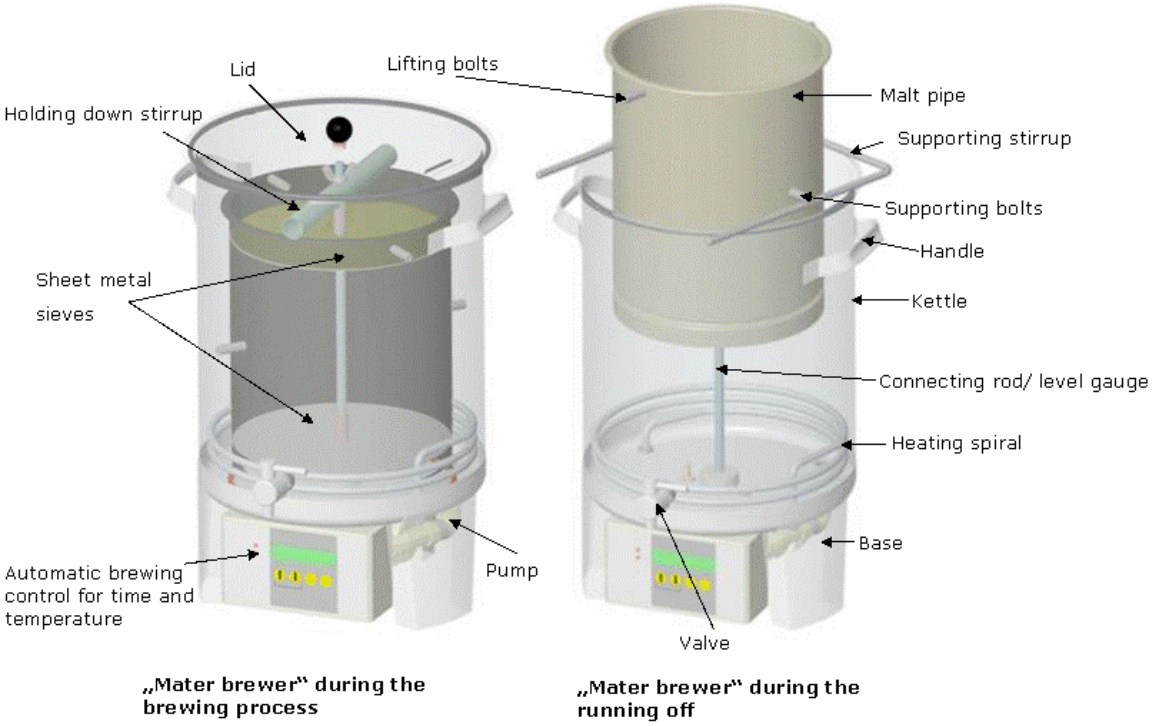
Legally binding signature:
Stefan Speidel
Speidel Tank- und Behälterbau GmbH
Krummenstrasse 2, D-72131 Ofterdingen.

Ofterdingen, November 2006.

2 Presentation of the Master Brewer

2.1 Components and extent of supply

Please find out about the components and the extent of supply from the following illustration (the cooling spiral and fermenting cask are not included).



2.2 Installation of the Master Brewer

The Master Brewer must be placed on a sturdy, stable and horizontal base before use or before the brewing process. Note that the Master Brewer can weigh up to 90 kg when it is in a filled condition and full up with boiling hot wort. Horizontal installation is a prerequisite for the pumped recirculation during the brewing process. Avoid a wobbly base. A sturdy wooden box or a table that is not too high is ideally suitable. The Master Brewer is not allowed to be moved during the brewing process. The handles are only intended for transporting and handling it in an empty condition. It is imperative to keep children away from the device when it is in use.

2.3 Cleaning the Master Brewer

The Master Brewer must be cleaned immediately after the brewing process. The cleaning is considerably eased by preventing the residual wort and malt from drying out. All stainless steel parts can be cleaned with a conventional, domestic washing-up liquid [mixed with water]. Scouring agents and sponges or brushes that cause scratches are unsuitable. The heating spiral can best be cleaned with a pipe-cleaning thread. The pump and the drive ball located inside it should also be flushed out regularly. Fresh water is pumped through the pump several times beforehand. Just invert the Master Brewer and loosed the screwed connection – which should only be tightened manually – in order to open the pump. The pump can be easily removed by completely detaching the plug's screwed connection from the Master Brewer. Care

must be taken when cleaning the brewing boiler, that no sprayed water or moisture comes into contact with the electrical components. The power supply must be disconnected in order to clean the Master Brewer. The Master Brewer and the associated internal fitments only have to be freed of dust and dirt with warm water before the brewing begins. The pump and conduits also have to be rinsed out by means of pumped recirculation. Take care that you also include the malt pipe's seal and the stop cock. Ensure that no residue at all from the flushing agent remains in the Master Brewer any longer, which could have a negative effect on the beer's content of foam.

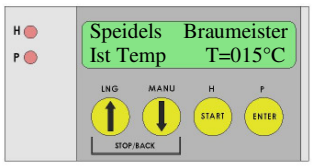
2.4 Storage of the Master Brewer

The Master Brewer must be stored in dry conditions. Avoid contact with ferrous or rusty objects.

2.5 Technical data about the Master Brewer

Weight:	24 kg with fittings and the lifting stirrup.
Heating spiral:	3,200 watts of heat output.
Pump:	2 x 23 watts.
Mains power supply:	230 V.
Capacity:	a brewing quantity of approx. 50 litres of manufactured beer (normal beer) = approx. 53 litres of wort.

2.6 Language selection



The language selection menu is accessed from the basic display by pressing and holding the UP ARROW (LNG) for 3 seconds. The language can then be set using the arrow buttons to GERMAN, ENGLISH, FRENCH or SPANISH. The selected language is accepted by pressing the ENTER button.

