MUELLER LICHTENVOORDE B.V. – Postbus 20 – 7130 AA – LICHTENVOORDE - NEDERLAND

USERS MANUAL

BEER TANK

CONTENTS

1. INTRODUCTION

This users manual (in accordance with NEN 5509) has been drawn up to help you work with and maintain the beer tank safely and sensibly.
The users manual is intended for use by the operator in charge of installation (the user).
This users manual meets the requirements registered in the directions for the Pressure Equipment Directive (PED Direction 97/23/EG).

Before you start operating or carrying out maintenance, you should be familiar with the contents of this users manual. In case of any uncertainty with regard to the contents or if problems arise during the execution, please contact your deliverer or installer.

In this users manual pictograms are used, the meaning of which are described in chapter 2.
The positions in this manual (right, left, in front of, behind etc.) used to show the position of a part of the installation, are to be interpreted as seen from the operators standpoint.
Unless otherwise indicated, the measurements are in metres.

For decades Mueller Lichtenvoorde BV has produced and delivered BierDrive Compatible beer tanks. Further on in this manual they will be referred to as BDC beer tanks.

Mueller Lichtenvoorde BV, hereinafter to be referred to as Mueller, has compiled this manual with the greatest care. Nevertheless, we cannot completely exclude the possibility of error. Mueller does not assume any responsibility for mistakes and subsequent damages.

2.0 SAFETY

2.1 USED PICTOGRAMS

The following pictograms are used in this manual:

TIP
Gives the user suggestions and advice on how to carry out certain procedures more easily and effectively.

ATTENTION
Alerts the user to possible problems.

CAREFUL
Warns the user for possible damage to the machine or the product if the procedures are not executed correctly.

WARNING
Warns of (serious) bodily injuries if the procedures are not executed correctly.

2.2 GENERAL SAFETY INSTRUCTIONS

Secure all dangerous areas wherever possible. Nevertheless, great caution is required both during the use and the inspection and maintenance of the beer tank.
No responsibility whatsoever can be accepted in the event damages or bodily injuries resulting from failure to observe the indications in this users manual or by neglect during use, adjustment or maintenance of the installation.

To minimize any chance to injury while working on or with the beer tank it is necessary to protect oneself by means of safety shoes, safety glasses, hearing protection and working gloves etc.

2.3 INSTRUCTIONS FOR GENERAL USE

The correct operation of the pressure vessel is an essential condition for safe usage. To this end the following considerations are to be observed by the user:

1. All of the procedures in the following description of maintenance work or other work on the pressure vessel should be performed only by qualified personnel.

2. The pressure vessel may only be used for its designed purpose with the intended operating media indicated and within the pressure- and temperature limits, stipulated on the nameplate and in the manual. This manual is to be kept in a safe place.

3. Operational data:

	Tank	Cooling
Content	See nameplate	See nameplate
Max. admissible content	See nameplate	n.a.
Max./min. admissible operating pressure	3 / 0 bar (o)	3 / 0 bar (o)
Max./min. admissible operating temperature	50 / 0 ºC	50 / 0 ºC
Medium	Bier / gas	Cooling water
Test pressure (at a temperature of 10 to 30 ºC)	4,3 bar (o)	4,3 bar (o)
Weight	See nameplate	

Marking of the named machine for the EG-Test according to Module B+C1: CE0044

4. The pressure vessel is designed for a predominantly inactive pressure load. As technical specification to fulfil fundamental safety requirements of the appendix I of the DRGL, Ad-2000 was chosen. The connecting coefficient is 0,85.

5. For construction units from austenitic steel, the corrosion addition is 0 mm.

6. Welding on the pressure vessel is not admissible.

7. There must be a guarantee given that, on location, the Pressure vessel will be equipped with appropriate safety- and test measures, which prevent exceeding the maximum admissible operational data.

8. The pressure vessel is to be set up in a horizontal position. The cooling water system should be filled before start-up and all air vented from system. Water should be circulated before the admission of the coat area.

9. The pressure vessel must be placed on a foundation that is designed to accommodate the weight of the full vessel.

10. Connections to the pressure vessel need to be attached strain-free.

11. During operation the pressure vessel may not be exposed to any vibrations, which can lead to fatigue failure. If necessary precautions must be taken to prevent vibrations.

12. The cooling water may not contain corrosive components, which can damage the material used. In addition, the cooling water (preferably water from a closed cooling circulation system) must be free of rough contamination or other impurities, which may cause clogging in the cooling jacket of the pressure vessel. If necessary a filter can be connected.

