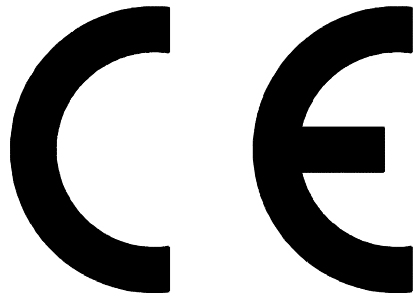


M21  
M26  
M30

# ■ Installation ■ Instructions

IA M21-M26-M30 2018-02 /E  
SN 707764

**BÖWE**



**This machine complies with the EC Machinery  
Directive 98/37 EC, the EC Low Tension Directive 73/23 EEC  
as amended by RL 93/68 EEC, EMV-recommendation  
89/336/EWG  
and the Harmonised Standards:**

**EN 292 Part 1 and Part 2  
EN 60204-1 (DIN-VDE 0113 Part I)  
EN 1127-1**

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**BÖWE**

**Dear Customer,**

It gives us great pleasure to present you with your **BÖWE** machine. You are acquiring a machine that has been designed and manufactured to meet the highest quality standards and that corresponds to the latest standards in research and technology.

Please do not put these installation instructions away without reading them!

This manual contains all of the important information that you need to operate your dry cleaning machine.

If the prescribed maintenance work is neglected or improperly performed, if repair work is carried out by service technicians other than those authorized by BÖWE or if parts other than original BÖWE spare parts are used, we naturally cannot fulfill the guarantee obligations according to our General Terms of Delivery.

Measurements and other values reflect the status as of the printing date.

We reserve the right to make technical changes at any time and without prior notice in the interest of continuing development or when changes are considered to be necessary for constructional reasons.

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# **BÖWE**

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# **Necessary Operating Materials and Chemical Additives**

Dear Customer,

In order to prevent any delays in the commissioning of your M21/M26/M30 dry cleaning machine, we ask you to make sure that the following operating materials and chemical additives are available.

## **- Solvent**

The solvents used must have a flash point that is higher than the temperature stated on the machine nameplate. The polycyclic aromatic compound content is not allowed to exceed 0.01% by weight. The solvent must be heat-resistant under operating conditions.

The solvent flash point must be checked every six months.

We recommend that only fresh solvent should be used in order to avoid contamination through dirt, foreign substances and smells.

Total filling amount for the first filling:	M21: approx. 445 l (117 US gal) *
	M26: approx. 510 l (135 US gal) *
	M30: approx. 565 l (150 US gal) *
Tank I: Minimum filling volume:	M21: 110 l (29.3 US gal)
	M26: 135 l (35.6 US gal)
	M30: 155 l (40.9 US gal)

\* Machine with 1 economy filter.

For machines with 2 economy filters: + 50 l (13.2 US gal)

For machines with 2 economy filters and 1 cartridge filter: + 75 l (19.8 US gal)

For machines with 2 economy filters and 2 cartridge filters: + 90 l (23.8 US gal)

## **- Chemical additives**

The chemical additives used must be halogen-free and must have a flash point that is higher than the temperature stated on the machine nameplate. The polycyclic aromatic compound content is not allowed to exceed 0.01% by weight. The chemical additives must be heat-resistant under operating conditions.

Depending on the equipment, the following should be available:

- Dry cleaning detergent
- Waterproofing agent
- Pre- and post-spotting agents



Caution

## Attention !

### Important information regarding solvents

When delivered, this machine is released only for the solvent specified on the nameplate.

At the time this manual was printed, the following statements are valid:

It is generally possible to use the following solvents:

- Cyclosiloxane (such as GreenEarth) with a flash point > 75°C
- Hydrocarbons (such as DF 2000) with a flash point > 60°C
- Hydrocarbons (such as Total TDC 3, among others) with a flash point > 55°C
- Solvon K4 (Kreussler) with a flash point > 60°C
- HiGlo (Christeyns) with a flash point > 60°C
- Intense (Seitz) with a flash point > 60°C
- SENSENE (Safechem) with a flash point > 60°C

The use of the solvent perchlorethylene is not permitted!

The following must be observed in this regard:

If you plan to use the machine with a solvent whose data differs from that given on the machine nameplate, you must first consult with BÖWE and obtain its written authorization. This will require different software and a different nameplate.

Permission to operate the machine becomes invalid in case of non-compliance.

# **BÖWE**

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# 1 General Information

1

## 1.1 Technical Literature

1.1

We make particular reference here to the literature and leaflets of the trade and professional associations, research institutes and mutual indemnity associations, as well as safety data sheets provided by the solvent producers.

## 1.2 Laws, Ordinances, Regulations

1.2

To avoid health risks and environmental damage, you must strictly comply with all directives and regulations pertaining to the industry, particularly with regard to proper handling of solvents.

**In any case, you must observe the applicable laws and regulations in the country in which the machine is installed.**

**The machine complies with the following regulations:**

- EC Machinery Directive 98/37 EC
- EC Low Voltage Directive 73/23 EEC in the version RL 93/68 EEC
- EMC Directive 89/336/EEC
- Pressure Equipment Directive 97/23/EC

Applied harmonized standards:

- EN ISO 12100-1 and 12100-2
- EN 60204-1 (DIN-VDE 0113 Part 1)
- EN 1127-1

Applied national standards and directives:

- Accident Prevention Regulations for Refrigeration Plants, Heat Pumps and Cooling Equipment (BGVD4)
- CFC and Halon Prohibition Ordinance

**When operating the system in Germany, the following laws and directives must be observed:**

- Accident Prevention Regulations for Chemical Cleaning (BGR 500 chapter 2.14)
- Water Resources Law (WHG § 19)
- Waste Disposal Law
- Explosion protection guidelines
- Technical Regulations for Dangerous Working Materials (TRGS 402)
- VDI guidelines
- VDE regulations
- 31<sup>st</sup> BImSchV
- GefStoffV with technical rules (Regulation for hazardous material)
- Operating safety regulation

## 1.3 Corrective Maintenance Work

1.3

We recommend that you commission the customer service department of the BÖWE organization for the maintenance, servicing and operating safety of this valuable dry cleaning machine. They use original BÖWE spare parts.

## 2 Safety Regulations

2

Each person who is charged with the installation, commissioning, operation, maintenance or repair of the dry cleaning machine must first have read and understood the operating and installation instructions. In particular, we refer to the observation of the relevant laws and regulations for the countries in question.

The cleaning machine has been built according to the latest state of the technology. Only persons who are familiar with the machine and informed of the possible risks are authorized to set up, install, commission, operate, maintain and repair this machine. The relevant accident prevention regulations and other regulations involving safety and medical care for workers must be strictly adhered to.

### Safety Symbols



This safety symbol identifies particular information regarding occupational safety. It points out hazards and serves to protect personnel from physical injury. You must observe all applicable laws and regulations; the information on occupational safety only emphasizes particularly dangerous areas. Failure to observe this information can result in serious consequences for the health, up to and including life-threatening injuries.



This symbol provides important information on the correct use of the machine. Failure to observe this information can lead to disturbances in the machine or surrounding area.

You are not permitted to bypass or turn off safety devices or to make them otherwise inoperative. You must observe all applicable industrial safety regulations during installation and repair work. You must dispose of distillation residues and process water in accordance with regulations.

### 2.1 Safe Installation and Commissioning

2.1

You must install the dry cleaning machine according to the enclosed installation instructions. The room must be sufficiently ventilated.

You are not permitted to operate the machine in potentially explosive areas or in areas in which systems with open flames have been installed. All electrical systems within a radius of 2 m (approximately 6.5 feet) must comply with the IP 54 degree of protection.

**The BÖWE Organization Customer Service department is responsible for carrying out the first startup.**

### 2.2 Authorized Use

2.2

This dry cleaning machine is designed exclusively for operation with solvents with flash points higher than the temperature information on the machine nameplate. (See "Necessary Operating Materials and Chemical Additives"). Handle these solvents directly only when absolutely necessary and wear protective gloves and goggles.

## 2 Safety Regulations

## 2

---

This closed-circuit dry cleaning machine for industrial use (including use in cleaning shops) is intended for cleaning textile articles (also leather or fur or for treating skins). This dry cleaning machine is not intended for customer access (such as in self-service shops).

You are not permitted to treat textiles that are easily inflammable or poisonous or that contain radioactive materials.

The definition of authorized use includes compliance with the operating, maintenance and repair conditions prescribed by BÖWE.

The manufacturer is not liable for damages resulting from unauthorized use or from changes to the system made without proper authority.

### 2.3 Operation and Maintenance

### 2.3

Only trained service personnel who are familiar with the machine are authorized to operate and maintain the BÖWE dry cleaning machine. Safety regulations must be observed during operation and maintenance.

Do not start the system unless all protective devices (belt guard for cage and filter drive) are in place and working.

Check the operating safety of the machine (sealing test) and the liquid levels daily before turning it on. Dispose of lint, process water and distillation residues according to the operating instructions.



Do not perform any maintenance work when the machine is in operation. Make sure that the solvents, lubricants and chemical additives meet the specified quality requirements.

**Perform maintenance work only when the machine is turned off and secured and has cooled off.**


**When the machine is not in operation cooling water feed must be cut off by means of a stop valve to be fitted on site.**

## 2 Safety Regulations

2

	<p><b>Attention:</b> Drain distillation residues only when the green lamp on the still is lit. The collecting tank must hold the amount that is expected to be drained and must be temperature and solvent-resistant at up to 150 °C (302 °F)</p>
	<p><b>Attention:</b> Check the liquid level before opening the still door</p>
	<p><b>Attention:</b> Do not allow distillation residues to reach the sewer system or garbage. You must dispose of these residues according to country-specific regulations on special waste.</p>

### Requirements for the owner and operating personnel

	<p>According to the legal stipulations of the German accident prevention regulations BGR 500 chapter 2.14, special knowledge is required for the operation and maintenance of dry cleaning systems. A person with this special knowledge must regularly be present during the operation of dry cleaning systems.</p>
---	--

As a person / body who runs a plant one is obliged to have the refrigerating plant of the dry cleaning machine inspected annually with regard to tightness.

### 2.4 Repair Work

2.4

Only skilled workers with suitable protection devices and work tools are authorized to carry out repairs. Make sure that there are no solvent emissions.

#### During repair and cleaning work:

Turn main switch off

Close the stop valves on the supply lines (steam, condensate and compressed air).

Make sure that the system cannot be turned on without permission (close off and put up a sign "DO NOT TURN ON - REPAIR WORK" )

Always remove the main fuse when working on the electrical system.

Use only original fuses to replace defective ones.

When working on pneumatic control parts, make sure that there is no pressure in the system.

Only specially trained refrigeration technicians are authorized to make repairs to the refrigeration unit.



All spare parts used must comply with the technical standards set by the manufacturer.

## 2 Safety Regulations

2

### 2.5 Decommissioning and Disassembling

2.5



Only skilled workers with suitable protection devices and work tools are authorized to decommission and disassemble the system.



When decommissioning and disassembling the machine, drain all solvent from the machine, including the pipelines, valves and fittings. You must remove residues that could cause environmental pollution.



You must separate electric lines and pipelines that were used to supply or drain the machine from the supply network. Make sure that they cannot be turned on by unauthorized persons.

Have an authorized customer service technician dispose of the cooling agent from the refrigeration unit.

### 2.6 Further Safety Regulations

2.6



This BÖWE dry cleaning machine works with a solvent. These solvents are harmful to the health in the context of the Hazardous Substances Ordinance.

**Drinking, eating and food storage are prohibited in the area where the machine is installed.**

**Open flames and fires are not allowed in the operating area. No smoking is allowed.**

Install steam generators in such a way that they do not draw in air that contains solvent.

A BÖWE customer service representative must train the personnel in the operation of the machine before the first startup. This training must include information on safe operation and possible hazards.

The owner is responsible for employing trained personnel to load and unload the machine and must employ well-informed and expert personnel for maintenance work. No unauthorized personnel are allowed in the area of the machine.

The daily checks prescribed in the operating instructions represent the minimum requirements. Operating personnel must immediately report any changes in the machine that could affect the safety.

## 2 Safety Regulations

## 2

The owner is obligated:

- to draw up clear regulations regarding responsibility for operation and maintenance, to ensure that the machine is only operated when it is in perfect condition and to ensure the order, safety and cleanliness at the workplace by means of instructions and inspections.

The owner is obligated to make sure that no working method is used that could place the health of the personnel, the environment or the safety of the machine at risk.

Notice and warning signs must be placed on the machine or in the operating area in plain sight. Damaged or missing signs must be replaced immediately. The specified safety regulations must be followed at all times.

In the event of any kind of hazard, stop the machine immediately and turn off the main switch.

If there is a solvent leak:



Turn off the machine

Immediately send all personnel into the open air

Open windows and doors

Cut off the cause of the solvent leak

Change any clothing that is wet with solvent

If necessary, request a BÖWE customer service technician.

The escape of larger amounts of solvent is a reportable malfunction. It must be reported to the responsible authorities, industrial control group, fire department, water resources board or subordinate water authorities.

## 2 Safety Regulations

## 2

---

The proper handling of solvent is an important prerequisite for workplace safety.

Note the following potential hazards:

Solvents are very good grease removers; they also remove natural oils from unprotected skin.

Protection: Wear solvent-resistant protective gloves; apply skin cream with oil to the hands.

Liquid solvents are strongly irritating to the eyes.

Protection: Wear protective goggles.

Solvents are combustible.

Protection: Avoid ignition sources (smoking, sparks, fire).

Risk of explosion if the flash point is lowered.

Protection: You must use solvents that have a flash point that is higher than the temperature stated on the machine nameplate. Use only chemical additives that do not lower the flash point.