3 Working with the Master Brewer

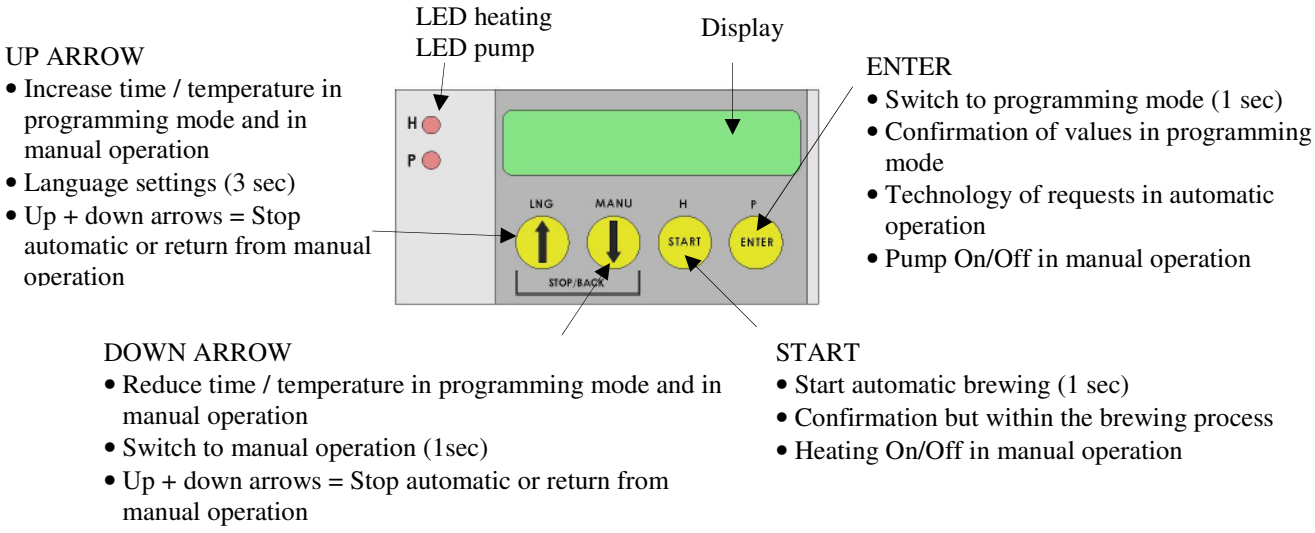
3.1 Advice about safety

Caution: danger of burning! The container, lid and fittings become very hot. The boiler contains boiling wort at the end of the brewing process. Follow the advice about installation. Never move the Master Brewer when it is in a hot condition. Keep children away. You should always use oven cloths or gloves when working on and with the Master Brewer.

Caution: danger of condensation! Take care when lifting the lid, that the condensed water on its underside runs back into the container. Hold the lid obliquely over the container accordingly.

Caution: electricity! Only carry out cleaning work on the Master Brewer when the plug has been pulled out of the mains socket outlet (separated from the mains power supply). Avoid overloading the electrical fuse. Do not connect any other appliance with a high electrical rating to the same fuse because the Master Brewer has a high consumption of electricity. Important: for operation of the control unit, the plug connections on the rear side (pump and heating) of the unit must be locked at all times. Operating the unit without the plug connections locked will create the danger of overheating, damage to the Master Brewer and danger to the user.

3.2 Advice about the temperature control unit



Automatic operation: Start by pressing START (1 sec). A comprehensive description is given in the following chapter "Brewing with the Master Brewer".

Programming module: The programming module is accessed by pressing the ENTER button (1 sec). A comprehensive description is also given in the following chapter "Brewing with the Master Brewer".

Manual operation: Press ↓ (1sec) to switch to manual operation of the Master Brewer. The heating (H) is switched on/off by pressing START. Pressing ENTER also activates the pump (P). The temperature can be set by means of the arrow buttons. Pressing

↓+↑ simultaneously returns to the initial display of the Master Brewer.

Cancel / back: In all operating modes (automatic, programming mode and manual operation), pressing the buttons ↓+↑ returns the user to the initial position.

3.3 Advice about the recirculating pump

The recirculating pump can be switched on and off via the switch that is located on the electrical box. It is important that the pump is ventilated after filling up with brewing water, so that it has the full output. This is done by switching the pump on and off several times when filled up with water and a mounting position of the pump of 45° (until no bubbles of air escape any longer and hardly any noise can be heard from the pump).

3.4 Advice about the container's lid

The lid assists the temperature being reached more quickly during heating. The ventilating slots avoid pressure building up in the boiler and they allow the air to circulate slightly. Water condenses on the lid's underside at higher temperatures. Care must be taken when lifting the lid, that the lid's rim is held over the boiler's opening, so that the condensation which runs off (when holding the lid obliquely), runs back into the boiler and does not run down outside it.

3.5 Advice about hygiene

Hygiene is of paramount importance when brewing beer. The beer or the wort is exposed to the danger of infection in the cold area especially (when cooling, bottling [decanting] and fermenting), which can spoil the beer and ruin the whole work. Therefore pay special attention to absolutely clean containers, (fermenting cask and bottles) and working materials (spoons, stop cocks and seals). Sulphurous acid is particularly suitable for disinfecting these containers and objects: it is obtainable from specialized vintners and hobby-brewing shops. This powder is mixed with water and thinned: it is suitable for pouring into the fermenting bung, for disinfecting the fermenting container, other utensils and even the hands. It is typically recommended to use a bucket of sulphurous acid, in which the hands and utensils are disinfected during the brewing and before the bottling. The fermenting cask containing 3 to 5 litres of sulphurous acid is sealed and allowed to stand for several hours. Shake the cask several times in the meantime, then empty it and allow droplets to drain out before use. It is unnecessary to rinse it out with water. A few droplets or residue from the sulphurous acid in the beer are not a cause for concern as a result. Storage casks and maturing casks are disinfected just like the fermenting containers. The bottles are disinfected by heating them up in an oven, if the beer is decanted into bottles with stirrup stoppers for maturation and storage after the fermentation. The rubber seals are removed from the stirrup stoppers and then boiled in hot water or immersed in sulphurous acid. The bottles are heated up in the oven to a temperature of approx. 130°C. The bottles are allowed to cool down to room temperature after that by means of switching off the oven and they are then sealed with the disinfected seals. It is thus guaranteed that the fermented beer will be decanted into absolutely sterile containers. This work should be done several days before the fermenting, so that the decanting process can take place quickly and not at a frantic pace.