13. During maintenance and/or inspection of the pressure vessel, the welds must be cleaned and checked for damages. New seals (original parts) are to be used. The safety valve must be checked for correct operation. Before beginning maintenance and/or inspection work, make sure that the vessel is no longer under pressure, completely emptied. During maintenance and/or inspection, operation may not be initiated by a third party. When maintenance and/or inspection work has been completed, a pressure test must be done before the vessel can resume operation.

14. The national regulations regarding the industrial safety, valid at the place of assembly, are to be observed.

15. The national regulations valid at the place of assembly, regarding the operation of pressure machinery are to be observed.

16. The pressure vessel may only be lifted empty. A suitable lifting device should be used for lifting.

17. During filling the operating instruction of the operator are to be followed up. The valid national regulations regarding the industrial safety are to be observed.

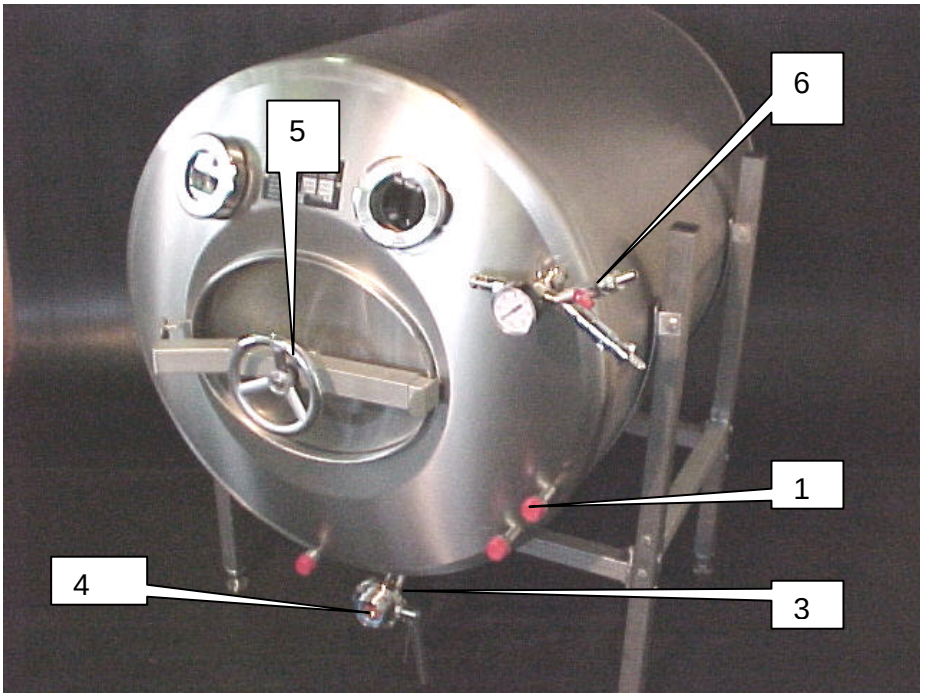
18. When emptying the vessel make sure that no vacuum develops.

3.0 PRODUCT DATA

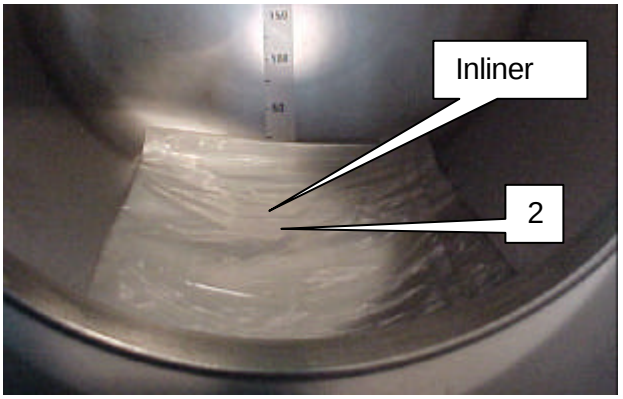
3.1 GENERAL PRODUCT DESCRIPTION

Ever since 1982 Mueller developed, produced and delivered beer tank systems. These tank systems can be described as follows (see picture 3.1):

