

**NDL**CRAFT

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# Operation Instruction

100L Brewhouse  
4 Vessels

[ndlcraft.com](http://ndlcraft.com)  
[sales@ndlcraft.com](mailto:sales@ndlcraft.com)

# Catalogue



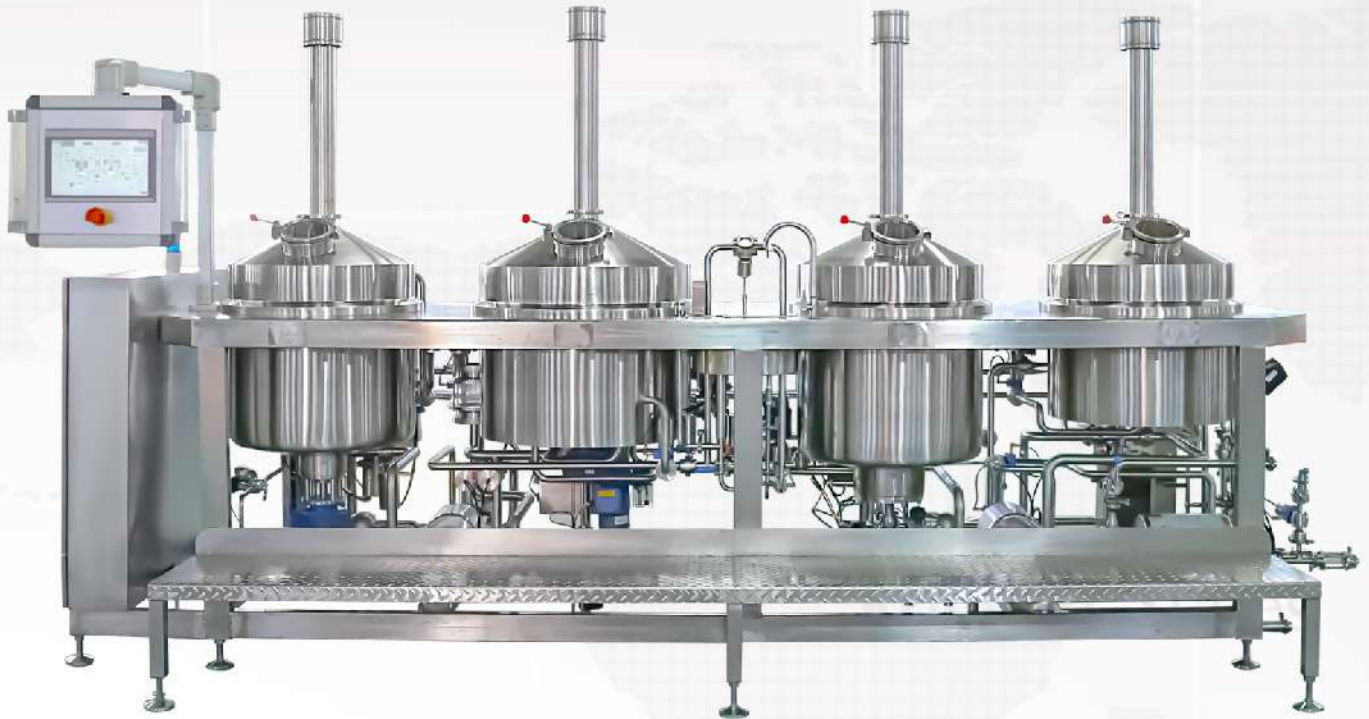
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## 1. Equipment general introduction

### 1.1 Equipment feature

100L Brewhouse four-vessel combination, this set of equipment perfectly combines four vessels brewhouse on one operating platform, with beautiful appearance, compact structure and reasonable layout.

### 1.2 Equipment capacity

Equipment capacity: one batch can be brewed 100L cold wort.

### 1.3 Equipment configuration

Mash tun, Lauter tun, Kettle tank, whirlpool tank, wort cooling plate.

### 1.4 System configuration

Two wort pumps and automatic valves. Through automatic control, automatic scrubbing and automatic mash transfer are realized.

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## 2. The first cleaning of brewhouse after installation

### 2.1 Pre-washing

2.1.1. Connect the hot water to the CIP cleaning pipe interface of the mash tun, open the drain port, and rinse until the clear water is discharged. During the flushing, open and close the associated valve of the mash tun to achieve the purpose of flushing the pipeline. (Break three times, 5 minutes each time).