4 Brewing with the Master Brewer

4.1 Introduction

Manufacturing beer with the Master Brewer can be split up into different phases: each of which is described in detail below. These phases are described generally first of all, in order to cover the brewing process and all sorts of beer and recipes for them. The following section gives a definitive example of brewing for the novice brewer, as well as a special recipe with exact information about quantities, brewing times and temperature levels. It would be ideal if you could review the individual steps that lead to the manufactured beverage first of all, before you begin with brewing the beer. It is recommended to keep a record [e.g., a logbook] of brewing (refer to the record in the appendix or at www.speidel-behaelter.de), so as to ensure that you do not omit any steps: it will give you a review of your brewing processes retrospectively too. Some more advice: you should allow a whole day for your first brewing attempt and do the brewing with another person because that is more enjoyable and one can make good use of the extra help. You should also bear in mind that brewing beer requires some experience and one becomes more proficient when progressing from one brewing process to the other. Do not be disappointed therefore, if the first beer does not meet your expectations completely. A poem expresses this idea best of all.

> "The first beer tastes so awful
> that the farmer wets his trousers:
> as an example for the others.
> The second beer is a mediocre score,
> you drink three measures and then pee four.
> The third beer is from the core,
> men and women drink it gladly for ever more."

4.2 Preparations

Obtaining the ingredients

Obtain the requisite brewing ingredients in good time (hops, malt and yeast). It is important that the malt is fresh while doing so. The malt should be used as quickly as possible after the milling (grinding or crushing of the grains – not too finely). The quantitative information varies somewhat according to the recipe: whereby the amount of malt should be about 10 kg, whereas the amount of hops should be between 80 g and 120 g. The hops are usually offered in pressed form as pellets. Dry yeast is recommended for the fermentation because it is easier to store and it has a longer shelf life. These ingredients have to be bought in a hobby-brewing shop or via the internet. A third possibility of procuring the ingredients is from a brewery in your vicinity. Just have a go at making enquiries!

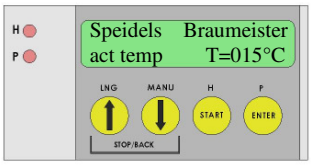
Cleaning the equipment

The Master Brewer is rinsed out with warm water and the pump is rinsed through by means of switching it on, before the brewing. The other utensils like beer spindles, a wooden spoon and fermenting container should be ready for use and they must have been cleaned too. Refer to the advice in the sections entitled "Advice about hygiene" and "Cleaning the Master Brewer" for this purpose.

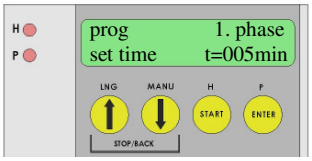
Softening the brewing water

The brewing water can be softened if necessary. The water (cold tap water) is boiled for 30 minutes in the Master Brewer for this purpose, then it is cooled and stored temporarily – e.g., in the fermenting container – until the brewing. The separated lime has been deposited on the bottom of the container and it will be disposed of. The Master Brewer is designed to brew approximately 50 litres of manufactured beer (normal beer). Between 55 and 60 litres of brewing water will be required for this purpose in that case. However, normal (hygienically faultless, colourless and odourless) cold tap water is also usable for the novice or for the first brewing attempts, in order to keep the expense and effort somewhat limited at the beginning. The brewing water should have a hardness of less than 10° dH on principle. The softer the water, the more suitable it is for brewing.

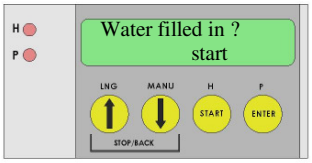
4.3 Programming / starting the Master Brewer



Connect the Master Brewer. The controls are then in the basic condition. To programme a recipe and its time and temperature values, press the ENTER button for 1 sec.



Select the time and temperature with the aid of the ARROW BUTTONS, confirming each value by pressing the ENTER button. Programme the mashing, phases 1-5 and the boiling of the hops. The mode 5 is set to 0 and is only used for special recipes.



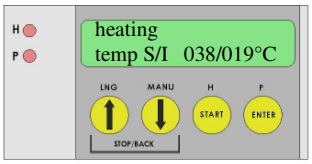
After confirming all programme stages with ENTER, the display returns to the basic condition. From here, you can now start the automatic brewing by pressing the START button (1 sec). Now follow the instructions of the programme!

4.4 Mashing (brewing)

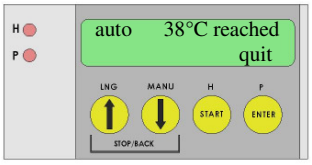
The mixing of crushed malt [i.e. grist] and water is described as mashing. The objective of the entire mashing process is to dissolve the malt starch that is stored in the malt and to convert it into sugar with the aid of enzymes that are present in the malt. The various enzymes are effective at different temperatures, which is why the various temperature stages are then passed through as well.

Mashing

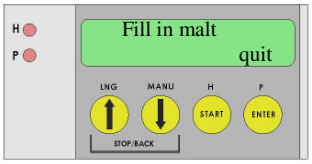
About 53 litres of brewing water is poured into the boiler (up to approx. 2 cm below the upper marker) first of all. The malt pipe is not installed yet while doing so. The markers that are fitted on the connecting rod indicate the level of 45 litres, 50 litres and 55 litres. Confirm that you have added the water by pressing START. This switches the pump and heating on. The pump switches on and off several times in order to ventilate it.



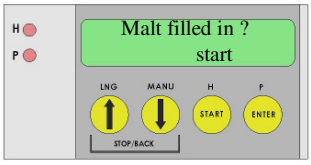
The pump and heating remain switched on until the programmed mashing temperature is reached. The set temperature and actual temperature are shown on the display.



On reaching the mashing temperature, a signal tone sounds, which must be acknowledged by pressing the ENTER button. The pump is now switched off.



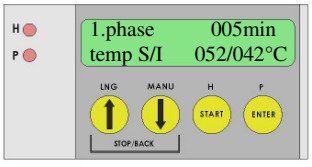
The malt pipe can now be installed in the boiler with the seal facing downwards. Make sure that the pipe is clean, centred and lying flat on the bottom. Now insert the first sieve base (with the pipe's jointing sleeve facing upwards) into the malt pipe and put the first filter cloth on top of it. The cloth must lie on the sheet metal sieve and it is not allowed to float upwards. The whole malt is now poured into the malt pipe with a scoop, then stirred in well. Take care that the malt is poured in neatly and that nothing falls into the tank, which could block the pump. Now put the second filter cloth on top and then the second sheet metal sieve over that again (with the pipe's jointing sleeve facing upwards). This is screwed together with the stirrup and wing nut for fastening and clamping down the malt pipe, and is pressed downwards while doing so.