1. Cooling
2. Inliner (see picture 3.2)
3. Plug-in unit
4. Distributor
5. Manhole cover
6. Safety pressurise fitting



Picture 3.1

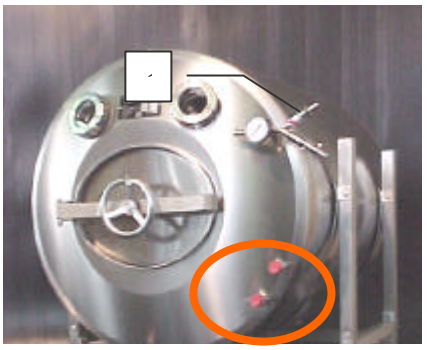


Picture 3.2

3.1.1 COOLING

The beer tanks that are delivered are either single walled and without insulation or double walled and insulated.
The double-walled system is provided with a cooling spiral or cooling plates. The advantages of this system are the possibility of placing the tanks anywhere with minimal alterations to the surroundings. The tanks must not be exposed to frost or full sunlight (for connection options see pictures 3.3 & 3.4).

Picture 3.3

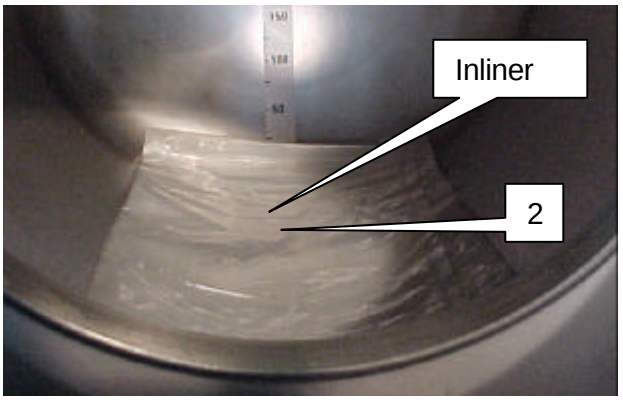


Picture 3.4

Single walled beer tanks are usually kept in cool cells. The advantage of this system is that the entire system is cooled and the installation of the beer tanks is easier (size and weight). The main disadvantage is the room it takes up in the cool cell.

3.1.2 INLINER

An inliner, also called a beer liner is a bag (see picture 3.5) made of plastic (low pressure polyethylene with food approval), which is filled with beer so that when empty, the bag can be removed thus making the cleaning of the tank basically unnecessary. In using an inliner, special discharge openings are applied, the so-called plug-in units.



Picture 3.5

3.1.3 PIERCING UNIT

The piercing unit is applied with the use of an inliner and serves as a pressure- and fluid-tight seal between the tank and the beer discharge openings. The plug-in unit is available according to the Mueller (see picture 3.6) and BDC (see picture 3.7) principle. The fundamental difference between both systems is the way the inliner is locked (see installation of the Mueller inliner, Chapter 4.5.2 & Installation / removal of the BDC inliners, Chapter 4.5.3).
With the Mueller construction, the inliner can simply be pushed into the appropriate bush. By installing the piercing unit the inliner will then be sealed hermetically for beer and air or CO2.
With the BDC construction, the inliner has to be pushed out from the inside through the appropriate bush and then the inliner has to be secured from the outside to the spout of the inliner by means of two moon shells. By installing the piercing unit the inliner will then be sealed hermetically for beer and air or CO2.

Picture 3.6

Picture 3.7

3.1.4 BEER DISTRIBUTOR

The Mueller distributors are available in the constructions 1x, (see picture 3.8) 2x, 4x and 6x (see picture 3.9). All constructions are built to a universal scale except for 1 distributor (see parts list). Clearly this means that only the distributor plates are different. Every seal, clamp, etc. is identical.
The distributors are provided with a non-return valve. This enables removal of the beer hose from the one tank and mounting it to the other without spillage. Furthermore it prevents beer flowing back from the beer hose into the beer tank, thus guaranteeing the quality of the beer in the tank.
In addition, the distributor can be dismounted completely for cleaning and maintenance without any tools.