Ignition sources

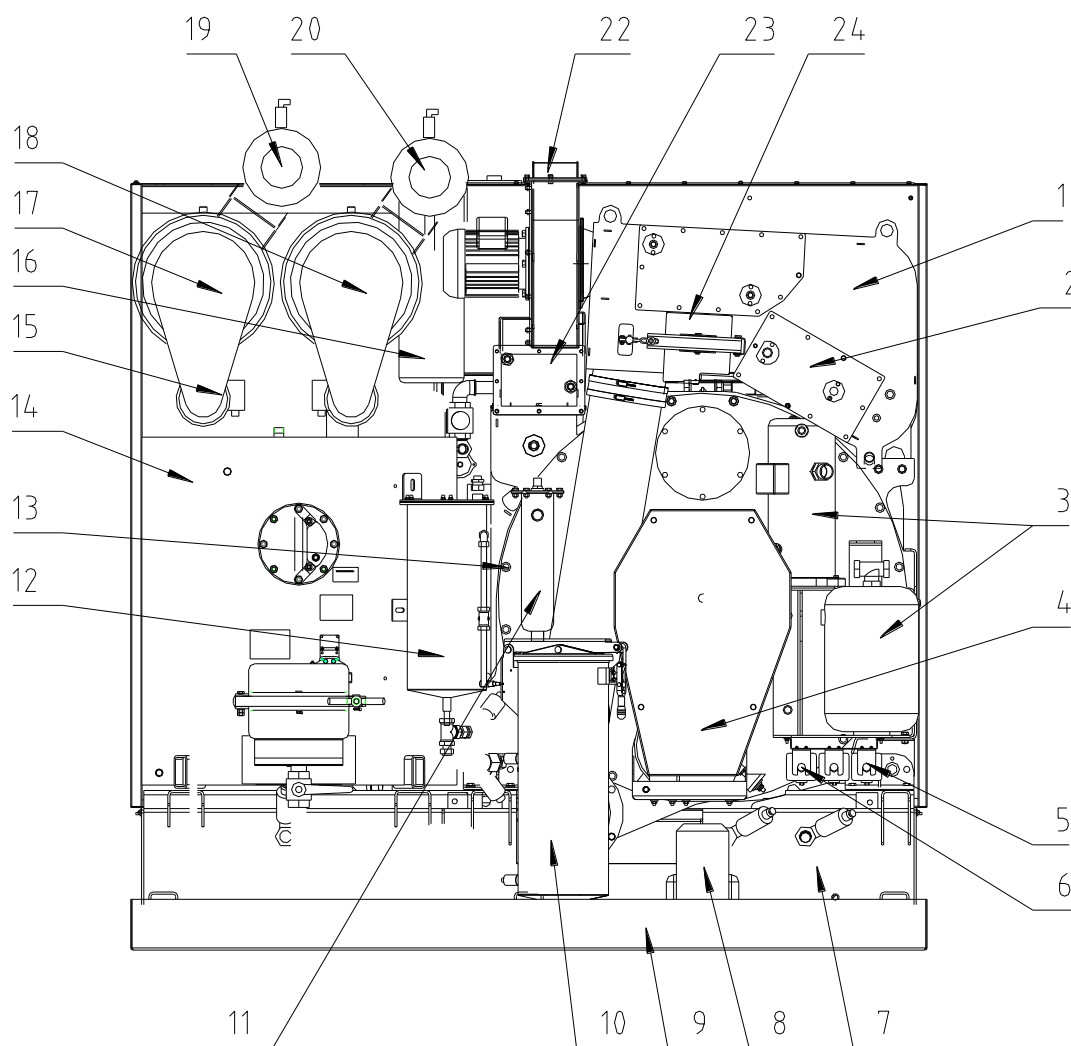
Protection: Check pockets for cigarette lighters, matches and metallic objects.

### **Do not overload the machine!**

You must hang up any operating instructions from the Clothing Mutual Indemnity Association in a visible location. The German Hazardous Substances Ordinance and the BGR 500 chapter 2.14 stipulate the obligation for operating instructions.

### 3 View of the Machine

3



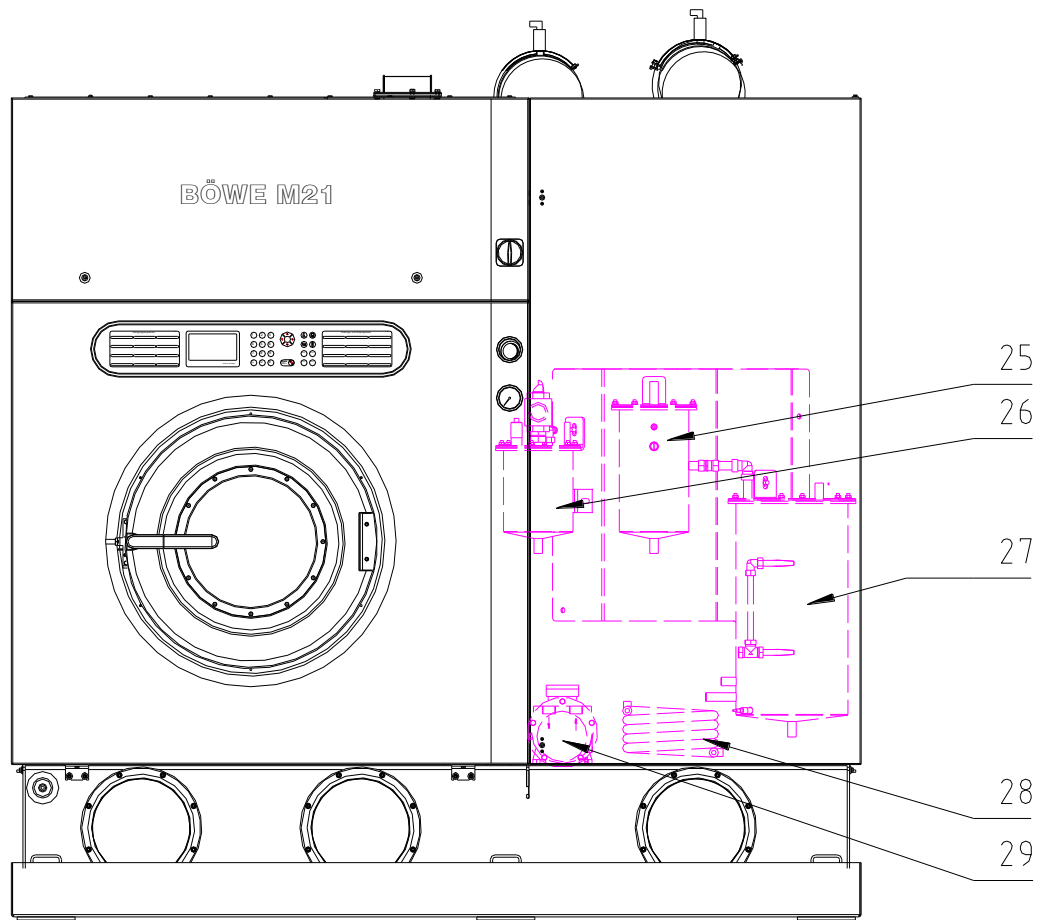
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- |    |                              |    |                                |
|----|------------------------------|----|--------------------------------|
| 1  | Airshaft                     | 13 | Cage housing with cage         |
| 2  | Cooling register             | 14 | Still                          |
| 3  | Refrigeration Unit           | 15 | Filter drive                   |
| 4  | Cage drive                   | 16 | Capacitor                      |
| 5  | Dosing unit                  | 17 | Economy filter 1               |
| 6  | Sprayer *                    | 18 | Economy filter 2 *             |
| 7  | Tanks 1, 2, 3                | 19 | Adsorption cartridge filter 1* |
| 8  | Solvent pump                 | 20 | Adsorption cartridge filter 2* |
| 9  | Safety trough                |    |                                |
| 10 | Button trap with lint filter | 22 | Fan                            |
| 11 | Solvent cooling system       | 23 | Heater battery                 |
| 12 | Water separator              | 24 | Lint post-filter               |

\* Option

### 3 View of the Machine

3



707764-01-0

- 25 Operating material tank
- 26 Flash tank
- 27 Extraction tank
- 28 Operating material cooler
- 29 Vacuum pump

## 4 Transport

4

In order to guarantee that no damages result from the handling, we recommend that you consult with the appropriate experts for correct transport, installation and connection.

You must provide suitable tools and equipment for unloading, transporting, machine entry and installation. For example: crane, forklift, elevating truck, pulley block, rope, winch, crowbar, rollers, wooden block and wedges.



**Caution**

**Attention: Note the center of gravity of the machine and secure against lateral tipping.**

### 4.1 Entry

4.1

Normally the machine is packed in a crate or shipping box and kept in an upright position when being transported and brought in.

Package dimensions (box measurements)		Machine with distillation		
		<b>M21</b>	<b>M26</b>	<b>M30</b>
Width	mm (in)	2330 (91.7)	2330 (91.7)	2330 (91.7)
Depth	mm (in)	1650 (64.9)	1780 (70.0)	1885 (74.2)
Height	mm (in)	2495 (98.2)	2495 (98.2)	2495 (98.2)
Normal dimensions after unpacking (entry dimensions)				
Width	mm (in)	2200 (86.6)	2200 (86.6)	2200 (86.6)
Depth	mm (in)	1500 (59.1)	1630 (63.0)	1735 (68.3)
Height (with cartridge filter)	mm (in)	2340 (92.1)	2340 (92.1)	2340 (92.1)
Height (without cartridge filter)	mm (in)	2180 (85.8)	2180 (85.8)	2180 (85.8)
Entry dimensions (without fan cover, without cartridge filter)				
Height	mm (in)	2130 (83.9)	2130 (83.9)	2130 (83.9)

### Seaworthy packing

Seaworthy packing without solvent	(Kg / lbs)
M21	2420 / 5,335
M26	2570 / 5,666
M30	2690 / 5,930

## 4. Transport

4

### Removing machine from the pallet and transportation:

Must be done by transport experts.

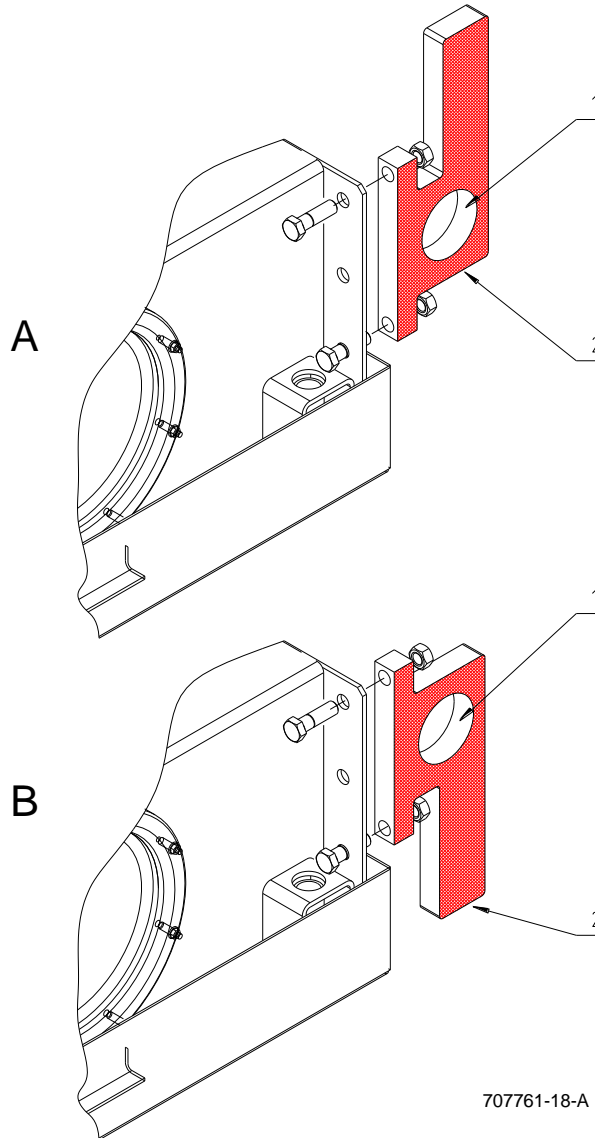
Note the center of gravity of the machine and secure against lateral tipping.

Screw on 4 transportation brackets. (Option A or B).

Lift the machine only at the sturdy points (2).

Use eyelets (1) for transportation with a crane.

To ensure a safe transportation of the machine, the forklift should have the capacity to carry at least 1.5(X) times of the weight of the machine.



707761-18-A

## 5 Installation

5

### 5.1 Operating Environment

5.1

#### 5.1.1 Regulations

You must observe applicable regulations for room ventilation and size, odor and noise emissions, accident prevention, etc. The switch panel contains contacts for the room ventilation control system (see Point 7.3.2).



Noise level: app. 62 dB (A)

(Average value at 6 measurement points at a distance of 2 m (78.7 in) from the machine and 1.60 m (63.0 in) above the floor.

If there is an increase in the air-borne sound (for example, resonance) because of the spatial conditions at the place of installation (for example, the condition of and distances between walls and ceiling), you must take local sound insulation measures.

#### 5.1.2 Temperature

Do not expose the machine to direct sunlight. Ensure that there is an adequate air supply for the heat exchange (heat buildup.)

Room temperatures under 5 °C (41 °F) are not permitted because of the risk that the water in the system will freeze.

During continuous operation, the room temperature is not permitted to exceed 35 °C (104 °F) because of increased solvent consumption and for safety reasons.

Heat dissipated to the surroundings: *				
		M21	M26	M30
		11000	14000	18000

\* 2-bath procedure, precleaning bath low level for distillation

#### 5.1.3 Structural Surroundings

Partitions, panels, suspended ceilings and other structures near the machine must be installed in such a way that they do not interfere with the operation, that no heat buildup occurs and that they can be easily removed for maintenance and repair work.