When you have filled in the malt, confirm this by pressing ENTER. The inquiry "Malt filled?" appears again as a check. You can now start the actual brewing process of the Master Brewer by pressing START. The pump and heating are switched on. The wort rises in the pipe and flows over. The circulation has started and the malt will be washed out by means of pumped recycling during the next phases.

<u>Protein mode</u>

The malt's large molecules of protein are split up into small components during the protein mode. The protein mode is not only important for clarification and full-bodiedness but for the beer's foaming stability and capacity to bind carbonic acid. The temperature is approximately 52°C and it is maintained for 5 to 20 minutes according to the programmed recipe.



The display now shows the mode, set and actual temperature and the time. On reaching the set temperature, the time display changes to a downward-counting remaining time display (flashing) for this phase. The further phases take place completely automatically, during which the display again shows the corresponding times and temperatures as in Phase 1.

Maltose mode

During the maltose mode, which is the second phase, the molecules of starch are converted into fermentable sugar with the aid of other enzymes that are present in the malt. This phase is an important stage of the brewing process for forming alcohol because the greatest amounts of sugar are formed during it. Extending the mode means gaining more sugar in the wort, which lead to a stronger beer. Shortening the time means that the beer will be more full-bodied on account of more dextrines. The temperature is approximately 63°C and it will be maintained for a duration of approximately 35 minutes. As in Phase 1, the controls show the relevant data in the display. The complete further process (Phase 2 to Phase 5) is handled completely automatically by the controls. In this phase and also in the following phase, the pump is switched off briefly twice (PUMP PAUSE), in order to move the malt into a new position and thereby achieve a better yield. The Master Brewer's lid is on in order to save energy.

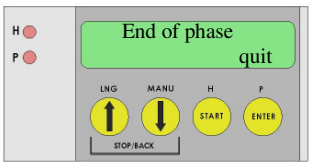
Saccharifaction mode 1

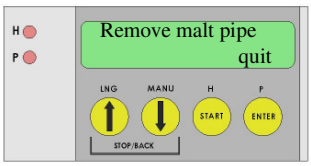
Other starchy constituents are split up with the aid of active molecules in this temperature level during the third mashing phase and they are liquefied in the wort. The temperature level is approximately 73°C and will also be maintained for 35 minutes.

Saccharification mode 2

Residual starches are saccharified in the final phase and they thus form even more unfermentable extracts, which allow the beer to become somewhat more full-bodied. The wort is heated up to 78°C while doing so and with continuously pumped recirculation: it has to be held there for between 10 and 20 minutes. An iodine test can be used to establish whether any residual starch is still present in the wort. Put some drops of wort on a white plate and add some salt for this purpose. The saccharification will be sufficient if the sample turns brownish red or yellow. If that is not the case, then the last temperature level must be held longer. In the last phase, no more pump pauses will take place because of clarification of the wort.

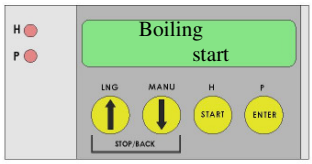
4.5 Running off





On completion of the programme brewing phases, a signal tone again sounds. This must also be acknowledged by pressing ENTER. The pump switches off, and the so-called 'running-off' process is requested ("Remove malt pipe"). One describes the separation of crushed malt from the beer wort as 'running off'. Running off with the Master Brewer is a relatively easy, quick and clean matter compared with many other methods of domestic brewing and it represents one of the Master Brewer's main concepts. Remove the wing nut together with the holding-down stirrup. The draining stirrup is laid on the brewing boiler's rim: the malt pipe is then pulled carefully and slowly out of the boiler with the lifting stirrup. One hangs the malt pipe in the holding stirrup on the lower supporting bolts, so that the beer wort drains out of the malt into the boiler. One can still leach the last residues of extracts by washing out the malt husks subsequently with an aftermash. One describes the process as 'sparging' (the process is not absolutely necessary). The so-called 'sparging' takes place by pouring in hot water at 78 °C (no boiling water) into the malt pipe from

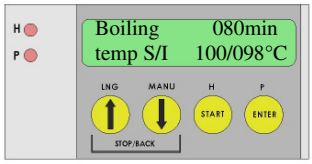
above. Remove the upper sheet metal sieve including the sieve cloth and pierce the malt husks with the aid of a long wooden spoon, so that 'encapsulated' beer wort can run off or drain downwards again. The temperature continues to be maintained constantly at the preset temperature of 78°C during the purging. Remove the malt pipe completely after 15 to 20 minutes and dispose of the malt husks. It is recommended for reasons of safety to always work with heatproof gloves in this case because all parts will have been heated up to high temperatures by now.



After removing the malt pipe, acknowledge this again by pressing ENTER. Now press START to begin boiling the hops. The pump and heating are switched on, and the automatic process is continued.

The wort content must now be tested, after the purging process has been completed. This test is important in order to achieve the desired content of basic wort and thus to be able to set adjust the beer's alcoholic content later on. Take a sample by filling a measuring cylinder (accessory) and establish the level of wort when the sample was taken. Use the three level rings indicating 45, 50 and 55 litres that are located on the connecting rod as an aid for this purpose. Estimate the liquid's level in between accordingly. The removed wort must be cooled down to 20°C so that the basic wort can be measured with a beer spindle (accessory), in order to obtain an exact measurement. A water bath with ice cubes, or a similar arrangement, is suitable for this purpose. However, you do not need to wait until you can take the measurement because the basic wort has a certain relationship with the liquid's level. Just continue cheerfully with the next phase of boiling the hops and then carry out the corrections or adjust the basic wort as the case may be.