Picture 3.8

Picture 3.9

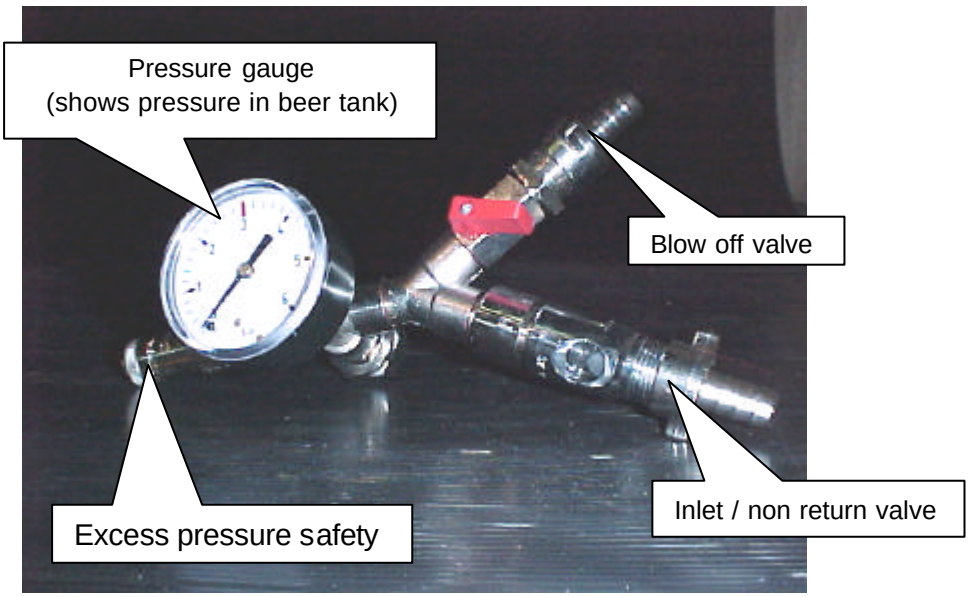
3.1.5 MANHOLE COVER

The beer tank can be opened by means of an oval manhole cover, which can be removed or swung inwards (named a hinged manhole cover). For further use of the manhole cover see chapter 4.5.1.

3.1.6 SAFETY PRESSURISE FITTING

With an application of a working pressure of 3 bar, Mueller beer tanks have to be provided with a CE approved excess pressure safety category IV. We advise installing the standard Mueller safety pressure fitting. The safety pressure fitting must be inspected regularly to make sure it is operating correctly.
Picture 3.10 shows the components of the safety pressurise fitting.

If the fitting falls and / or is damaged, it must be replaced immediately.



Picture 3.10

3.2 TECHNICAL SPECIFICATIONS

Technical specification of the beer tank:

Table 3.1 – Data pressure vessel / accessory	
Contents pressure vessel (range)	250, 500, 1000 of 1600 litre
Contents accessory	0,05 – 0,3 litre
Max. admissible pressure	3 bar(o)
Max. / min. admissible temperature	50 / 0 ºC

Table 3.2 - PED (97/23/EG) data	
Contents pressure vessel (acc. art.9)	Liquid – group 2 (beer) gas - group 2 (CO2 / air)
Contents accessory	Liquid - group 2
Category according PED, appendix 2	Category III
Module according PED, appendix 3	B+C1

Table 3.3 – Other technical data	
Material tank	1.4301 (AISI 304)
Material outside housing	1.4301 (AISI 304)
Wall thickness cylinder	2 mm
Wall thickness bottoms	2,1 mm
Wall thickness outside housing (by isolated tanks)	1,2 mm
Connecting dimensions piercing unit	DN40 piercing unit
Connecting dimensions distributor	G5/8”
Material / diameter cooling water pipe	Copper / ½”
Length cooling water pipe / hl tank contents	3 m/hl
Contact surface cooling pipe	0,09 m2/hl
Dimensions cooling water connection	2x G5/8” of G3/4” outer thread
Cooling water temperature	Ca. 2,5°C
Cooling water delivery	Ca. 250 litre/hour
Cooling time 10ºC > 5ºC	20 hour
Resistance cooling spiral	0,25 – 0,35 bar
Dimensions manhole	420x320 mm