2.1.2. Use the same step to clean Lauter tun, Kettle tank, Whirlpool tank and wort cooling plate.

### 2.2 Alkaline washing Mash tun

2.2.1. Connect the CIP system to the CIP cleaning pipe interface of the mash tun, connect the CIP return port to the CIP system, open the relevant scrubbing valve, and start the scrubbing step;

2.2.2. Circularly clean the inside of the tank and the material pipeline for 30 minutes;

2.2.3. After washing, pump all the alkaline liquor into the Lauter tun.

### 2.3 Alkali washing Lauter tun, Kettle tank, whirlpool tank, heat exchanger

2.3.1. The operation steps are the same as "2. Alkaline washing Mash tun".

### 2.4 Waste alkaline liquor treatment

2.4.1. When recovering alkaline liquor, pump the alkaline liquor from the whirlpool tank into the recycling container for temporary storage or the CIP station; when the Brewhouse is out of service more than 7 days, the above washing operation can be repeated to keep the equipment hygienic.

2.4.2 When the alkaline liquor is determined not to be used, it can be drained directly.

### 2.5 Rinse with water and hot water

2.5.1 After the alkali washing is completed, follow the pre-washing operation steps to connect the CIP to the Brewhouse CIP cleaning port and rinse until the discharged wastewater has no alkali residue.

2.5.2 Hot water circulation cleaning, 80°C hot water (the water level has be over the heater), and then clean the Mash tun, Lauter tun, Kettle tank, Whirlpool tank, heat exchanger and pipes again according to the alkaline washing steps.

#### Attention:

A. Pay attention to protection. You must wear protective equipment during operation. It is strictly forbidden to directly contact the lye and high-temperature pipelines with your limbs.

B. Steam heating ensures that the pressure of the steam jacket is  $\leq 1.5\text{bar}$  to avoid overpressure operation; equipment with heating function must ensure that the liquid level over the heater to avoid damage to the heater caused by dry burning; (the same below).

## 3. Brewhouse operating procedures

### 3.1 Wort brewhouse operation procedures

3.1.1. Equipment inspection: whether the Brewhouse pipe fittings, valves, instruments, water, electricity, steam, refrigerant and compressed air supply are normal or not, and the feed can only be fed after there is no abnormality and cleaned.

3.1.2. Prepare brewing water: adding water to the mash tun according to the ratio of material to water, and heat up to the feeding temperature + 2°C (hot water can also be added to the mash tun).

3.1.3 Feeding: Start stirring, slowly put the malt powder into the mash tun, stop stirring after stirring evenly; keep the temperature at 52±1°C, and let stand for 20 minutes.

3.1.4 The first stage of Mash: start stirring, turn on the heating to raise the temperature, the heating rate is 0.8-1°C/min, turn off the heating when the temperature rises to 64°C, stop stirring; keep the temperature at 65±1°C, and let it stand for 60 minutes.

3.1.6 Enzyme killing: start the stirring, turn on the heating to raise the temperature, the heating rate is 0.8-1°C/min, turn off the heating when the temperature rises to 78°C, keep stirring, and prepare to pour the mash.

### 3.2 Operating procedures for wort lautering

3.2.1 Bottom water: 78°C hot water is poured into the Lauter tun, and the liquid level is flush with the sieve plate.

3.2.2 Pour the mash: Start the Mash tun agitator and the Lauter tun raker; the mash comes out from the bottom of the Mash tun, passes through the mash pump, enters the Lauter tun, and pumps it in quickly. After pouring the mash, close the relevant valves and pumps, and wait until the mash is well stirred, Stop the raker from running.

3.2.3 Wort Lautering : After the mash has stood still for 10 minutes, open the valve of the wort return pipeline in the Lauter tun, start the return flow of the wort pump, and when the filtered wort is observed clear through sight glass, open the valve of the Kettle tank and close the return flow valve, the wort is filtered into the Kettle tank.

3.2.4 Measuring the first wort: After 10 minutes of normal filtration, take a small amount of wort and measure the sugar content of the first wort.

3.2.5 When the original wort in the Lauter tun is close to revealing the dregs layer, open the valve of the sparging pipeline, turn on the hot water pump, and carry out the sparging operation. The sparging can be divided into one or more operations. The sum of the total amount of sparging water and the first wort amount is the total capacity before boiling;

3.2.6 After Lautering, measure the concentration of mixed wort.

3.2.7 Discharging grains: After lautering, open the grain discharge door, discharge the grains into the grain container and transport them away.