4.6 Boiling the hops



As described in the previous section, the automatic process has been continued, and the boiling of the hops started to. The display again shows the time and temperature of the phase. Since the set temperature of 100°C cannot always be reached, the time begins to run with an additional period of 3 min after reaching at least 95°C. The beer wort is boiled during this phase. Coagulatable protein substances are separated on the one hand and the wort is sterilized on the other hand: i.e., all of the bacteria that could otherwise spoil the fermentation is destroyed. As has already been stated when describing the previous phase, the original wort can be adjusted in this case by means of vaporized water or by replenishing with water. The hops - which give the beer its requisite bitterness and also impart spiciness - can then be added during the boiling time of 80 to 90 minutes. The amount of added hops can vary according to the recipe and individual's preference. After the wort that has been sampled at the end of the preceding phase has been measured for its content of basic wort, one adjusts this content with the liquid level. If the original wort's content corresponds to the set value, then the level must be maintained at the same level by replenishing with boiling water. If the original wort's content is too high, then the wort will be diluted by the replenishing and the liquid's level will rise accordingly. Care has to be taken while

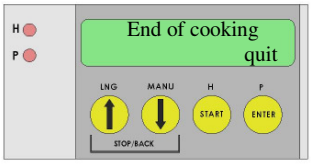
doing so, that the vaporized water is also replaced. Conversely, the liquid's level will fall when the content of basic wort is too low (by the water vaporizing), which leads to a higher concentration of sugar and thus to a higher alcoholic content too. The brewing boiler must be open when the boiling phase is carried out. This prevents the wort from overboiling on the one hand and it is primarily essential for boiling the hops, so that unwanted aromatic substances - which would spoil the beer's taste - can evaporate. Adding hops to the beer originally served to improve the beer's shelf life and conservation. Add the first hops to the boiling wort between 10 to 15 minutes after the boiling begins, according to the kind of hops and content of bitter substances. The hops remain in the wort until the boiling time has ended because its substances only take effect after a longer boiling time and they give the intended bitterness of hops to the beer. Resins and oils in the hops will also be released while doing so, which subsequently give full-bodiedness to the wort together with the malt aroma. Hops can then be added again approximately 10 minutes before the boiling ends: which only contributes to the aromatization. It is not possible to separate the bitter substances any longer during the remaining time. The quantity of hops differs according to the recipe and type of beer. Furthermore, it is dependent on the hops too, which can vary according to the place where and in which year they are cultivated. The hops can be added in the form of pellets or dried hops. The content of bitter substances is given in bitter units (BE) and it is between 10 to 20 BEs for wheat beer and between 25 to 45 BEs for Pilsener beer. Information about the content of bitter substances to the hops is given as a percentage of alpha acids, which can be between 2% to 4% (approximately 8% for pellets). The quantity of hops can be calculated with the following formula:

$$\textit{Quantity of hops in grams} = \frac{\textit{bitter units (BE) x litres of beer x 10}}{\textit{\% of alpha acids x \% of bitter substances utilized}}$$

It can be assumed that 30% of the bitter substances will be used during a total boiling duration of between 80 to 90 minutes.

Example:
It is intended to brew 50 litres of wheat beer with a content of bitter substances of 15 BE. The available hops have a 3% content of alpha acids. The following amount of hops thus results, which will be added when the boiling process begins. The hops which are added shortly before the boiling ends, are not allowed for in this calculation because no appreciable quantities of bitter substances will be added to the wort any more during the brief time.

$$\textit{Grams of hops} = \frac{\textit{15BE x 50 litres x 10}}{\textit{3\% x 30\%}} = 83g$$



On completion of the boiling time, a signal tone sounds again, indicating the end of the brewing process. This is acknowledged by pressing ENTER, and the heating is then switched off.

4.7 Cooling

You must work in absolutely sterile conditions from now on because contamination that is caused by bacteria which are present in the air or on dirty equipment [e.g., utensils] during all of the further working steps, can utterly ruin your work All of the equipment that is now used must be thoroughly cleans or disinfected as the case may be. Follow the advice in the section entitled "Advice about hygiene".
Before inserting the cooling spiral, we recommend vigorous stirring of the still hot wort using a long cooking spoon. This produces a so-called "whirlpool effect", which assists the deposition of cloudy materials contained in the wort, thereby clarifying the wort.
The cooling process primarily serves to cool the wort and to deposit the protein substances and hop constituents that have been separated during the boiling. These cooler sludge substances settle on the bottom slowly and they remain on the container's bottom when the clear wort is drained off. Stirring or moving the cooled down wort should definitely be avoided because the deposited cooler sludge will be churned up again and runs off with the wort into the fermenting container. It is recommended to use a so-called wort cooler (a cooling spiral - refer to accessories) for cooling, which is placed in the wort immediately after the boiling ends and it must also be disinfected beforehand because of that. The cooling takes place with hot water. The water that flows through the cooling spiral extracts heat from the wort and cools it down to the desired temperature of 20°C in 30 to 40 minutes. Caution: almost boiling water flows from the wort cooler's outlet at the beginning (danger of scalding), which can be re-utilized for cleaning work later on. It is primarily important to achieve rapid cooling between 40°C and 20°C, when the wort is particularly susceptible to an infection. Take the cooling spiral carefully out of the tank when the wort has cooled down to 20°C and then allow the beer wort to flow into a disinfected fermenting cask via the stop cock (refer to accessories). However, approximately 6% (3 litres for 50 litres of wort) will still be drawn off in a sealable container beforehand and frozen afterwards. This wort will later serve as an additive to the fermented beer, in order to achieve a subsequent fermentation and sufficient formation of carbonic acid [i.e., carbon dioxide] in the filled bottles. Use a suitable and clean hose or a hopper for bottling. The last litres will be decanted by tilting the Master Brewer carefully – provided that no cooler sludge flows with it into the fermenting container. The fermenting container or fermenting cask should be chosen to be distinctly larger than the amount of wort, in order to have adequate fermenting space and thus to avoid the fermenting foam from overflowing. The residue and the cooler sludge that are located on the Master Brewer's bottom can be thrown away. The Master Brewer is not needed any longer now: please clean it as quickly as possible in order to prevent it from drying out and you will thereby ease the cleaning process considerably.