4.0 TRANSPORTATION AND INSTALLATION

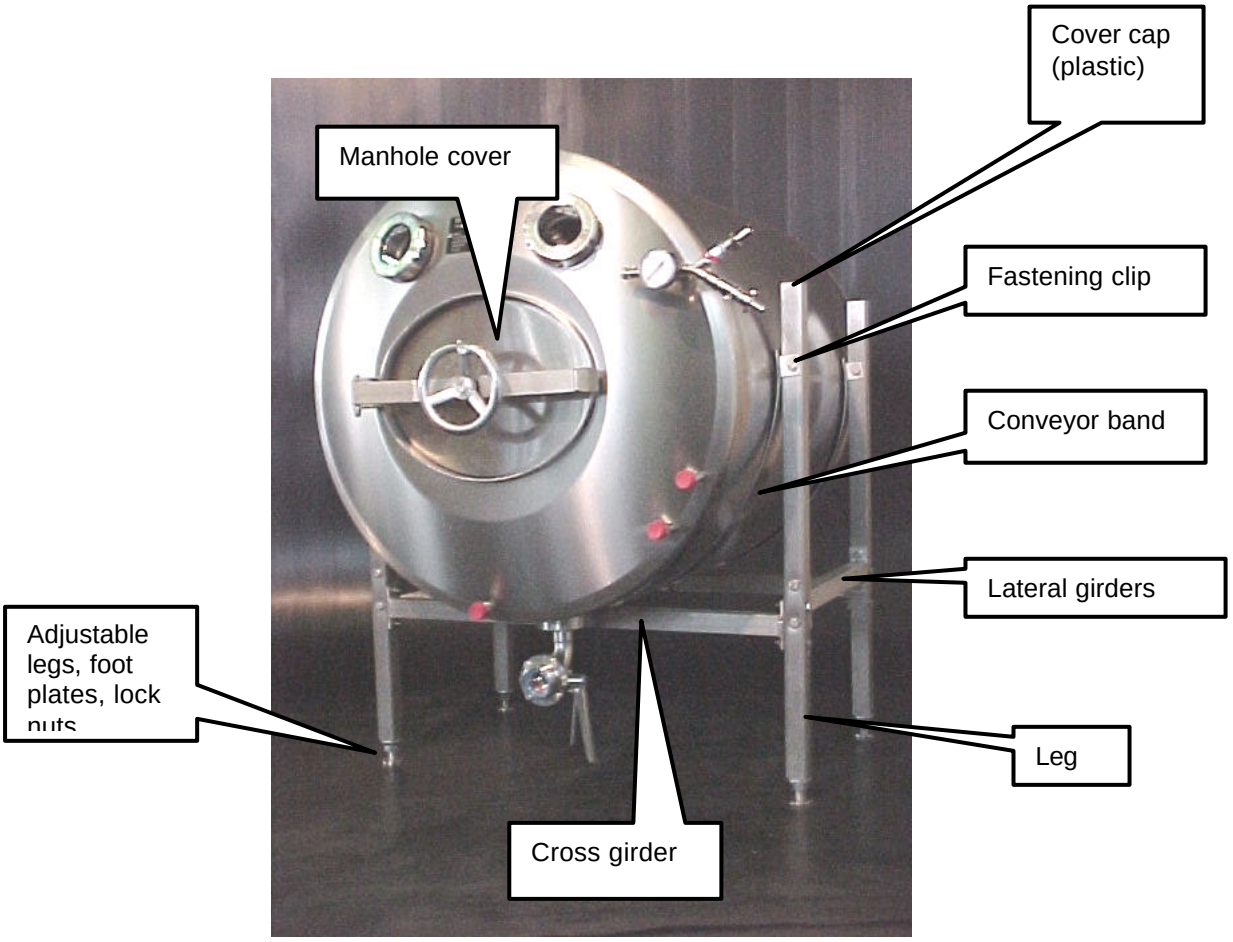
- ***When transporting the beer tanks by truck shifting or falling of the tanks it is a risk that must be taken into account. The transporters must therefore make sure that the tanks are secured using the pallets provided by the Mueller to prevent damage occurring.***

- ***Pay special attention to vulnerable protruding parts and manometers.***

- ***Always inspect the beer tank for damages before transport. A damaged beer tank may not be assembled but must be given to the Mueller for inspection.***

4.1 PLACEMENT OF TANK AND FRAME

To use the beer tanks we advise placing them on the standard frames provided by Mueller. The 100% stainless steel frames consist of an easy-to-assemble pipe construction (see picture 4.1).



Picture 4.1

4.2 INSTALLATION

Because hoisting activity is necessary during assembly, the required safety precautions must be observed.

During hoisting, make sure no ‘foreign’ (not rust proof) metals come in contact with the beer tank as this could lead to undesired corrosion. Use of wood or plastic is advised as support material as well as use of clean slings.

Before the beer tanks can be placed, the floor destined for placement must be inspected to determine whether it can support the tank. Take point load into consideration.