**5.1.4 Machine Environment**

**Do not operate systems with open flames (such as gas-heated flatwork ironer, tumbler) in the same area (machine room)**



**In the machine room or within 2 m (78.3 inches) of the machine, no hot surfaces with temperatures above the ignition temperature of the solvent are permitted.**

**Use a hose to vent the machine system outside or connect to the room ventilation system.**

**You must ensure that the air from the machine room cannot escape into a heating room, if there is one in the area.**

**The air from the machine room is not permitted to be fed into the exhaust line of a furnace system.**

## 5 Installation

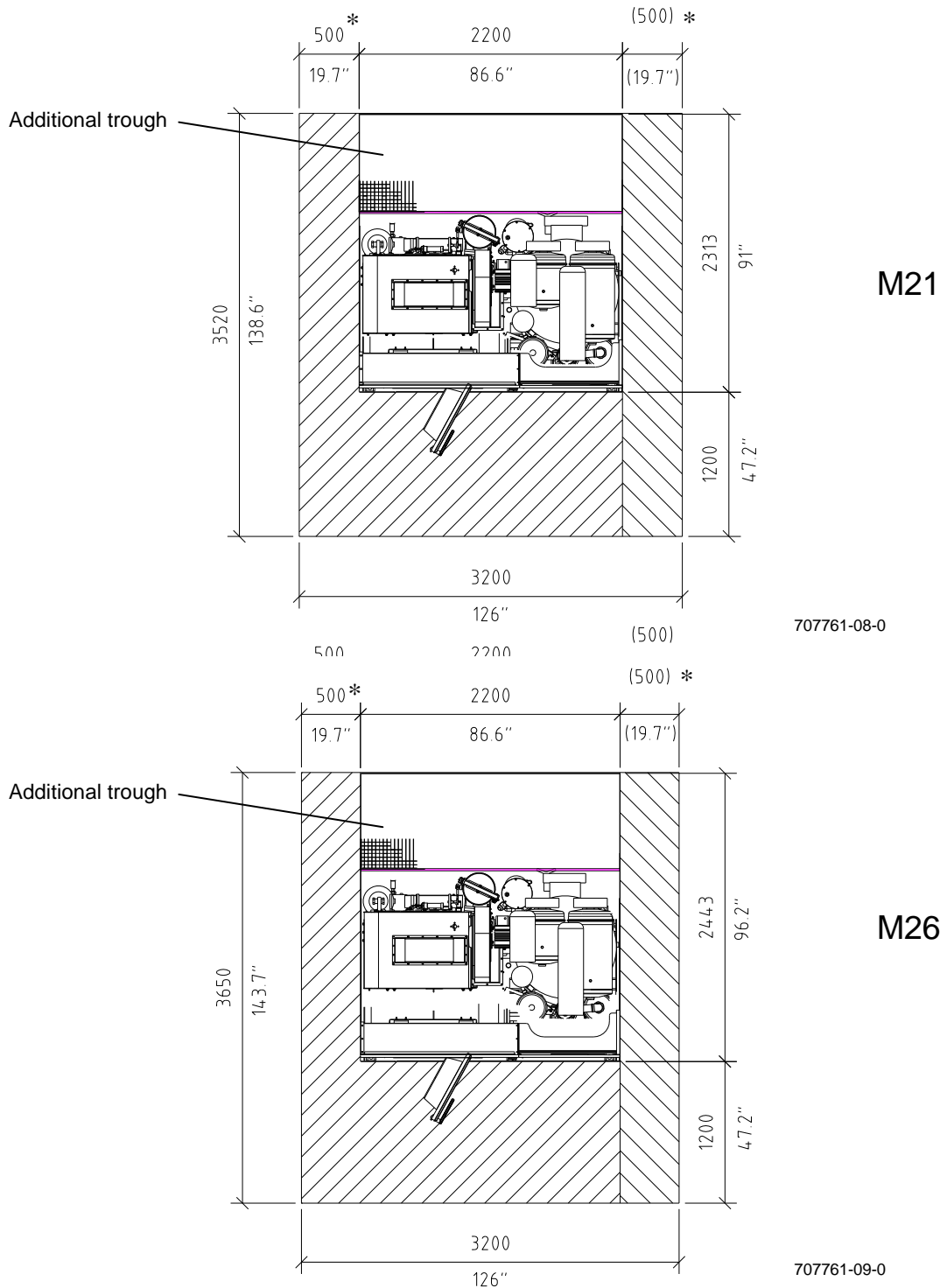
## 5

### 5.2 Place of Installation

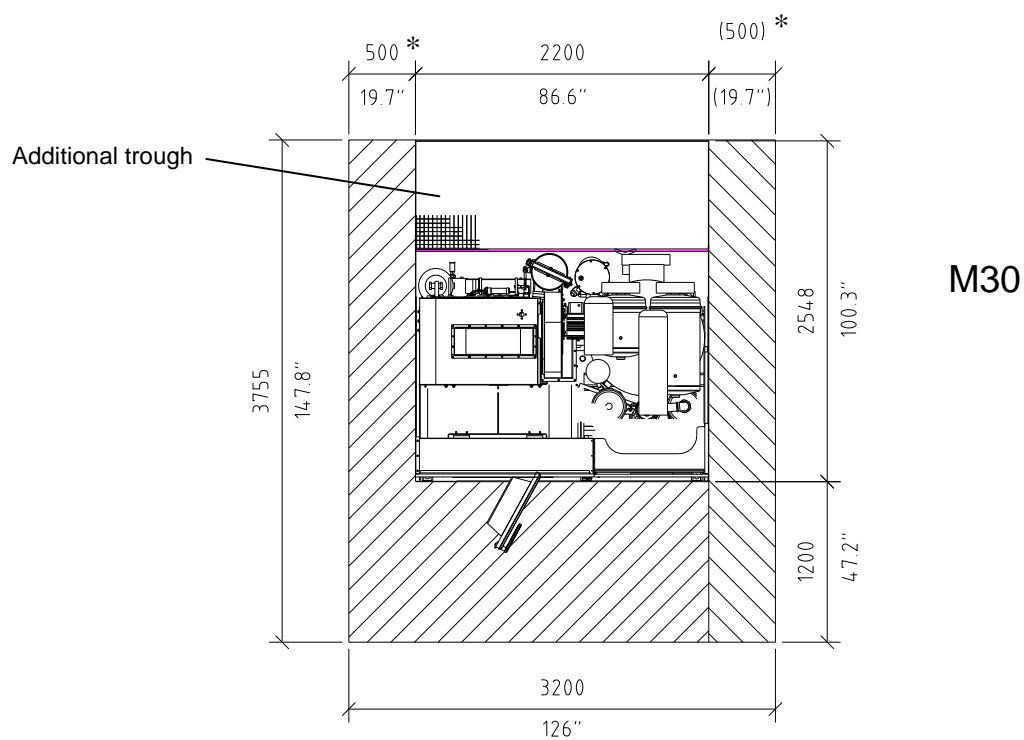
### 5.2

#### 5.2.1 Space Requirements

The machine must be accessible for operation and maintenance and repair work (see hatched areas).



\* The machine can be placed at the wall either at the left or right hand side.



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\* The machine can be placed at the wall either at the left or right hand side.

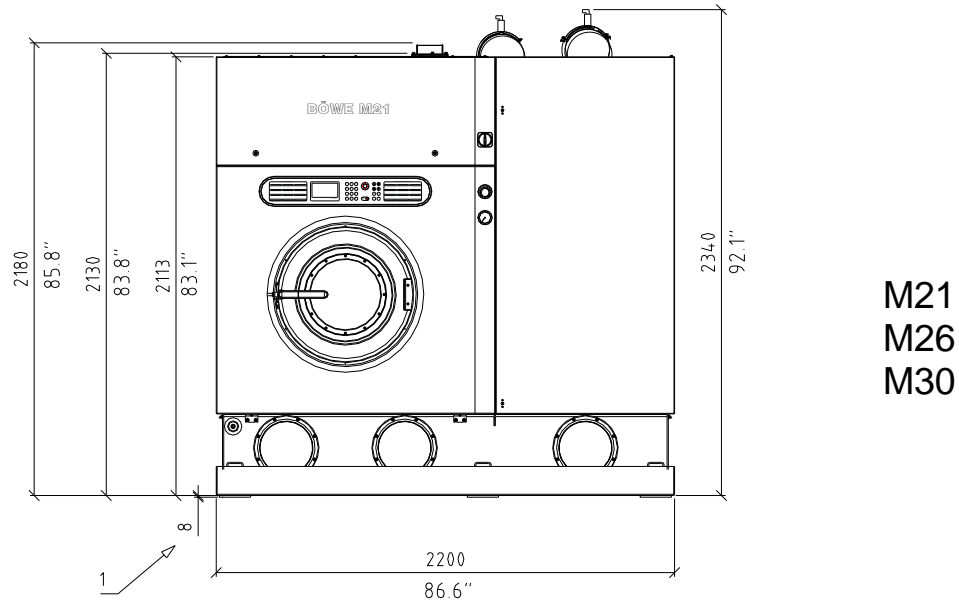
## 5 Installation

## 5

### 5.2.2 Machine Dimensions

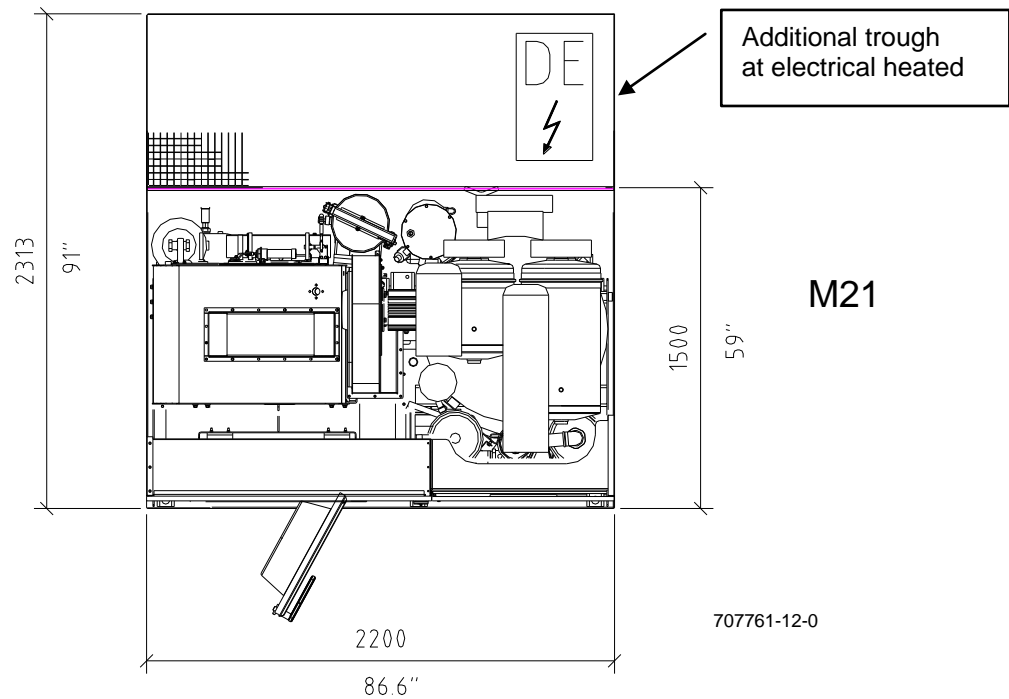
		<b>M21</b>	<b>M26</b>	<b>M30</b>
Width	mm (in)	2200 (86.6)	2200 (86.6)	2200 (86.6)
Depth	mm (in)	1500 (59.1)	1630 (64.2)	1735 (68.3)
Height inc. trough	mm (in)	2180 (85.8)	2180 (85.8)	2180 (85.8)

The dimensions given may differ if special options are used



707761-07-0

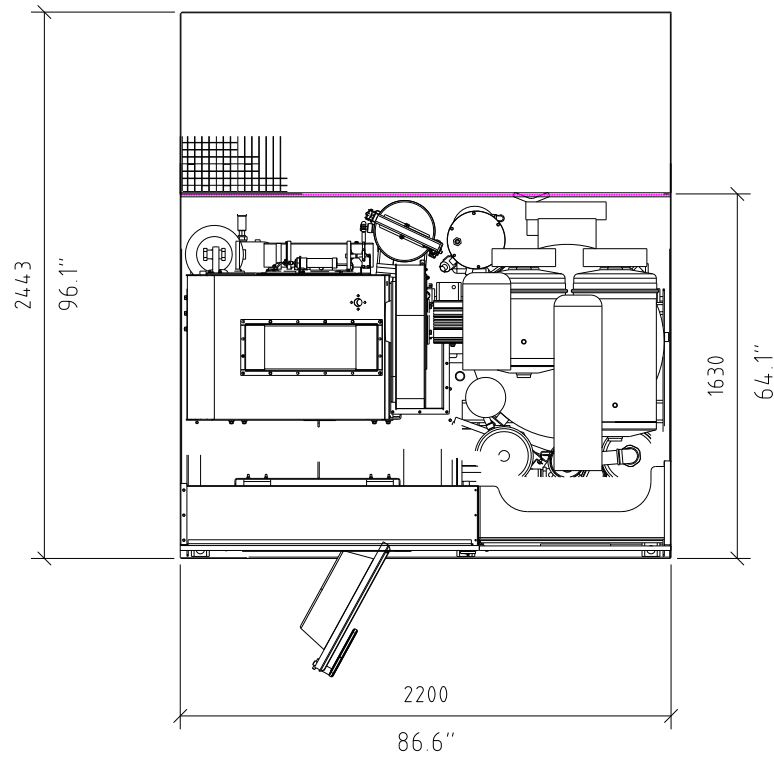
1 = With the legally stipulated floor clearance of the safety trough, the machine height increases by the size of the spacer plate (8 mm (.3 in)).