4.8 Main fermentation

The yeast is added to the wort after the cooled down wort has been decanted into a fermenting cask (a 601-PE cask with a stop cock - refer to accessories). Dry yeast is recommended for this purpose, which is easily added with the wort to the cask. You have to decide in this phase whether you want to prepare bottom-fermented or top-fermented beer. Top-fermented yeast namely needs 15°C to 23°C for the fermenting process, whereas bottom-fermented yeast is active at 4°C to 12°C. The addition of yeast is thus dependent on each recipe too and from the desired kind of beer. Wheat beer and Koelsch are top-fermented sorts of beer. Maerzen and Pilsener are typical sorts of bottom-fermented beers. The alcoholic fermentation of beer is set in motion by

the activity of organisms in the beer yeast, which convert the fermentable sugar into alcohol and carbonic acid. The cask is sealed with a lid and a fermenting bung immediately after adding the yeast. Sulphurous acids should be filled in the fermenting bung, so that no foreign organisms can enter the cask. You must also bear in mind that you should be working in absolutely sterile conditions, in order to prevent the beer from becoming infected with foreign organisms. The cask is never allowed to be sealed completely: the CO_2 that arises from the fermentation can thus escape. Put the cask in a darkened room, which has the requisite temperature for the yeast. The fermentation of bottom-fermented beer can also take place in a refrigerator that is not too cold, whereas top-fermented beer can be fermented at room temperature. It is therefore suitable for the novice to begin with top-fermented beers because certainly not everyone has an extra refrigerator available. It is particularly important to maintain the temperature. The yeast cells can become active only slowly or even not at all when temperatures are too low. The yeast cells can die when temperatures are too high. The fermentation should be active 6 to 12 hours after adding the yeast: which can be easily established when bubbles of gas escape through the fermenting bung. The fermenting duration amounts to between 2 and 4 days. Dark flakes of yeast can occur on the fermenting foam during the fermenting process, which can be skimmed off with a sterilized wooden spoon. The stop cock must be cleaned immediately and disinfected by applying sulphurous acid with swab of cotton wool, if you remove wort via the stop cock during the main fermentation (e.g., for taking measurements with the beer spindle), in order to prevent it from drying out and to avoid it from becoming infected subsequently by bacteria sticking to it.

4.9 Maturation (ripening)

The sugar that remains from the main fermentation and is added afterwards, is fermented during the subsequent fermentation or maturation – the fresh beer is enriched with carbonic acid, which is significant for the foam's formation and maintenance later on: it matures to a tasty full-bodiedness. The beer is clarified naturally during the maturation. If the fermenting activity is now set (no fermenting gases escape), then one can commence with the decanting [i.e., bottling]. The following preparations have to be made for this purpose: prepare the maturing containers or bottles and thaw out the frozen wort.

Subsequent fermentation in bottles is the best possibility available to you and it is also preferred by most hobby brewers. Further possibilities are various, pressure-resistant containers like special 5 litre tins or appropriate beer and pressure casks. Working in sterile conditions is always vital at this stage too. All equipment must therefore by thoroughly cleaned and disinfected before use. The following method of procedure is recommended when using stirrup bottles: rinse out and clean the bottles thoroughly with warm water, in order to remove liquid and dried residues. Then put the bottles in the oven (leave space between the bottles and remove the seals) and heat them up to 130°C. The temperature must be maintained for a maximum of 5 minutes. Leave the bottles lying there to cool down as well. The rubber seals are disinfected separately in boiling water. The bottles are sealed immediately after they have cooled down in order for them to be airtight and they are then prepared for filling. This preparation should have already taken place during the fermenting process or even earlier, so that you do not have to work at a frantic pace on the filling day and so that you can concentrate on the essentials. Larger bottles can also be used, in order to limit the outlay of time for cleaning the bottles and filling them.

The thawed-out wort is now added carefully to the fresh beer in the fermenting container about 1 to 2 hours before the filling begins. The thawed-out cooler sludge

can thus be deposited again. A hose that is pushed onto the stop cock and reaches down to the bottom of the bottle serves for the filling. That avoids the foam forming too profusely and it also prevents too much carbonic acid from being lost. The bottles are filled up to between 90% and 95% of their capacity (thus leaving some fermenting space) and sealed immediately. Take care in this case too that deposits on the bottom of the fermenting cask are not churned up and decanted into the bottles with the beer. The beer is still stored for 1 to 2 days after the filling, at the same temperature as for the main fermentation. They are then stored at 10°C to 12°C for top-fermented beer and 0°C to 2°C for bottom-fermented beer. Important: the bottles must definitely be ventilated after approximately 12 hours during the subsequent fermentation and then once again during the first 2 or 3 days, in order to avoid excess pressure because of the CO_2. The bottles are stored standing, so that particles of sludge can be deposited on the bottom. This way of manufacturing beer concerns a naturally cloudy beer. A nutritious beer was always naturally cloudy in former times because it contains the valuable B vitamins that are combined with the yeast cells. The first tasting can take place after a storage time of 4 to 6 weeks. A somewhat longer storage leads to an even more matured taste.

Your self-brewed beer is now ready for drinking: you can pour it out after chilling and enjoy it with your friends! Cheers!

5 A brewing example and brief instructions

We want to demonstrate brewing with the Master Brewer by using a definitive example that will guide you through the first brewing process step by step, as follows.

Beer type: Light wheat beer: top-fermented.
Quantity of beer: 50 litres of manufactured beer.
Basic wort: 11 to 12 ° Plato.

Ingredients

- 10 kg coarsely crushed brewing malt (50% wheat malt, 50% barley malt and some caramalt if necessary).
- 60 litres of moderately-hard brewing water or tap water (53 litres to begin, with and the rest for topping up).
- 90g of hops with 3% of alpha acid (approx. 60g immediately after boiling begins and approx. 30 g several minutes before boiling ends).
- dry yeast for over-fermenting.

Obtain the ingredients according to the above information.

Clean the Master Brewer and place it on a sturdy base in the kitchen or on the terrace. Also clean the other requisite utensils like the malt scoop, wooden spoon, wort spindle, cooling spiral, fermenting cask with accessories, etc. and keep them within easy reach.

Programme the recipe – Press ENTER for 1 sec. In the programming mode, you can set times and temperatures for the relevant recipe. Any standard recipe already used is already saved. After confirming all values with ENTER you return to the basic setting. Start the automatic process by pressing START (1 sec). The Master Brewer leads you through the following brewing process.

Pour in 53 litres of brewing water – up to about 2 cm below the upper mark on the connecting rod or on the level gauge.
Follow the instructions of the brewing controls, and confirm that the Master Brewer has been filled with water by pressing ENTER. The pump ventilates itself automatically and the Master Brewer comes up to the programmed mashing temperature.

On reaching the mashing temperature, a signal tone sounds, which must be acknowledged by pressing the ENTER button. The malt pipe can now be inserted with the seal facing downwards. Make sure that the pipe is clean, centred and lying flat on the bottom of the boiler. Now insert the first sieve base into the malt pipe and put the first filter cloth on top of it. The cloth must lie on the sheet metal sieve and it is not allowed to float upwards.