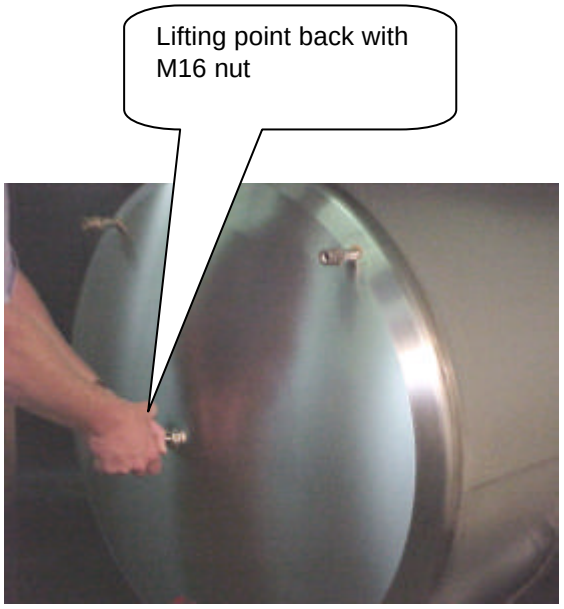
In the event that the tanks are to be placed in an environment that poses potential risk (e.g. in a situation where there is the likelihood of vibrations caused by heavy traffic, earthquakes, installation on moveable platforms or on ships) consultation with the Mueller about these conditions is required so that extra stability measures can be taken in the placement of the beer tank.

Various facilities required for the beer tank. Cool water supplies, placements of a compressor, beer mains, beer hoses etc. take up space around the beer tank and can result in less space for service and waiting. At the same time, these facilities should not place any undesired reaction forces on tanks, appendages and frames as this can lead to dangerous situations (instability of the installation).

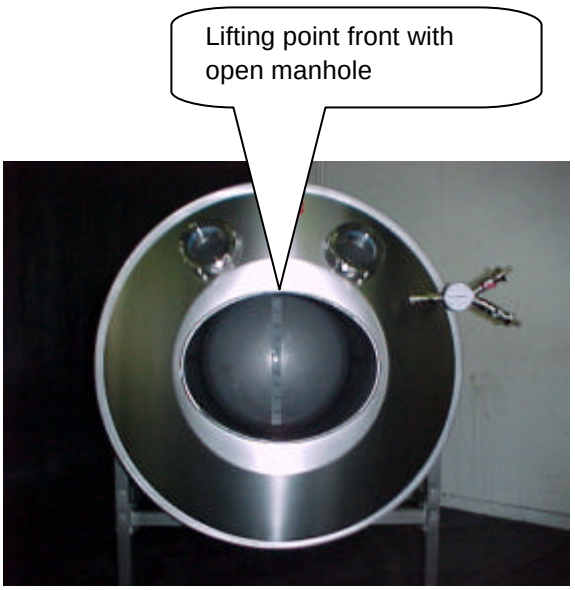
Make sure that the area in which the tank is placed has a constant temperature of between 0 and 30 ºC. In other words, a frost-free area not exposed to direct sunlight.

Where CO2 is used to supply pressure in the tanks is danger of suffocation exists should the CO2 leak in a room where there is insufficient ventilation. MUELLER advises that where CO2 is used, the national regulations concerning health and welfare be observed.

Accredited installation companies must carry out all activities undertaken to prepare for the installation of the water-cooling system, such as the placement of water mains and electricity. Once the beer tank has been checked for damage, it can be placed in the desired location. At this point only approved-of hoisting and lifting machinery must be used. Lashing gear is also admissible. It is advisable to lift the tanks from underneath, for the better distribution of pressure (see picture 4.2 & 4.3).