707761-12-0

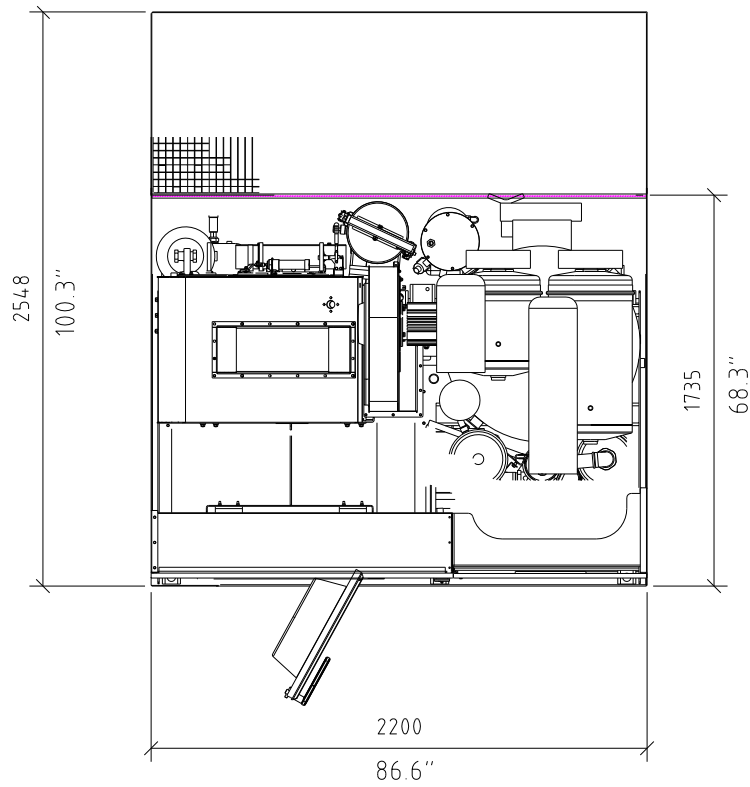
## 5 Installation

5



M26

707761-13-0



M30

707761-14-0

## 5 Installation

## 5

### 5.3 Floor Load

### 5.3

The place of installation must be designed according to the specified floor load.  
This consists of:

Static load = machine weight + max. solvent filling and

Dynamic load = cage centrifugal force with normally distributed, spin-damp garments.

Do not forget to take into account the centrifugal forces that arise during the spin processes, according to the local conditions (ground, supporting walls, etc.).

No resonance is permitted.

**Please consult building specialists.**

#### 5.3.1 Dimensions

##### M21-M26-M30

		M21	M26	M30
Depth*	mm	1060	1190	1295
	in	41.7	46.9	51.9
Width*	mm	2200	2200	2200
	in	86.6	86.6	86.6
Portion of the floor surface for force transmission	m <sup>2</sup>	2.3	2.6	2.8
	ft <sup>2</sup>	24.8	28.0	30.1
Weight without solvent	kg	2120	2270	2390
	lbs	4674	5005	5270
Weight with solvent (stat. load)	kg	2500	2700	2800
	lbs	5512	5954	6174
Cage centrifugal force (dyn. load)	N	18100**	22400**	25900**
	lbs	4070**	5040**	5820**
Floor load (stat. + dyn. load)	N/m <sup>2</sup>	18500**	18800**	19200**
	lb/ft <sup>2</sup>	387	393*	400**

\* Portion of the machine dimensions that is decisive for the size of the cage centrifugal force and floor load.

\*\* Calculated with:

- 21 kg (46.3 lb) or 26 kg (57.3 lb) or 30 kg (66.1 lb) load weight, with 50 % unevenly distributed
- Mixed outer clothing
- EBS
- 600 rpm
- Solvent weight 0.77 kg/dm<sup>3</sup>

**Building specialists will find the best solution, from both a structural and economic point of view, for the design of the foundation, taking into consideration the system or machine-related conditions and the local particulars.**

Use a load dispatcher frame if the permissible load for your floor is not sufficient.

## 5 Installation

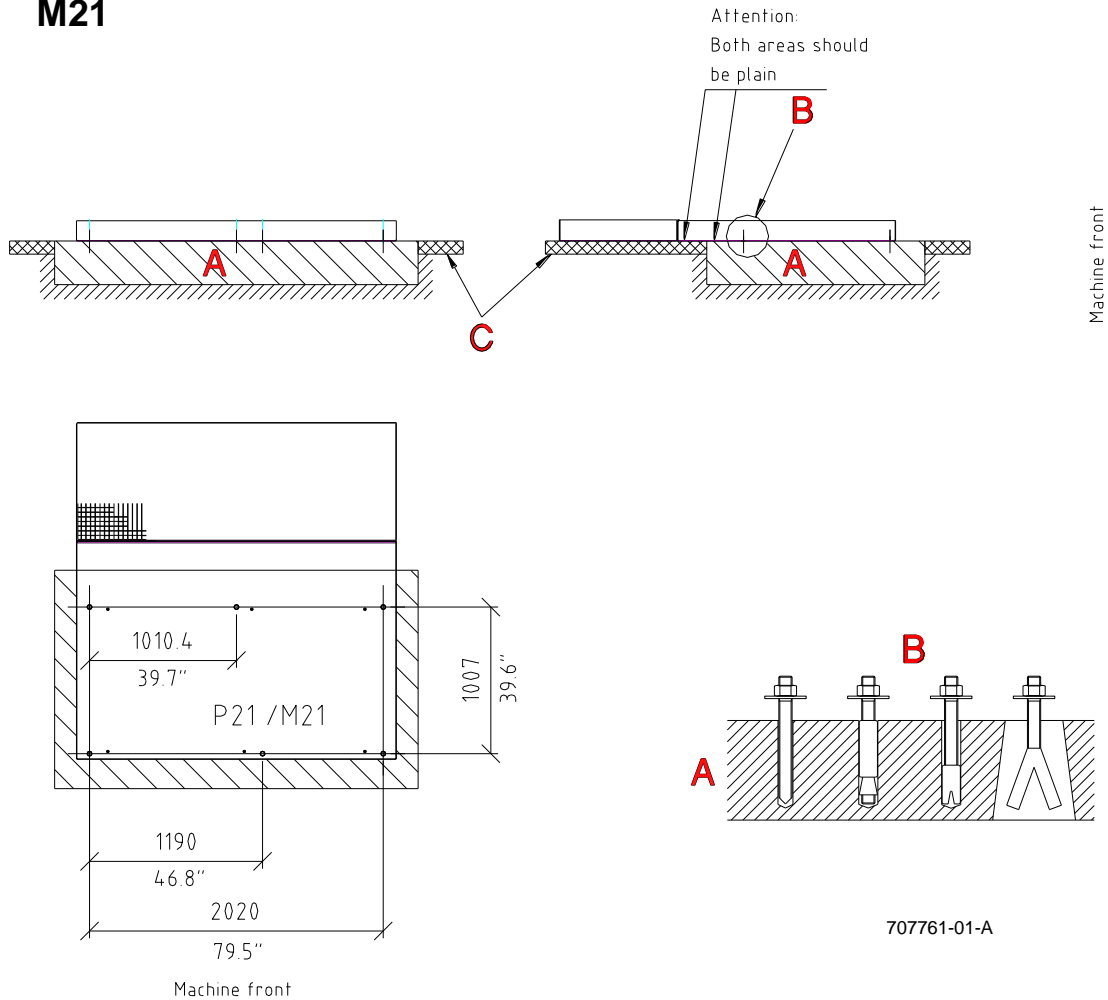
5

### 5.4 Foundation

5.4

#### 5.4.1 Foundation Dimensions

#### M21



**A** ..... Reinforced concrete

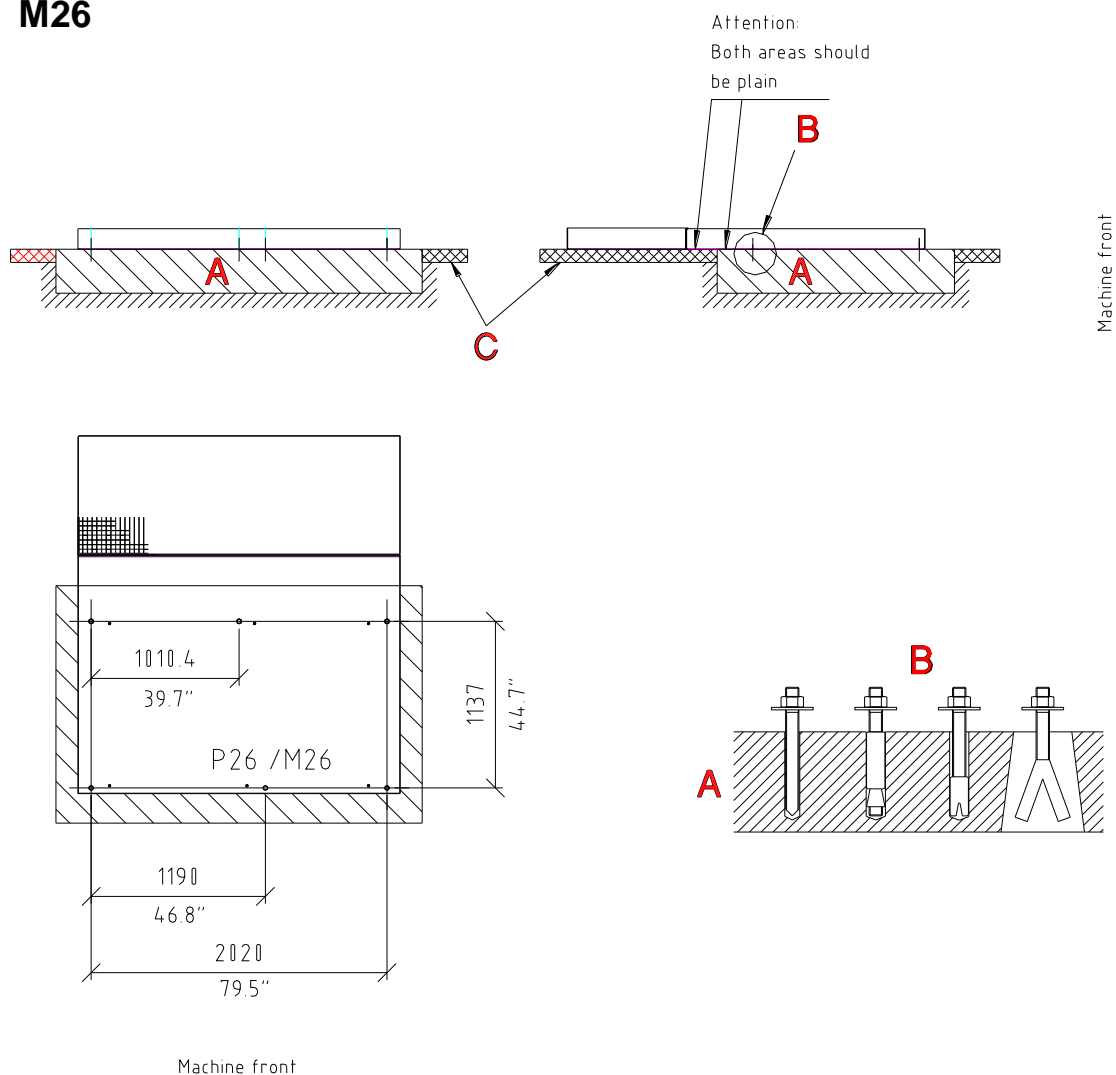
**B** ..... Examples for fixing the machine in place

**C** ..... Room floor surface - concrete slab

## 5 Installation

## 5

### M26



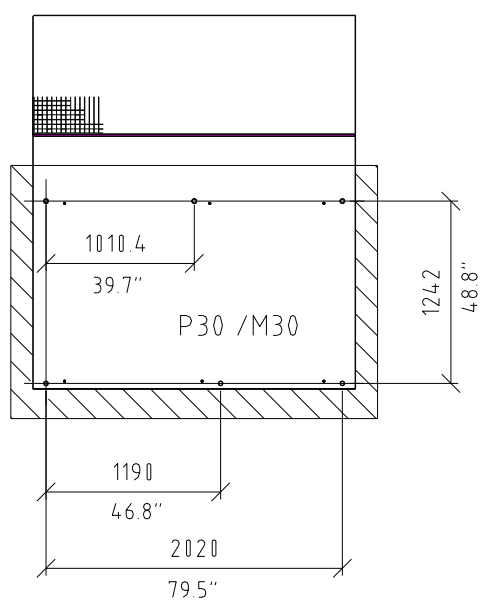
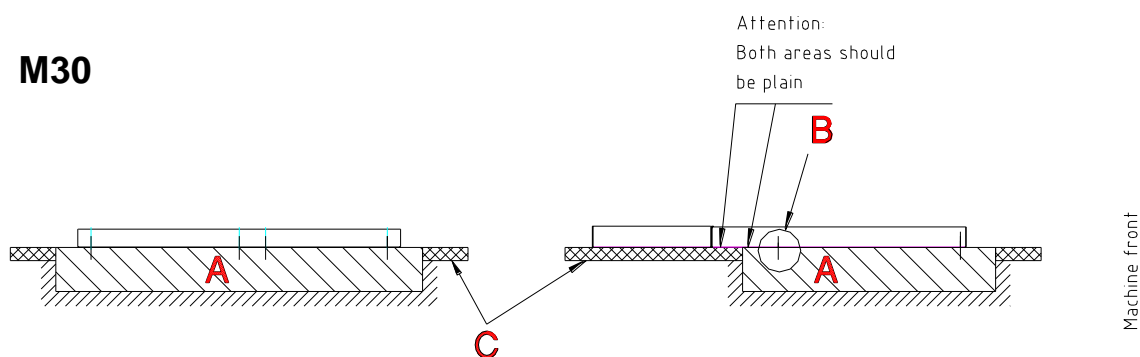
707761-02-A