#### Attention:

A. If suction filtration method is used for reflux, gradually adjust the frequency converter, carefully control the flow of wort, and maintain the stability of reflux.

B. If during the suction filtration process, the wort pump speed reaches 25HZ, and the filtration is still difficult, stop filtering the wort at this time; open the raker to re-form the filter layer, and do not increase the wort pump speed when the filtration is difficult.

C. During the wort filtration process, if the wort is not clear or difficult to filter, stir the mash to stand still for 10 minutes, and reflow until the wort is clear.

D. The combination of Brewhouse containers is different, and the flow direction of materials is different. Please refer to the combination of Brewhouse equipment for details.

### 3.3 Boiling Operating procedures

3.3.1 Turn on the heating of the Kettle tank (the liquid needs to be submerged in the heater), and start counting until the wort boils. The boiling time is 60 minutes, and the wort is always in a boiling state; after boiling, measure the concentration of the final wort.

3.3.2 The wort was boiled for 5 minutes, 30 minutes and 5 minutes before the end of the boil, and bitter flowers and fragrant flowers were added respectively.

#### Attention:

A. The wort must always be in a boiling state during the boiling process, otherwise there will be abnormal fermentation such as sour wine.

B. During the boiling process, carefully control the steam source to avoid the hot wort from overflowing, wear protective equipment to prevent burns.

C. After the boiling is over, the manhole of the Kettle tank cannot be opened arbitrarily to prevent the miscellaneous bacteria in the air from falling into the tank.

### 3.4 Whirlpool Operating procedures

3.4.1 After boiling, open the relevant valve, start the wort pump, pump the wort from the tangent port into the Whirlpool tank, and when all the wort is poured into the Whirlpool tank, close the valve and wort pump; let it settle for 20 minutes, open the discharge valve to cool the wort. After the wort cooling is over, drain the thermal coagulation in the tank.

#### Attention:

A. When draining the thermal coagulation: leave the body away from the nozzle to prevent burns

B. The bottom of the tank body is a conical bottom, and the high and low discharge ports should open the high discharge port, and the low discharge port is the sewage discharge port; the bottom of the tank bottom is an inclined bottom, and the high discharge port should be opened first when the material is discharged, and the liquid level drops to When approaching the high discharge port, switch to the low discharge port.

### 3.5 Operating procedures for wort cooling (for hoses used for fermentation)

3.5.1 Connect the sterilized wort hose from the material outlet of the heat exchanger to the material port at the bottom of the fermentation tank (drain the heat exchanger and the sterilized water in the pipeline before connecting the pipeline).

3.5.2 Alcohol flame disinfection should be used when connecting the hose to the feed port at the bottom of the fermenter.

3.5.3 Wort cooling:

Check whether the heat exchanger pipe fittings, valves, wort hoses, instruments, ice water, tap water, oxygen and other supplies are normal. Open the whirlpool tank, heat exchanger and fermenter related material process valves in turn, and at the same time open the refrigerant valve on the heat exchanger; start the wort pump and refrigerant pump, and adjust wort pump frequency appropriately from small to large according to the temperature of wort at the outlet of heat exchanger to maintain the temperature of wort entering the tank.

#### Attention:

A. Pay attention to protection. You must wear protective equipment during operation. It is strictly forbidden to directly contact the lye and high-temperature pipelines with your limbs.

B. Steam heating ensures that the pressure of the steam jacket is  $\leq 1.5\text{bar}$  to avoid overpressure operation; equipment with heating function must ensure that the liquid level over the heater to avoid damage to the heater caused by dry burning; (the same below).

3.5.4 Hot water recovery: After cooling the hot wort, the hot water from the heat exchanger can be recycled to the brewhouse system tank or hot water tank.

3.5.5 Oxygenation: While the wort is cooling, open the oxygen valve to continuously oxygenate the wort. The control dose is 1 time the amount of wort, that is, the oxygen flow rate in the observation sight glass is evenly mixed with the wort and oxygen.

3.5.6 Cleaning at the end of entering the fermenter: rinse the brewhouse equipment, process pipelines and heat exchangers with recovered hot water.



## 4. Equipment Precautions

4.1 Check the various instruments (such as temperature, voltage, etc.) of the control cabinet every day on and off duty, and confirm that the parameters of the equipment are in operation.