Picture 4.2



Picture 4.3

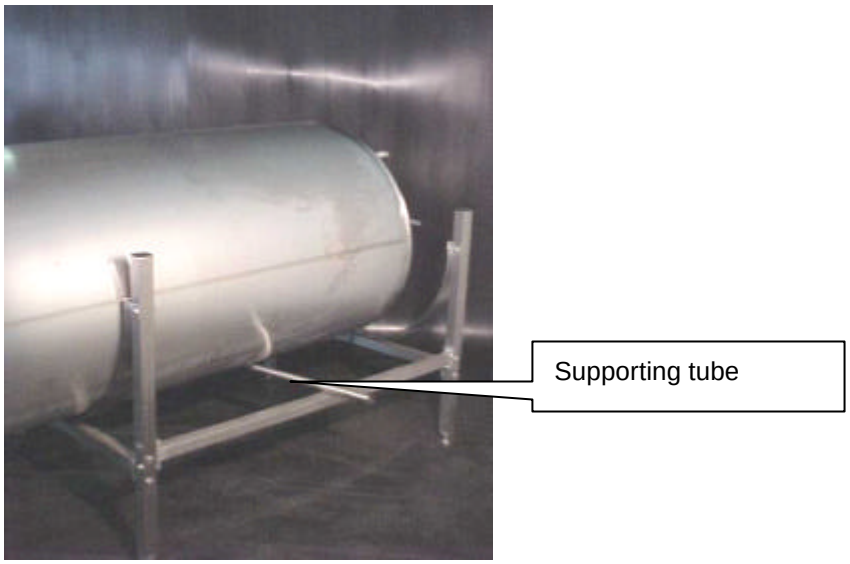
4.2.1 ADJACENT PLACEMENT

When placing the beer tanks in adjacent position, it is advisable to build the frames first then to place the tanks.

All wire connections must be checked carefully with a spanner.

4.2.2 STACKED PLACEMENT

When two frames are to be stacked, two complete and independent frames must first be built and the lower tank first, as in picture 4.4. Approximately 5 cm must be left free between the conveyor band and the insertion fitting.
Then the connection between the tubes can be made and the second frame can be placed on the first. You can then place the beer tank as illustrated in picture 4.4. The beer tank must protrude far enough out in front of the first tank that the insertion unit can be introduced. The beer tanks can also be stacked directly above each other is a raising set is used (optional).



Picture 4.4

All wire connections must be checked carefully with a spanner.

4.2.3 ADJUSTMENT AND STORAGE

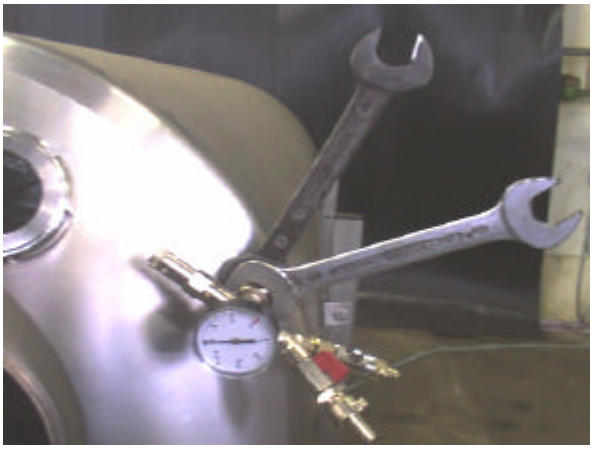
After the frames for the beer tanks have been assembled, they must still be adjusted. Place the frame first level and then place the frames in a longitudinal direction on a slant with a 1 to 1.5 % angle (1 to 1.5 cm p/m) which is the lowest point that still allows flow.

4.3 ATTACHMENT OF SAFETY FITTING

The pressure/safety fitting is attached to the beer tank by means of a G3/4”wire connection. A teflon ring should be placed between the fitting and the beer tank to assure pressure tightness (see picture 4.5).

Picture 4.5

The connection should be secured with two spanners whereby only the rear spanner is in a fixed position (see picture 4.6). This is to prevent excess pressure to the pressure mains.



Picture 4.6

4.4 ATTACHMENT OF WATER-COOLING SYSTEM

The water-cooling system consists of an entry and exit opening containing a G3/4" of G5/8" threaded tube. This threaded tube connection is a solid soldered joint with a copper cooling spiral. In order to prevent damage to or stripping of the cooling spiral during removal it is necessary to secure the threaded tube (which is attached to the tank) when installing the water cooling connection with a spanner to prevent its rotation (see picture 4.7). Instead of turning the back nut key you must prevent it from turning along with the front nut key.

Picture 4.7

4.5 USE INLINERS

ATTENTION: the inliners are designed for once-only use!!!!!

4.5.1 OPENING MANHOLE COVER

- Let out pressure from the beer tank through the outlet valve on the front side of the tank.
- Open the tank by opening or removing the manhole cover (see picture 4.8 & 4.9).