- A** ..... Reinforced concrete
- B** ..... Examples for fixing the machine in place
- C** ..... Room floor surface - concrete slab

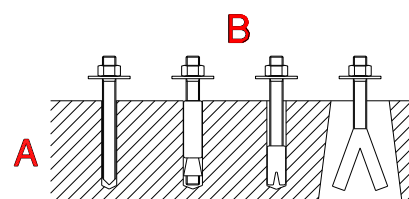
## 5 Installation

## 5

### M30



Machine front

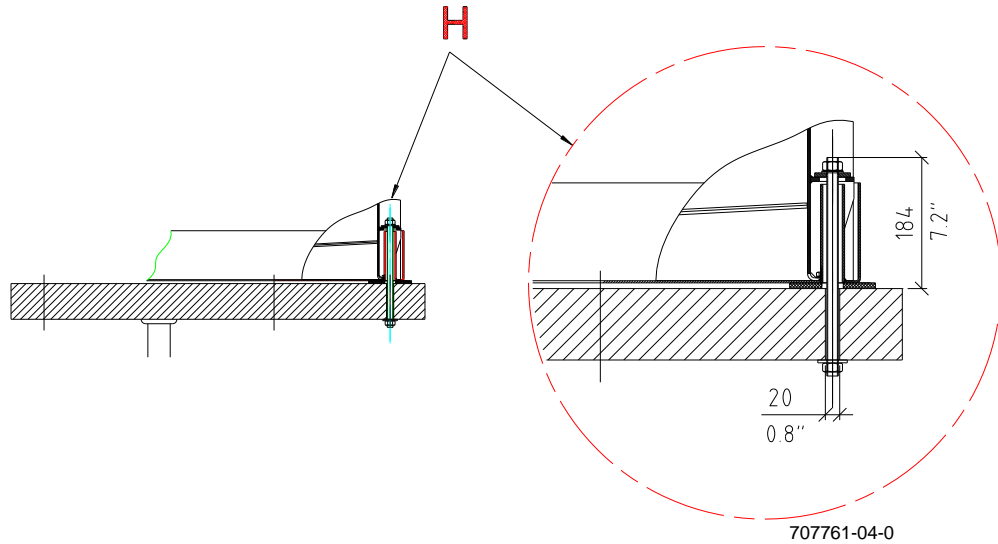


707761-03-A

- A** ..... Reinforced concrete
- B** ..... Examples for fixing the machine in place
- C** ..... Room floor surface - concrete slab

## 5 Installation

## 5



**H** ..... Ceiling bore holes ( $\varnothing$  20 mm or 3/4 in) for through bolt, length depending on the thickness of the ceiling. Support if necessary

### 5.4.2 Anchoring Surface

Correct anchoring is extremely important for low-noise, fault-free operation. When installing on the foundation, the use of stone bolts is preferable.

The anchoring surface must be horizontal and level.  
Never place the machine directly on felt, bituminous coatings, rubber or cork.

**On uneven concrete floor, you must level the machine or safety trough with leveling plates and even out the supporting surface with filler (epoxy resins).**

### 5.4.3 Sound and Vibration Insulation

Consult with building and insulation specialists with regard to the use of special foundations, dampers, spring cups or similar devices for special vibration insulation.

## 6 Fixing the Machine in Place

6

### 6.1 Machine Trough

6.1

The machine trough is a permanently integrated component of the machine.

Collecting capacity: M21 377 l (99.5 US gal)  
 M26 410 l (108 US gal)  
 M30 437 l (115.4 US gal)  
 Material: St1203 /1.0330.03 /3 mm (.1 in)  
 painted active primer

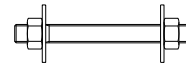
### 6.2 Anchoring Methods

6.2

Alternatively, you can also use the following anchoring methods for fixing the machine in place:

For ceiling installation:

- Through bolts (threaded rod) with M16 washers, nuts.

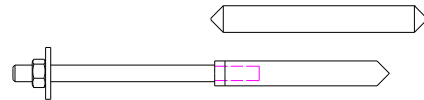


703871-25-0

For foundation installation:

## M16

- Adhesive plugs/shear connectors.



707761-15-A1

Thread for all anchoring methods: **M 16**

Quality: Property class 8.8 - DIN 267

The fixing nuts must be self-locking, with quality conforming to DIN 985.

We will not accept any liability for damages that result from the failure to comply with our recommendations and information.

**Attention:**



**Pay attention to the floor load of the machine floor space.**

**Threaded rod (bored-through ceiling)**

Steps:

- Position the machine in its intended position. Note the transport information in Chapter 4.  
Use the holes of the machine trough as a template.
- Holes in the ground pretend.
- Take the machine away.
- Prebore with 16 mm (.6 in) stone drill. Drill in vertically!
- Drill the boring pattern for normal ceiling installation.  
(see foundation sketch in Point 5.4) with stone drill 20 mm (.8 in).
- Position the machine and level.  
The machine must lie flatly on the ceiling.  
If the floor is uneven, level the machine with leveling plates and even out the surface with filler (epoxy resins).
- Mount the threaded rod
- Tighten the nuts evenly.

## 6 Fixing the Machine in Place

---

## 6

### Adhesive plugs/shear connectors

Steps:

- Position the machine in its intended position. Note the transport information in Chapter 4. Use the holes of the machine trough as a template.
- Holes in the ground pretend.
- Remove the machine.
- Prebore with 16 mm (0.6 in) stone drill. Drill in vertically!
- Boreholes: Drill the diameter and depth according to the information provided by the plug manufacturer and blow out any dust.

For further steps, refer to the information provided by the plug manufacturer.

Note the hardening time.

Position the machine and level.

If the floor is uneven, level the machine with leveling plates and even out the surface with filler (epoxy resins).

Finish the machine installation according to Point 6.3.

## 6 Fixing the Machine in Place

6

### 6.3 Machine Installation

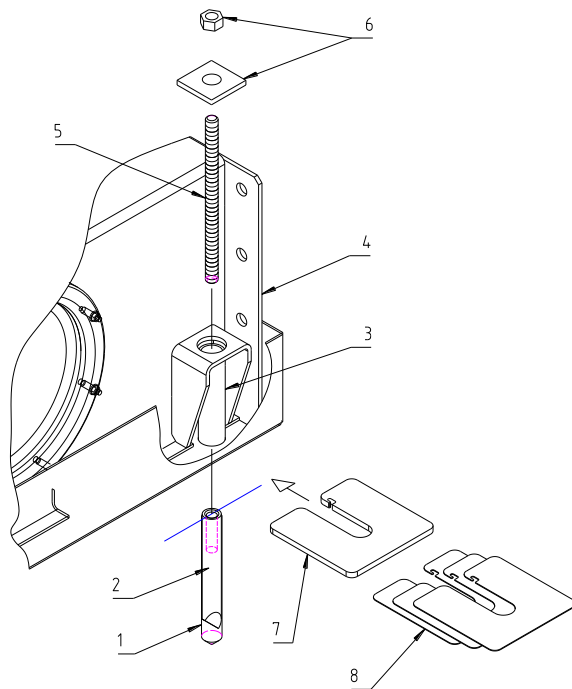
6.3

#### Work steps:

- To level the machine, slide the slotted leveling plates (8) included with the machine between the trough and floor.

**Attention:** For the legally stipulated floor clearance of the safety trough, you must also install the supplied spacer plates (7) between the trough and floor.

- Put the threaded rod (5) through the trough pipe (3)
- Mount the washers and nuts (6).
- Tighten the nuts on the anchor evenly.



- 1 Grout cartridge
- 2 Plug with internal thread
- 3 Trough pipe
- 4 Tank
- 5 Threaded rod
- 6 Washer and nut
- 7 Spacer plate (8mm)
- 8 Leveling plates

707761-15-A

#### Part numbers:

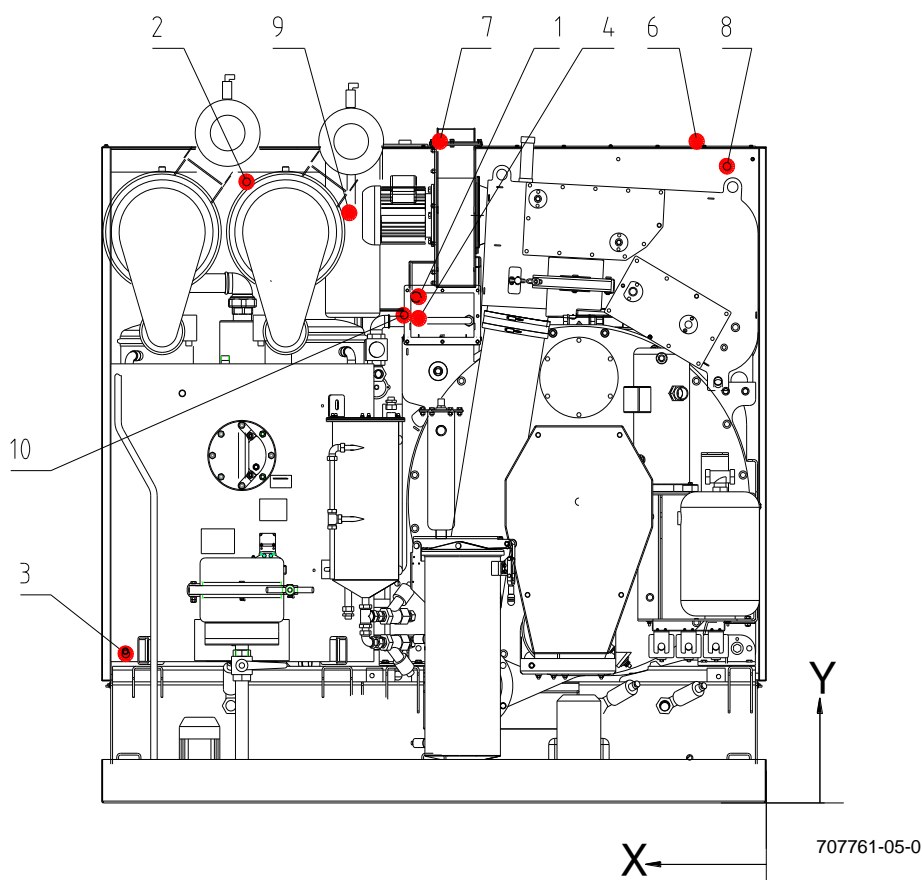
Leveling plates:	1 mm	SN 709955
	2 mm	SN 709954
	3 mm	SN 709909
Spacer plates:	8 mm	SN 709902

## 7 Connection

7

### 7.1 Dimensioned Drawing of the Machine Connections

7.1



We reserve the right to change dimensions!

Item	Medium	NW mm	Inch	-X- mm (in)	-Y- mm (in)
1	Steam machine	15	1/2	1150 (45.3)	1630 (64.2)
2	Distillation steam	15	1/2	1720 (67.7)	2000 (78.7)
3	Distillation condensate	15	1/2	2120 (83.5)	480 (18.9)
4	Heater battery condensate	15	1/2	1150 (45.3)	1560 (61.4)
6*	Cooling water inlet	20	3/4	230 (9.1)	2130 (83.9)
7	Cooling water outlet, distillation	20	3/4	1080 (42.5)	2130 (83.9)
8	Cooling water outlet, refrigeration unit	20	3/4	130 (5.1)	2050 (80.7)
9	Compressed Air	8	1/4	1380 (54.3)	1900 (74.8)
10	Electric connection (front side)	-	-	1200 (47.2)	1570 (61.8)
11	Option: Loading door venting	50	2	1220 (48)	1100 (43.3)

\* There must be a measuring potentiometer installed (on the machine) between the machine and customer wiring system.

## 7 Connection

## 7

### 7.2 Lines and Pipelines

### 7.2

Connect the customer-supplied supply and drain lines according to the information in the dimensioned drawing. Steam, condensate, compressed air and water must be equipped with stop valves. Follow DIN 1988 when connecting the water. To avoid transmission of structure-borne noise, you can connect the pipelines with a spacer of flexible metal tubing and insulate the pipe holders.

#### 7.2.1 Steam

Install the wiring system and connections in such a way that they are insulated.  
Operating pressure 4 - 5 bar (58 - 72.5 psi) saturated steam.