Pour 10 kg of malt into the malt pipe. It is important while doing so, that no malt is spilt next to it because that could block the pump. Stir in the malt with a wooden spoon and allow it to rise for several minutes. Push the second filter cloth onto the malt after that and then push on the second sheet metal sieve (pipe facing upwards again). Put on the holding-down stirrup and tighten it with the wing nut.

Continue the automatic process by pressing START. Lightly coloured brewing water rises up and runs over. The circulation has begun. The next brewing phases are carried out fully automatically in accordance with the programme. During some brewing phases, the controls initiate a brief pump pause in order to reposition the malt. To display shows the actual and set temperatures, together with the remaining time, which starts to countdown after reaching the set time (flashing).

On completion of the brewing phases, a signal tone sounds again. Acknowledge this by pressing ENTER. Remove the wing nut and holding-down stirrup. It is definitely recommended to use kitchen gloves because all parts are very hot. Put the supporting stirrup onto the boiler. Use both hands to pull out the malt pipe with the lifting stirrup and hang it on the lower bolts in the supporting stirrup. Allow the malt to drain off. Pierce the malt several times downwards with the wooden spoon, so that the beer wort can run off better. Completely remove the malt pipe with the malt after 15 to 20 minutes.

Continue by pressing START in order to start boiling the hops. Avoid over-boiling. Add the first 60g of hops 10 minutes after boiling begins. Do not put on the lid when the hops are boiling either. Steam must be able to escape. Replenish to compensate for the evaporated amount of water or adjust the basic wort. Add the last 30 g of hops 10 minutes before boiling ends.

Stir the hot wort vigorously (whirlpool effect) in order to clarify the wort. Put the cooling spiral (accessory) into the middle of the boiler immediately after the boiling ends. Connect the spiral to cold water and begin the cooling. Caution: boiling hot water will flow out of the spiral at the beginning. Cool down the beer wort to 20°C. You must work in sterile conditions from now on because of the risk of infection. Allow the separated cooler sludge to be deposited on the bottom. Avoid vibrations. Duration of approximately 35 minutes.

Decant into a sterilized 60l plastic cask by means of a hopper (refer to the illustration) or hose. Disinfect the cask and decanting aids beforehand with sulphurous acid. Do not allow the residues on the boiler's bottom to flow out with the wort.
Add 7g of dry yeast into the wort and seal with fermenting cask with the fermenting bung and the sulphurous acid that is poured in above.
Store the container in darkness at 16°C to 20°C. The fermentation begins after approximately 12 hours. Do not forget: decant 1.5l of wort into a container or similar receptacle and freeze it (before adding the yeast).

The fermenting duration is 3 to 5 days. The fermentation has been completed when no fermenting gases escape any longer. The maturing bottles must have already been prepared during the fermentation. Sterilize the stirrup bottles in the oven at 130°C and allow them to cool down in the oven. Boil the rubber seals.

Thaw out the frozen wort and carefully pour it into the fermenting cask 1 hour before the decanting [i.e., bottling]. Use a ladle to skim off the foam that is floating on top. Do not move the cask any more. Decant into the bottles with a hose. Only fill the bottles up to between 90% and 95% of their capacity. Allow the bottles to stand at the same temperature for 1 to 2 days and briefly ventilate them daily (only at a high overpressure). Then allow the beer to mature at 10°C to 15°C for another 3 to 4 weeks.

Cheers !!!

You can find further recipes at www.speidel-behaelter.de

6 Brewing defects and eliminating problems

Problem	Eliminating the problem
Fountains of wort shoot up during circulation.	The malt is crushed too finely. If necessary, crush the malt yourself (only break it up).
Blocked pump.	Put on the filter cloth and sheet metal sieve properly. Pour the malt into the malt pipe carefully. No malt into the boiler!
The temperature's initiation time is very long.	Put the lid on when heating. Place the Master Brewer so that it is protected from the wind.
Condensation leaks out of the lid.	Place the Master Brewer horizontally.
The recirculation process does not run properly.	Check whether the pump is functioning and has been ventilated. Check that the malt pipe is evenly supported and that the seal does not leak.
The wort runs off very slowly or not at all during the purging.	Pierce the malt with a wooden spoon several times from above, down to the sheet metal sieve. The malt is crushed too finely -> Just break up the grains, do not crush them too finely.

Problem	Eliminating the problem
The beer stinks and smells sour.	Bacteria have multiplied: throw the beer away. Work properly in the cold area. The brewing times could be too short, which has produced too much starch in the beer. Stop replenishing by malt. The replenishment is too hot (over 80°C).
The alcoholic content is too high.	Reduce the content of original wort by adding water when boiling the hops.
The alcoholic content is too low.	Increase the content of original wort by boiling longer (water vaporizes).
Strange smells of all kinds.	Greater cleanliness. Avoid touching the mould and using metals other than stainless steel. Avoid illuminating the beer during storage.
The fermentation does not function properly.	Add more yeast. 'Activate' the yeast. Check the fermenting temperature. Ventilate the wort by stirring.
The beer is cloudy.	Store the beer longer. Subsequently ferment colder. No losses when bottling (decanting).
There is too little carbonic acid.	Too much carbonic acid is lost when bottling or hosing. Freeze more wort and add it before the decanting.
There is too much carbonic acid - the beer foams over.	Too much pressure – ventilate the stirrup bottles more frequently. Bottled too soon – the fermentation had not ended yet. Too much wort

	was added before the bottling.
Poor content of foam.	Too little carbonic acid. Shorten the protein mode. Mash at a higher temperature. It is better to remove hot cooler sludge. Ferment at lower temperatures.

7 Legal aspects of domestic brewing (valid just for Germany)

For the legal aspects in your country, please contact your local departements!!!

Hobby brewers who prepare beer in their households for their own consumption, are allowed to manufacture up to 200 litres of beer per year tax-free. This beer is not allowed to be sold. The hobby brewer must notify the brewing procedure to the responsible main customs and excise office before beginning it for the first time. The following regulations are prescribed by the Beer Tax Law's enabling legislation (BierStV).