4.2 Check the process pipelines of the equipment every day on and off duty to see if there is any leakage.

4.3 Check the pressure of each tank every day on and off duty to see if it is within the normal pressure range.

4.4 Check the working conditions of the chiller every day on and off duty. Whether the high and low pressure of the chiller is within the normal working range (usually the high pressure is 11-15bar, and the low pressure is 0-3bar). For specific maintenance, please refer to the instruction manual that comes with the chiller.

4.5 The boiler must be drained after daily use to ensure that the water quality in the boiler is clean; for detailed daily maintenance of the boiler, please refer to the "Boiler Installation and Operation Manual" that comes with the boiler.

4.6 The automatic valve in the softened water system of the boiler must ensure that the power supply is always on; the salt tank must be checked every day to ensure that the salt solution in the salt tank is a saturated salt solution. If the solubility is not enough, add large-grained salt in time.

4.7 The brewhouse transmission system needs to be inspected and maintained regularly, usually once every 3-6 months, including but not limited to lubricating oil, bolts, seals, abnormal noise, etc.

4.7.1 If the transmission device includes bearings (except for the geared motor), it is found that the lubrication is not in place, abnormal noise or rust is found during the maintenance process, and the lubricating oil should be replenished in time.

4.7.2 The lubricating oil of the reduction box should be replaced every 3-6 months after the first use, and every 12-24 months thereafter.

4.7.3 The transmission device adopts O-ring sealed transmission. If there is any leakage or dripping, fasten the pressure ring in time until no leakage is found, and avoid tightening it to the end at one time. If it has been tightened to the end and still leaks, the O-ring needs to be replaced.

4.7.4 The transmission device adopts the skeleton oil seal for transmission. If there is any leakage or dripping, replace the skeleton oil seal in time.

4.7.5 If the transmission device includes a limit switch, check whether it is loose or displaced during the maintenance process, and reset and tighten it in time if found; at the same time, check whether the limit switch can work normally.

4.7.6 The transmission system includes fastening or connecting bolts. Check whether they are loose during the maintenance process, and fasten them in time if they are found to be loose.

4.7.7 During the inspection and maintenance process, it is necessary to ensure that the power supply is cut off, and there are people on duty on site, and maintenance work must not be carried out unattended on site.

4.8. If the kettle tank uses an internal heater or an external tubular heater, it should be cleaned regularly by boiling lye. The concentration of the lye in the tank should be 2.5%, and the liquid level should be higher than the highest point of the heater. It should be cleaned by circulating heating. Usually the brewing equipment is cleaned once in 30-40 batches, each time for 20-30 minutes, to ensure that the fouling substances in the inner heater are thoroughly cleaned.

4.9. If any abnormalities are found in the above problems, please stop the machine immediately and contact the company's after-sales personnel, and we will troubleshoot as soon as possible.





## 5. Record sheet

### Beer fermentation operation record

Date:

Type:

Batch:

Tank No.:

Process \ Time			Process \ Time		
Malt grinding			Feeding water		
Feeding malt			52°C		
65°C			72°C		
78°C			Sterilization		
Wort backflow			Original wort lautering		
			Original wort concentration		
Washing spent grain			Boiling		
Whirlpool			Cooling		
Adding hops for the first time	Time	Weight(g)	Adding hops for the second time	Time	Weight(g)
Mixed wort concentration					
Barley malt (Kg)					
Remark:					

(Reference form) Operator:

Beer fermentation process parameter record

Date:

Type:

Batch:

Fermenter No.:

Date	Time	Temp	Pressure	Operator	Remark		Date	Time	Temp	Pressure	Operator	Remark

(Reference form) Operator:

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**CHINA**

Head Office: Qingdao, China

Tel: +86 139-639-15265

Branch Office: Jinan, China

Factory 1: Jiaozhou City, Qingdao, China

Factory 2: Pingyuan County, Dezhou, China

**UNITED STATES**

1420 Washington Blvd. Suite #301

Detroit, MI 48226

Tel: +1 248-850-8275

**UNITED KINGDOM**

25a Orgreave Drive

Sheffield, UK, S13 9NR

Tel: +44 01142-699080

**CANADA**

7475 Boul. Newman, Suite 510

Lasalle, QC H8N 1X3 Canada

Tel: +1 418-998-3156