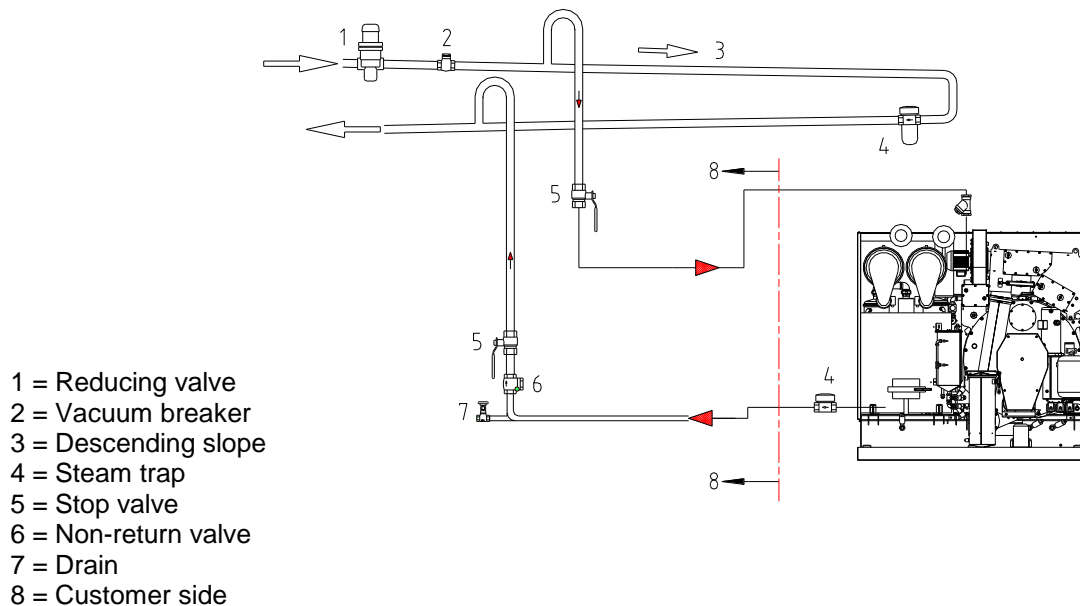
**If the admission pressure is more than 5 bar (72.5 psi), build in a reducing valve with pressure gauge and safety valve.**

**The steam pressure reducer on the distillation system is adjusted to 3.0 bar (43.5 psi)  
!!! Be careful overheated steam !!!**

Peak steam demand (large steam generator):

M21-M26-M30

Drying	0.6 kg/min (1.3 lbs/min)
Distillation	0.6 kg/min (1.3 lbs/min)



707761-06-0

#### 7.2.2 Condensate

Install condensate line so that it slopes away from the machine, if possible. If there is an ascending slope, provide a non-return valve and drain at the lowest point.

#### Attention:

**Condensate counter-pressure must be at least 1.5 bar (21.8 psi) under the incoming steam pressure.**

## 7 Connection

## 7

### 7.2.3 Cooling Water Supply

#### 7.2.3.1 Mains water supply

The cross-sections of the lines to the machine should not get smaller and should be without bends and curves, if possible. The heat balance of the machine has been optimally designed for cooling water with an inlet temperature of 12 °C (53.6 °F) and uniform pressure of 2 - 4 bar (29 - 58 psi). (Minimum pressure 2.0 bar (29 psi), maximum pressure 6.0 bar (87 psi))

A manually operated stop valve should be fitted.

Peak cooling water demand 2 - 4 bar (29 - 58 psi) (12 °C/53.6 °F):

M21-M26-M30

Drying/detergent solution cooler	6 l/min (1.6 US gal/min)
----------------------------------	--------------------------

Distillation	14l/min (3.7 US gal/min)
--------------	--------------------------

According to DIN 1988, a water flowback stop and venting device must be installed on machines in the Federal Republic of Germany.

#### 7.2.3.2 Cooling Tower Operation

For cooling tower or recooling operation, the nominal width of the feeding and drain lines must be dimensioned to be larger than the nominal width of the circulation pump or must be dimensioned according to the pump.

Inlet temperatures are not allowed to exceed 24 °C/ (75.2 °F) because otherwise the solvent consumption increases and the drying times are also longer.

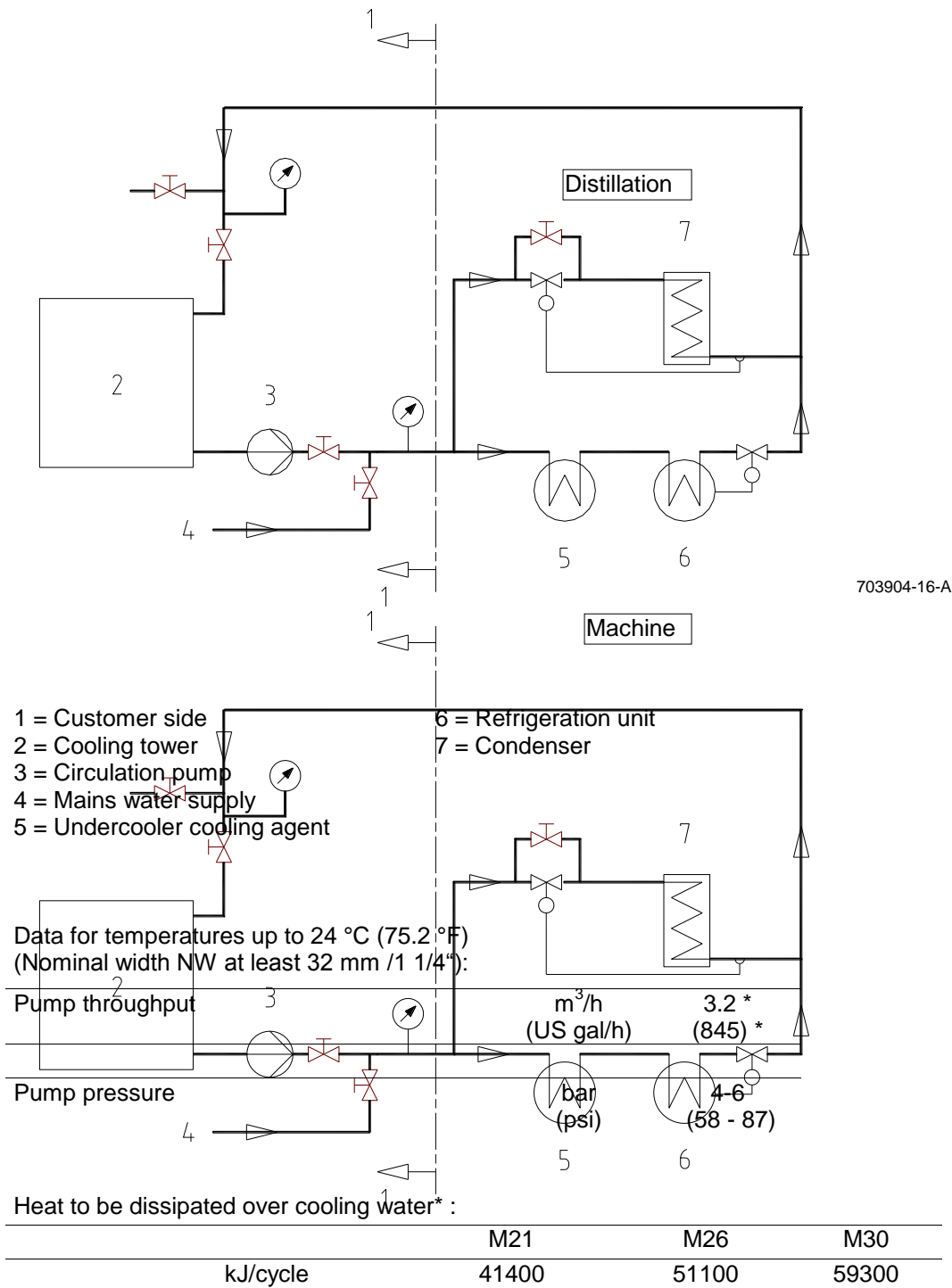
Cooling water inlet temperatures that are too high can also overload the refrigeration unit.

The water pressure must be adapted to the high inlet temperature, up to double the peak demand.

In cooling tower or recooling operation, correct installation is especially important. Consequently, some of the things that must be kept in mind are the cooler capacity, mains water supply switch-over, stored cooling capacity, pump size and cooling water by-pass.

The cooling water regulator (water economizer valve) for the machine and distillation system must be corrected or avoided with a bypass (manual valve) (= continuous water flow).

The cooling water supply or the back feeding to the recooling unit must come from the mains water system or from a soft water system. The cooling water should be approx. 5° dH.



\* refers to water without additives

Also refer to the separate installation and operating instructions for the rechiller.

## 7 Connection

## 7

### 7.2.4 Cooling Water Outlet

The cooling water leaving the system can be directed to the sewer system, reused and recooled because it circulates through the machine in a closed system and does not come into contact with the solvent. You should endeavor to reuse the cooling water.

### 7.2.5 Compressed Air

The operating pressure is 6 bar (87 psi). The machine is equipped with a compressed air reducing valve, pressure gauge and compressed air water separator. The line pressure should be 10 bar (145 psi). The customer has to install at his air compressor an automatic water drain and an air cooler (refrigeration dryer). Otherwise BÖWE can not take any warranty on pneumatic parts. The compressor has to be located in a dry and cool area.

### 7.2.6 Process Water

Empty the process water collecting tank daily.  
Dispose of the contents according to the regulations for your country.

### 7.2.7 Aeration Lines

The venting ducts of the machine must lead without diminished cross section into the open or via open funnel and cock valve to the room venting system (if existing).



**It must be ensured that the venting does not lead to areas with high explosion risks or to ignition sources.**

## 7 Connection

## 7

### 7.3 Electrical Connection

### 7.3



**Caution**

Only trained electricians are permitted to work on the electrical system according to the relevant standards of the respective countries. The power supply must be provided by the customer/operator of the machine and is not included in the delivery.

Note the supply voltage (on the nameplate). Connect L1 /L2 /L3, neutral and ground wires with the appropriate cross section and fusing. Pass the cable into the switch panel through the PVC screwed union provided and connect to terminal.

#### Main switch connection

The main switch must be connected at the customer with an approved cable. Strip the cable right before the main switch only. Do not lay stripped cable in the cable trunking.

**Attention:** Supply voltage must be present even when the machine's main switch is turned off in order to guarantee the function of the crankcase heating in the refrigeration unit.

#### Ground-fault circuit interrupter at the customer



In case of a fault current breaker integrated in the building it is recommendable to make sure, if it is applicable to the machine with variable speed drive. As the manufacturer we recommend an all-current sensitive residual-current breaker (RCD) with at least 300 mA.

M 21	Operating load kW	Max. current A	Fuse A
<u>400 V, 50 Hz</u>			
Steam /electric without distillation	12	26	35
Steam /electric with distillation	13	29	35
<u>230 V, 60 Hz</u>			
Steam /electric without distillation	12	47	50
Steam /electric with distillation	13	51	63



**Attention:** The electric model is implemented with a separate steam generator. This steam generator must have separate fusing.

M 21	Operating load kW	Max. current A	Fuse A
<u>400 V, 50 Hz</u>			
Steam generator	30	44	50
<u>230 V, 60 Hz</u>			
Steam generator	30	74.8	80

## 7 Connection

## 7

M 26 /M30 heated with external steam	Operating load kW	Max. current A	Fuse A
<u>400 V, 50 Hz</u>			
Steam without distillation	12	26	35
Steam with distillation	13	29	35
<u>230 V, 60 Hz</u>			
Steam without distillation	12	47	50
Steam with distillation	13	51	63

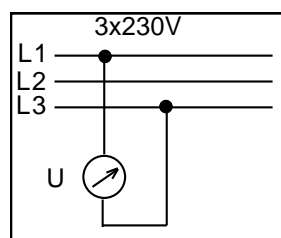
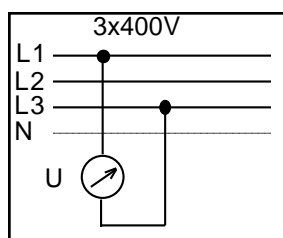
## 7 Connection

## 7

### 7.3.1 Permissible Voltage Range

#### **Attention:**

The power supply must be measured at the machine before you turn the machine on. If it deviates from the standard voltage, you must adapt the machine to the local voltage with an autotransformer.



When making the electric connections for a dry cleaning machine, you must observe the following voltage ranges:

1. Main supply (according to DIN IEC 38):		
Range	Primarily 400-V power system	Primarily 230-V power system
Not allowed; requires external adjustment	< 360 V	< 207 V
Normal working range MIN: -10.0 % MAX: +6.0 %	360 V to 424 V	207 V to 244 V
Not allowed; requires external adjustment	> 424 V	> 244 V

Range	Primarily 230-V power system																																																												
Not allowed; requires external adjustment	< 207 V																																																												
Normal working range 207 V to 244 V	<p>Klemmen am Netzteil G1</p> <table><thead><tr><th></th><th>3x400 V</th><th>3x230 V</th></tr></thead><tbody><tr><td>U=207-220 V</td><td><table><tr><td>253</td><td>230</td><td>207</td><td>N</td></tr><tr><td>○</td><td>○</td><td>○</td><td>○</td></tr></table><p>↕ ↕ ↕ ↕ L1 N Schwarz Blau</p></td><td><table><tr><td>253</td><td>230</td><td>207</td><td>N</td></tr><tr><td>○</td><td>○</td><td>○</td><td>○</td></tr></table><p>↕ ↕ ↕ ↕ L1 L2 Schwarz Schwarz</p></td></tr><tr><td>U=220-240 V Normaler Bereich</td><td><table><tr><td>253</td><td>230</td><td>207</td><td>N</td></tr><tr><td>○</td><td>○</td><td>○</td><td>○</td></tr></table><p>↕ ↕ ↕ ↕ L1 N Schwarz Blau</p></td><td><table><tr><td>253</td><td>230</td><td>207</td><td>N</td></tr><tr><td>○</td><td>○</td><td>○</td><td>○</td></tr></table><p>↕ ↕ ↕ ↕ L1 L2 Schwarz Schwarz</p></td></tr><tr><td>U=240-244 V</td><td><table><tr><td>253</td><td>230</td><td>207</td><td>N</td></tr><tr><td>○</td><td>○</td><td>○</td><td>○</td></tr></table><p>↕ ↕ ↕ ↕ L1 N Schwarz Blau</p></td><td><table><tr><td>253</td><td>230</td><td>207</td><td>N</td></tr><tr><td>○</td><td>○</td><td>○</td><td>○</td></tr></table><p>↕ ↕ ↕ ↕ L1 L2 Schwarz Schwarz</p></td></tr></tbody></table> <p>703904-18-0</p>		3x400 V	3x230 V	U=207-220 V	<table><tr><td>253</td><td>230</td><td>207</td><td>N</td></tr><tr><td>○</td><td>○</td><td>○</td><td>○</td></tr></table> <p>↕ ↕ ↕ ↕ L1 N Schwarz Blau</p>	253	230	207	N	○	○	○	○	<table><tr><td>253</td><td>230</td><td>207</td><td>N</td></tr><tr><td>○</td><td>○</td><td>○</td><td>○</td></tr></table> <p>↕ ↕ ↕ ↕ L1 L2 Schwarz Schwarz</p>	253	230	207	N	○	○	○	○	U=220-240 V Normaler Bereich	<table><tr><td>253</td><td>230</td><td>207</td><td>N</td></tr><tr><td>○</td><td>○</td><td>○</td><td>○</td></tr></table> <p>↕ ↕ ↕ ↕ L1 N Schwarz Blau</p>	253	230	207	N	○	○	○	○	<table><tr><td>253</td><td>230</td><td>207</td><td>N</td></tr><tr><td>○</td><td>○</td><td>○</td><td>○</td></tr></table> <p>↕ ↕ ↕ ↕ L1 L2 Schwarz Schwarz</p>	253	230	207	N	○	○	○	○	U=240-244 V	<table><tr><td>253</td><td>230</td><td>207</td><td>N</td></tr><tr><td>○</td><td>○</td><td>○</td><td>○</td></tr></table> <p>↕ ↕ ↕ ↕ L1 N Schwarz Blau</p>	253	230	207	N	○	○	○	○	<table><tr><td>253</td><td>230</td><td>207</td><td>N</td></tr><tr><td>○</td><td>○</td><td>○</td><td>○</td></tr></table> <p>↕ ↕ ↕ ↕ L1 L2 Schwarz Schwarz</p>	253	230	207	N	○	○	○	○
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Not allowed; requires external adjustment	> 244 V																																																												

## 7 Connection

## 7

### 7.3.2 Control of Room Ventilation

If there is already a room ventilation system, you can couple the automatic machine actions with the ventilation system.