Article 2 - Manufacture by domestic and hobby brewers
(1) Beer that is prepared by domestic and hobby brewers in their households for solely their own consumption and it not sold, is exempt from taxes up to a quantity of 2 hectolitres in one calendar year. Beer that is manufactured in non-commercial, community breweries, is deemed to have been manufactured in the domestic brewer's household.
(2) Domestic and hobby brewers have to notify the main customs and excise office beforehand about the start of manufacture and the manufacturing location. The quantity of beer that will be probably be produced in one calendar year must be given in the notice. The main customs and excise office can permit easements.

You can find the customs and excise office that is responsible for you – and to which you must notify your first brewing process – at www.zoll-d.de . The customs and excise office can be notified by fax or letter. The notice could look like the example given below.

Main customs and excise office's address

Sender's address

Date

Dear Sir or Madam,

Re. Notice about the manufacture of beer in a private household

I intend to manufacture beer in my aforementioned dwelling.

Manufacturing location
(If different from the sender's address.)

Date of manufacture

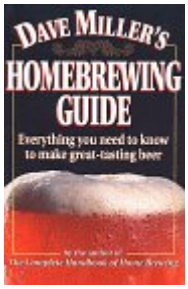
Quantity of beer
50 litres of top-fermentation wheat beer.
Original wort content of approximately 11°Plato.

I do not intend to manufacture more than 200 litres of beer in the calendar year of 2007.

Yours faithfully,

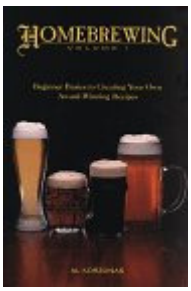
8 Advice about literature and purchasing sources

Numerous internet pages and books which solely deal with the subject of domestic brewing, can be acquired on the internet and specialized book shops. It is also advisable to obtain many helpful tricks and tips from there, which will certainly assist you further on the way to becoming a 'true' master brewer. We would like to recommend two books in this case.



Dave Miller´s Homebrewing Guide
by Dave Miller

Paperback – 368 pages – Storey Publishing
Date of publication: Oktober 1995
ISBN: 0882669052



Homebrewing
by Al Korzonas

Hardback – Sheaf & Vine
Date of publication: September 1997
ISBN: 0965521907

Purchase sources for ingredients can be found on our Internet site and at www.speidel-behaelter.de

9 Brewing record

Basic data

Date:	Date:	Date:

Recipe

Malt in kg , hops in g, water in litres:

Brewing process

Processing phase	Processing phase	Duration
Mashing	Mashing	
1st phase, protein mode		
2nd phase, maltose mode		
3rd phase, saccharification 1:		
4th phase, saccharification 2:		
Iodine test:	Running off:	Replenishment in litres:
Measuring the ACTUAL content of wort:		Litres:
Measuring the SET content of wort:	°Plato:	Litres:

Boiling the wort:	Total duration:	1st addition of hops:	Boiling the wort:

Efflorescence:	Cooling:	Removing the wort:	Efflorescence:	Cooling:	Removing the wort:

Fermenting process and subsequent ripening

Date when the fermentation began:		Date when the fermentation began:	
Bottling date:	Bottling date:	Bottling date:	Bottling date:

Tasting

Taste, colour, foaming properties, carbonic acids and defects

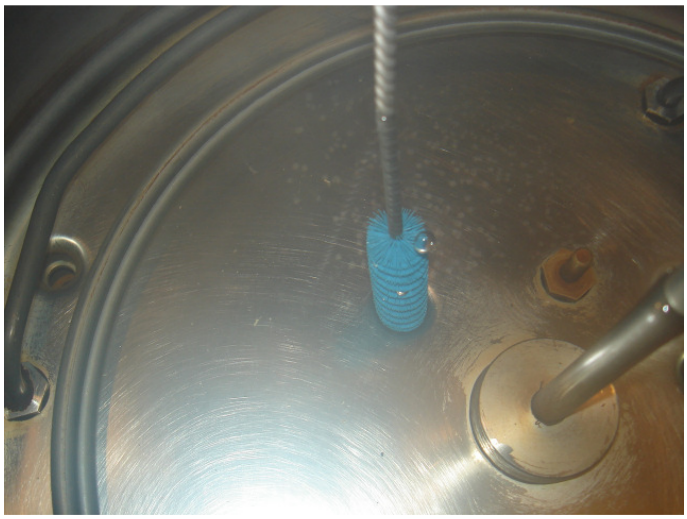
Improvements

10 Pump cleaning

Fill with water to a level about 2 cm above the heating coils and then, using the controls, heat up manually to approx. 35°C.

Then unplug the Braumeister!

Now brewing residues can be removed from inside the container and the heating coils with a brush; this is best done directly after every brew.



Thorough cleaning includes cleaning out the suction and pressure openings.

After cleaning the heating coils, the inside wall of the container and the suction and pressure openings, the Braumeister must be emptied and once again rinsed out thoroughly .

The next step is to clean the pump (P.24).

Open the pump:

It should be possible to open the pump housing by hand. If it is not, you should use a small block of wood and a hammer to release the union-nut.

In the interior of the pump, the impeller wheel will now be visible.
Caution:

- the pump impeller may fall out!
- damage to the impeller wheel will cause the pump to stop working properly later on!

The impeller wheel is taken out of the housing for cleaning.
Any brewing sediments must not be allowed to block the holes and must therefore be removed carefully.

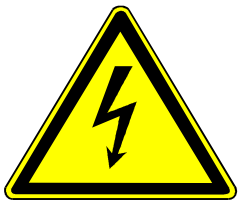
The pump housing should also be carefully cleaned. After this, replace the impeller wheel carefully in the housing.

Finally, to secure the pump once more, the union nut should only be tightened by hand.

Accessories: Cleaning set (item No.: 78027)

11 Warnings

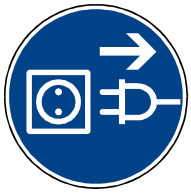
Before brewing, the Braumeister must be placed on a stable, flat and level surface.



Danger! Electric current!
The appliance, that is the pump, heating and the controls are all LIVE!

Caution! Danger of burns or scalding!
Boiler, components and the boiler's contents will all get very hot.

To avoid burns, it is recommended you wear heat-resistant gloves.



To avoid electric shocks, the appliance must always be unplugged when cleaning or maintenance work is being carried out.

Be sure to keep children away from the appliance – particularly whilst brewing, as the vessel and its contents become extremely hot!