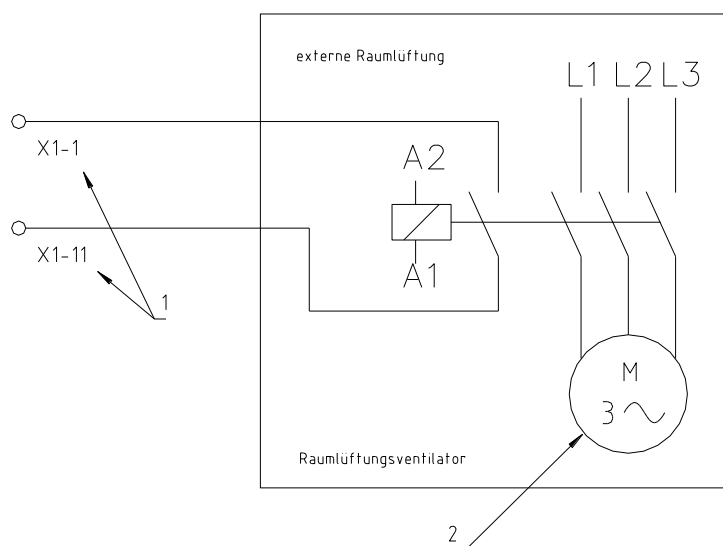
In this case, the machine starts only when the room ventilation has been turned on.

Recommendation for renewing the room air:

The room ventilation must be sufficient to meet the requirements for your country.

Example: BGR 500 chapter 2.14:

The minimum requirement for renewing the room air is achieved when the dissipated amount of air in  $\text{m}^3/\text{h}$  is equal to 60 times the numerical value of the standard loaded amount in garments in kg. The air renewal rate can be limited to 5 per hour if the calculation results in a larger numerical value.



703904-17-0

- 1 = Terminals in switch panel
- 2 = External room ventilation - room ventilation fan

## 8 Important Information

8

### 8.1 First Startup

8.1

The BÖWE Customer Service department is responsible for carrying out the first startup.



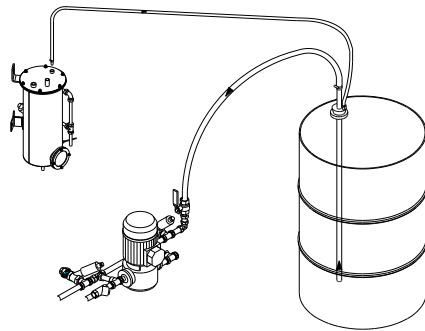
**Attention:** Before opening the switch panel or removing paneling, set the main switch to "0".

#### 8.1.1 Preparatory Work

Set up the supply systems (electrical current, cooling water, compressed air, steam and condensate lines).

#### 8.1.2 Filling Machine With Solvent

(When filling the machine using the gas pendulum process, refer to diagram)



707761-17-0

You must use solvents that have a flash point that is higher than the temperature stated on the machine nameplate.

The amount of solvent needed is:

Machine M21 tank I:	approx. 110 l / 29.0 US gal
Machine M26 tank I:	approx. 135 l / 35.6 US gal
Machine M30 tank I:	approx. 155 l / 40.9 US gal
Total filling amount M21:	approx. 445 l * / 117.5 US gal *
Total filling amount M26:	approx. 510 l * / 134.6 US gal *
Total filling amount M30:	approx. 565 l * / 149.2 US gal *



**Attention:** This solvent is a powerful fat solvent. Wear gloves when handling solvent and apply protective skin ointment to hands when done. Do not smoke.

Immediately change any clothing that is wet with solvent.

If you get solvent in your eyes,:

- rinse them thoroughly with water
- and see a doctor.



If there is no suction from the pump, pour about 5 liters (1.3 US gal) of solvent into the button trap. Check that the direction of rotation is correct.

\* Machine with 1 economy filter.

For machines with 2 economy filters: + 50 l (13.2 US gal)

For machines with 2 economy filters and 1 cartridge filter: + 75 l (19.8 US gal)

For machines with 2 economy filters and 2 cartridge filters: + 90 l (23.8 US gal)

## 8 Important Information

## 8

To fill without emissions, proceed as follows:

- Remove the screw cap on the pump line.
- Connect a hose between the barrel and pump suction side.
- Connect gas displacement line between the barrel and water separator.
- Open the ball valve.
- Start program P51
- The tanks fill up, with one overflowing into the other.
- Watch the level of the liquid in the tanks and stop program P51 when the tanks are full or when enough solvent has been filled in.
- Close the ball valve.
- Remove the connecting lines to the barrel.
- Screw the cap back on to the pump line.
- Remove the gas displacement line.

If may be necessary to refill with solvent after the filter is filled each time you replace a filter.

### 8.1.3 Refilling Solvent

Follow the procedure given in Point 8.1.2 for routine refilling of solvent.




**Attention:** Even empty containers can still hold solvent residues.  
Therefore tightly seal the container (barrel) again and  
store or dispose of in accordance with regulations!

## 8 Important Information

8

### 8.1.4 Filling Extraction Tank Using Program P54

- Enter P54 and press the "Hold" button
- Press the  button until you reach step n11
- Press the "Start" button

### 8.1.5 Manually Filling the Vacuum Pump Operating Material Tank

- Open the screw cap.
- Fill container with approximately 5 liters (1.3 US gal) of solvent. (Use funnel)
- Close the screw cap.

The vacuum pump is now ready for operation.

### 8.1.6 Vacuum Pump



The yellow ball valve between the operating material tank and the cooling coil is not permitted to be completely closed at any time during operation.


The black needle valve in the venting line (ø 6mm (approx. 1/4 in)) between the operating material cooler and the vacuum pump must be open.



Never allow the vacuum pumps to run when dry; never allow them to run in the wrong direction of rotation.

## 8.2 Refrigeration Unit

8.2

	<p><b><u>Attention:</u></b></p> <p>No cooling agent is allowed to escape into the atmosphere during operation, servicing work and decommissioning of refrigeration units.</p> <p>You must keep a record of the quantities of cooling agent used and present this record to the authorities upon demand.</p> <p>Only people who have the necessary special knowledge and technical equipment are authorized to service and decommission refrigeration units.</p>
---	---

## 9 Technical Specifications

## 9

### M 21

Heating		Steam	Electric
Filling quantity	kg (lb)	21 (46.3)	21 (46.3)
Cage volume	l/ US gal	420 (110.9)	420 (110.9)
Cage diameter	mm (in)	1000 (39.4)	1000 (39.4)
Cage depth	mm (in)	535 (21.1)	535 (21.1)
Cleaning speed/drying speed	RPM	35	35
Spinning speed:	RPM	600	600
Max. g-factor		200	200
Low level	l/ US gal	52.5 (13.9)	52.5 (13.9)
High level	l/ US gal	105 (27.7)	105 (27.7)
<b>Operating load</b> (max. at 400 V,50Hz)			
Without distillation	kW	12	42
With distillation	kW	13	43
<b>Connected loads:</b>			
Compressor capacity	kW	5.0	5.0
Fan capacity	kW	1.5	1.5
Solvent pump capacity	kW	1.1	1.1
Cage drive capacity	kW	5.5	5.5
Filter drive capacity	kW	0.55	0.55
Vacuum pump capacity	kW	1.1	1.1
Steam generator capacity	kW	-	30
<b>Dimensions:</b>			
Machine dimensions:			
Width with distillation	mm (in)	2200 (86.6)	2200 (86.6)
Depth	mm (in)	1500 (59.1)	1500 (59.1)
Height without cartridge filter	mm (in)	2180 (85.8)	2180 (85.8)
Height with cartridge filter	mm (in)	2340 (92.1)	2340 (92.1)
Floor space	m <sup>2</sup> (ft <sup>2</sup> )	3.3 (35.5)	3.3 (35.5)
<b>Filling volumes:</b>			
Tank I filling	l/ US gal	200 (52.8)	200 (52.8)
Tank II filling	l/ US gal	125 (33.0)	125 (33.0)
Tank III filling	l/ US gal	200 (52.8)	200 (52.8)
Economy filter 1	l/ US gal	75 (19.8)	75 (19.8)
Economy filter 2		50 (13.2)	50 (13.2)
Distillation filling	l/ US gal	220 (58.1)	220 (58.1)
Cartridge filter 1 (long)	l/ US gal	25 (6.6)	25 (6.6)
Cartridge filter 2 (short)	l/ US gal	15 (4.0)	15 (4.0)
Jumbo Cartridge Filter	l/ US gal	40 (10.5)	40 (10.5)

The dimensions given may differ if special options are used

## 9 Technical Specifications

9

### M21

Heating		Steam	Electric
<b>Consumption for drying:</b>			
Drying time incl. reduction	min.	26	26
Electric energy drying	kWh	3.1	7.7
Saturated steam drying	kg (lbs)	8.0 (17.6)	-
Cooling water drying (12 °C/53.6 °F)	l (US gal)	130 (34.3)	130 (34.3)
<b>Consumption for distillation(1x at low level):</b>			
Electric energy distillation	kWh	0.45	8.6
Saturated steam distillation	kg (lbs)	12.0 (26.5)	-
Cooling water for distillation (12 °C/53.6 °F)	l (US gal)	170 (44.9)	170 (44.9)
<b>Consumption per cycle: *</b>			
Electric energy, total	kWh	4.05	16.8
Saturated steam, total	kg (lbs)	20.0 (44.1)	-
Cooling water, total (12 °C/53.6 °F)	l (US gal)	300 (79.2)	300 (79.2)
Compressed air (6 bar/87 psi)	l (US gal)	6 (1.6)	6 (1.6)

## 9 Technical Specifications

9

### M21

Heating		Steam	Electric
<b>Other:</b>			
Distillation throughput (DIN 11916) max.	l/h (US gal/h)	180 (47.5)	180 (47.5)
Filter throughput	l/h (US gal/h)	5000 (1321)	5000 (1321)
Filter surface, economy filter 1	m <sup>2</sup> (ft <sup>2</sup> )	5.0 (53.8)	5.0 (53.8)
Filter surface, economy filter 2	m <sup>2</sup> (ft <sup>2</sup> )	3.5 (37.7)	3.5 (37.7)
Weight without solvent (with 2 economy filters, 2 cartridge filters)	kg (lb)	2120 (4674.6)	2120 (4674.6)
Weight with solvent (with 2 economy filters, 2 cartridge filters)	kg (lb)	2500 (5512.5)	2500 (5512.5)
Floor space	m <sup>2</sup> (ft <sup>2</sup> )	3.3 (35.5)	3.3 (35.5)
Floor surface **	m <sup>2</sup> (ft <sup>2</sup> )	2.3 (24.8)	2.3 (24.8)
Cage centrifugal force	N (lb)	18100 (4070)	18100 (4070)
Floor load, static and dynamic	N/m <sup>2</sup> (lb/ft <sup>2</sup> )	18500 (386)	18500 (386)
Noise level	dB (A)	62	62
<b>Heat balance: *</b>			
Heat to dissipate via cooling water ***:			
	kJ/cycle	41400	41400
Heat dissipated to the surroundings:			
	kJ/cycle	11000	11000

\* Values apply to a standard 2-bath load, 1st bath low level for distillation at cooling water inlet temperature + 12 °C (53.6 °F), steam supply 4 – 5 bar (58.0 - 72.5 psi) overpressure saturated steam, ambient temperature +5 °C to + 40 °C (5 to 104 °F)

\*\* For portion of the floor surface for force transmission, see Installation Instructions, Point. 5.3.1

\*\*\* Refers to water without additives

**Subject to change!**

## 9 Technical Specifications

9

Machine		M26	M30
Heating		Steam	Steam
Filling quantity	kg (lbs)	26 (57.3)	30 (66.2)
Cage volume	l (US gal)	520 (137.3)	600 (158.4)
Cage diameter	mm (in)	1000 (39.4)	1000 (39.4)
Cage depth	mm (in)	665 (26.2)	770 (30.3)
Cleaning speed/drying speed	RPM	35	35
Spinning speed:	RPM	600	600
Max. g-factor		200	200
Low level	l (US gal)	65 (17.2)	75 (19.8)
High level	l (US gal)	130 (34.3)	150 (39.6)
<b>Operating load</b> (max. at 400 V, 50 Hz)			
Without distillation	kW	12	12
With distillation	kW	13	13
<b>Connected loads:</b>			
Compressor capacity	kW	5.0	5.0
Fan capacity	kW	1.5	1.5
Solvent pump capacity	kW	1.1	1.1
Cage drive capacity	kW	5.5	5.5
Filter drive capacity	kW	0.55	0.55
Vacuum pump capacity	kW	1.1	1.1
Steam generator capacity	kW	-	-
<b>Dimensions:</b>			
Machine dimensions:			
Width with distillation	mm (in)	2200 (86.6)	2200 (86.6)
Depth	mm (in)	1630 (64.2)	1735 (68.3)
Height without cartridge filter	mm (in)	2180 (85.8)	2180 (85.8)
Height with cartridge filter	mm (in)	2340 (92.1)	2340 (92.1)
Floor space	m <sup>2</sup> (ft <sup>2</sup> )	3.6 (38.7)	3.8 (40.9)
<b>Filling volumes:</b>			
Tank I	filling	l/ US gal	225 (59.4) 250 (66.0)
Tank II	filling	l/ US gal	140 (37.0) 155 (40.9)
Tank III	filling	l/ US gal	225 (59.4) 250 (66.0)
Economy filter 1		l/ US gal	75 (19.8) 75 (19.8)
Economy filter 2		l/ US gal	50 (13.2) 50 (13.2)
Distillation	filling	l/ US gal	220 (58.1) 220 (58.1)
Cartridge filter 1 (long)		l/ US gal	25 (6.6) 25 (6.6)
Cartridge filter 2 (short)		l/ US gal	15 (4.0) 15 (4.0)
Jumbo Cartridge Filter		l/ US gal	40 (10.5) 40 (10.5)

The dimensions given may differ if special options are used

## 9 Technical Specifications

9

Machine		M26	M30
Heating		Steam	Steam
<b>Consumption for drying:</b>			
Drying time incl. reduction	min.	31	36
Electric energy drying	kWh	3.6	4.1
Saturated steam drying	kg (lbs)	10.0 (22.0)	12.0 (26.5)
Cooling water drying (12 °C/53.6 °F)	l (US gal)	150 (39.6)	170 (44.9)
<b>Consumption for distillation(1x at low level):</b>			
Electric energy distillation	kWh	0.6	0.75
Saturated steam distillation	kg (lbs)	15 (33.1)	18 (39.7)
Cooling water for distillation (12 °C/53.6 °F)	l (US gal)	220 (58.1)	260 (68.6)
<b>Consumption per cycle: *</b>			
Electric energy, total	kWh	4.7	5.35
Saturated steam, total	kg (lbs)	25.0 (55.1)	30.0 (66.2)
Cooling water, total (12 °C/53.6 °F)	l (US gal)	370 (97.7)	430 (113.5)
Compressed air (6 bar/87 psi)	l (US gal)	6 (1.6)	6 (1.6)

## 9 Technical Specifications

9

Machine		M26	M30
Heating		Steam	Steam
<b>Other:</b>			
Dist. throughput (DIN 11916) max.	l/h (US gal/h)	180 (47.5)	180 (47.5)
Filter throughput	l/h (US gal/h)	5000 (1321)	5000 (1321)
Filter surface, economy filter 1	m <sup>2</sup> (ft <sup>2</sup> )	5.0 (53.8)	5.0 (53.8)
Filter surface, economy filter 2	m <sup>2</sup> (ft <sup>2</sup> )	3.5 (37.7)	3.5 (37.7)
Weight without solvent (with 2 economy filters, 2 cartridge filters)	kg (lbs)	2270 (5005)	2390 (5270)
Weight with solvent (with 2 economy filters, 2 cartridge filters)	kg (lbs)	2700 (5955)	2850 (6285)
Floor space	m <sup>2</sup> (ft <sup>2</sup> )	3.6 (38.7)	3.8 (40.9)
Floor surface **	m <sup>2</sup> (ft <sup>2</sup> )	2.6 (28.0)	2.8 (30.1)
Cage centrifugal force	N (lb)	22400 (5036)	25900 (5822)
Floor load, static and dynamic	N/m <sup>2</sup> (lb/ft <sup>2</sup> )	18800 (390)	19200 (400)
Noise level	dB (A)	62	62
<b>Heat balance: *</b>			
Heat to dissipate via cooling water ***:			
	kJ/cycle	51100	59300
Heat dissipated to the surroundings *:			
	kJ/cycle	14000	18000

\* Values apply to a standard 2-bath load, 1st bath low level for distillation at cooling water inlet temperature + 12 °C (53.6 °F), steam supply 4 – 5 bar (58.0 - 72.5 psi) overpressure saturated steam, ambient temperature +5 °C to + 40 °C (41 to 104 °F)

\*\* For portion of the floor surface for force transmission, see Installation Instructions, Point 5.3.1

\*\*\* Refers to water without additives

**Subject to change!**

# 10 Settings and Optimum Operating Values

# 10

Machine		M21	M26	M30
<b>Basic values:</b>				
Steam pressure (saturated steam)	bar (psi)	4 - 5 (58 - 72)	4 - 5 (58 - 72)	4 - 5 (58 - 72)
Steam temperature (max. permitted)	°C (°F)	150 (302)	150 (302)	150 (302)
Cooling water pressure	bar (psi)	2 - 4 (29 - 58)	2 - 4 (29 - 58)	2 - 4 (29 - 58)
Low cooling water level switch	bar (psi)	2 (29)	2 (29)	2 (29)
Cooling water temperature, max.	°C (°F)	25 (77)	25 (77)	25 (77)
Compressed Air	bar (psi)	6 (87)	6 (87)	6 (87)
Low air pressure switch (if present)	bar (psi)	4 (58)	4 (58)	4 (58)
<b>Cage speeds:</b>				
Cleaning /drying	RPM	35	35	35
Spinning	RPM	400 /600	400 /600	400 /600
Reversing cycle (cleaning)	sec.	10 /5 /10	10 /5 /10	10 /5 /10
Low level	l (US gal)	52.5 (13.9)	65 (17.2)	75 (19.8)
High level	l (US gal)	105 (27.7)	130 (34.3)	150 (39.6)
Pump pressure (max.)	bar (psi)	1.5 (21.7)	1.5 (21.7)	1.5 (21.7)
Filter surface, economy filter	m <sup>2</sup> (ft <sup>2</sup> )	5.0 (53.8)	5.0 (53.8)	5.0 (53.8)
Tank I: Optimum filling volume (high level)	l (US gal)	110 (29.0)	135 (35.6)	155 (40.9)
<b>Detergent solution cooler:</b>				
Detergent solution thermal sensor:	Detergent	°C (°F)	40 (104)	40 (95)
solution cooler ON		°C (°F)	45 (113)	45 (113)
	Alarm value	°C (°F)	45 (113)	45 (113)
<b>Refrigeration technology:</b>				
Filling capacity, cooling agent R 404A	kg (lbs)	5.2 (11.4)	5.2 (11.4)	5.2 (11.4)
Expansion valve :				
Nozzle size: solvent cooling	No.	03	03	03
Drying /reduction	No.	01	01	01
High pressure control ON	bar (psi)	21 (304.6)	21 (304.6)	21 (304.6)
High pressure control OFF	bar (psi)	25(362.6)	25(362.6)	25(362.6)
Low pressure control	bar (psi)	2 (29)	2 (29)	2 (29)

## 10 Settings and Optimum Operating Values 10

Machine		M21	M26	M30
<b>Drying:</b>				
Cooling water regulator setting:				
Adjust 4 – 6 min. after start of drying	bar (psi)	18 (261)	18 (261)	18 (261)
Thermal sensor cage entry *	°C (°F)	75 (167)	75 (167)	75 (167)
Temp. sensor after cooler:				
Alarm value 1	°C (°F)	30 (86)	30 (86)	30 (86)
Alarm value 2	°C (°F)	35 (95)	35 (95)	35 (95)
Safety temperature limiter after cooler *	°C (°F)	45 (113)	45 (113)	45 (113)
Safety temperature limiter, cage inlet *	°C (°F)	100 (212)	100 (212)	100 (212)
<b>Distillation</b>				
Cooling water regulator condenser	°C (°F)	45 (113)	45 (113)	45 (113)
Thermal sensor:				
Cycle distillation OFF	°C (°F)	133 (271)	133 (271)	133 (271)
Still stripping OFF	°C (°F)	138 (280)	138 (280)	138 (280)
Residue draining	°C (°F)	55 (131)	55 (131)	55 (131)
Thermal sensor, distilled solvent *	°C (°F)	45 (113)	45 (113)	45 (113)
Restrictor in steam feeder	mm (in)	6 (.24)	6 (.24)	6 (.24)
Vacuum pressure control	kPa	minus 75	minus 75	minus 75

\* at flash point >55°C (131 °F)

## 11 Safety Remarks Located on the Machine

11

Gemäß EN ISO 8230 befinden sich an der Maschine nachfolgende Sicherheitshinweise:

*In accordance with EN ISO 8230 the machine is fitted with safety hints as given below:*

Conforme à EN ISO 8230 les indications de sécurité suivantes se trouvent à la machine:

Kontaktwasser kann geringe Spuren von Lösemittel enthalten.  
Vorschriftsmäßig entsorgen!

*Contact water may contain small quantities of solvent.  
Please dispose of according to the regulations in your country!*

L'eau de contact peut contenir une petite quantité de solvant.  
Evacuer l'eau de contact conformément à la réglementation.

SN 708073

Nadelfänger täglich bzw. bei Bedarf öfter reinigen  
(Nur bei ausgeschalteter Maschine und nach beendeter Trocknungsphase).

*Clean button trap if necessary but at least once a day  
(only if machine is switched off and the drying phase has been finished).*

Nettoyer le filtre à épingle tous les jours et si nécessaire plus souvent  
(seulement hors fonctionnement de la machine et après une opération de séchage).

SN 708074

Reinigen der Destillation nur bei  
- ausgeschalteter Maschine und  
- kalter Destillierblase durchführen

*Clean still only if  
- machine is switched off and  
- distillation is cold*

Nettoyer l'alambic seulement si:  
- La machine est hors de fonctionnement  
- Le distillateur est revenu à température ambiante

SN 708075

# 11 Safety Remarks Located on the Machine

11

<p><b>Vorsicht!</b> <b>Heiße Oberflächen</b></p> <p><b>Attention!</b> <b>Hot surfaces</b></p> <p><b>Attention!</b> <b>Surface chaude</b></p>	SN 708076
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<p><b>Zulässige Füllmenge</b></p> <p><b>Max. filling capacity</b></p> <p><b>Capacité admissible</b></p>	SN 708086
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<p><b>Filter täglich bzw. bei Bedarf öfter reinigen</b> <b>(nur bei ausgeschalteter Maschine und nach beendeter Trocknungsphase)</b></p> <p><b>Clean lint filter if necessary but at least once a day</b> <b>(only if machine is switched off and the drying phase has been finished.)</b></p> <p><b>Nettoyer le filtre tous les jours et si nécessaire plus souvent</b> <b>(seulement hors fonctionnement de la machine et après une opération de séchage).</b></p>	SN 708087
--	-----------

<p><b>Filter und Wasserabscheider dürfen manuell</b> <b>nur bei leerer Destillation abgelassen werden.</b></p> <p><b>Filter and water separator must only be drained manually</b> <b>if the distillation is empty.</b></p> <p><b>La vidange manuelle du filtre à solvant et du séparateur d'eau</b> <b>est seulement permise quand le distillateur est vide.</b></p>	SN 708077
--	-----------

<p><b>21 kg /46 lbs</b> <b>Zulässige Füllmenge</b></p> <p><b>Max. filling capacity</b></p> <p><b>Capacité admissible</b></p> <p>SN 800195</p>	<p><b>26 kg /57 lbs</b> <b>Zulässige Füllmenge</b></p> <p><b>Max. filling capacity</b></p> <p><b>Capacité admissible</b></p> <p>SN 800196</p>
<p><b>30 kg /66 lbs</b> <b>Zulässige Füllmenge</b></p> <p><b>Max. filling capacity</b></p> <p><b>Capacité admissible</b></p> <p>SN 800197</p>	

## 11 Safety Remarks Located on the Machine

11

### For cleaning machines that operate with combustible solvent

#### Hazardous to humans and the environment:

- Risk of fire or explosion if any contact with open flames, embers or sparks
- Damages the skin, risk of eczema formation
- Serious damage to the lungs is possible if vapor is inhaled

#### Safety precautions:



- No source of fire near the solvent, absolutely no smoking
- Avoid skin contact, use protective gloves if possible
- No direct contact with the solvent



- Use protective skin cream regularly
- **Do not eat or drink in the work area**

#### What to do in case of fire:

- In case of fire, extinguish with a carbon dioxide or foam fire extinguisher
- If you spill solvent, use a suitable bonding agent

#### First aid:

- Immediately remove clothing wet with solvent
- If you inhale concentrated vapor, go out into the fresh air immediately
- If you get solvent in your eyes, rinse with water and contact a physician immediately

#### Disposal:

When stored, the solvent must be kept in closed containers and must be disposed of by experts only.

Changings in this issue

Page 1-7: Regulations

Page 12, 16, 18, 24, 26, 28, 29, 32, 35, 36, 45

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