Hinged manhole cover

Picture 4.8

Manhole cover with clamping piece

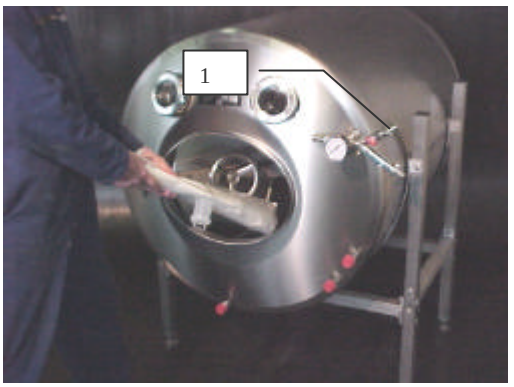
Picture 4.9

4.5.2 INSTALLATION / REMOVAL MUELLER- INLINER

INSTALLATION MUELLER INLINER:

Replace the sealing ring under the transit bush if necessary. To do so remove the coupling nut DN32 at the bottom of the tank and then push the bush up / inside. Be careful not to lose the peg on the transit bush (picture 4.10)!

Picture 4.10



Picture 4.11

- Clean the transit bush and the piercing unit as described in the cleaning instructions (H 4.6).
- Replace the transit bush in its former position.
- Remove the new inliner from the packaging; check it for possible damages and install the inliner in the beer tank (see picture 4.11).

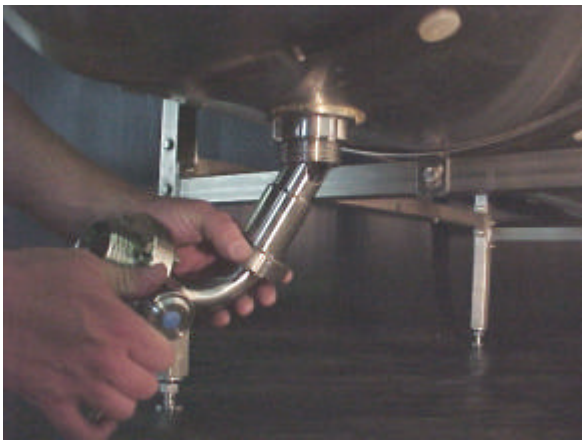
Picture 4.12

Picture 4.13

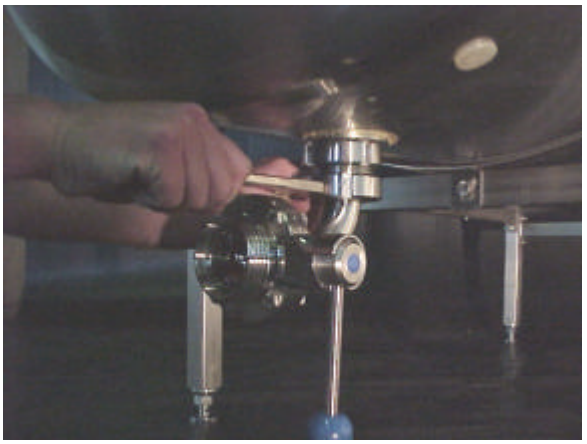
- Push the Mueller inliner with the connection into the outlet bush (see picture 4.12) of the beer tank. Check if the Mueller inliner is lying straight in the beer tank (picture 4.13).

Attention: the inliner has been rolled up (in the packaging) in such a way that, after the installation of the inliner in the beer tank, it can roll out to the back and then unfold to the side when it is filled (see picture 4.13).

- Replace the piercing unit in its old position (see picture 4.14).
- Tighten the coupling nut with the special hook spanner (see picture 4.15).



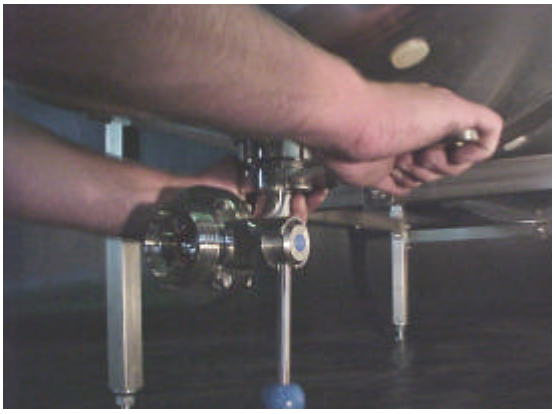
Picture 4.14



Picture 4.15

REMOVAL MUELLER INLINER:

- Close the valve of the piercing unit.
- Remove the piercing unit with the special hook spanner (see picture 4.16).
- Pull the inliner out of the tank (see picture 4.17) and clean the beer tank as described in the cleaning instructions (H. 4.6.).



Picture 4.16

Picture 4.17

4.5.3 INSTALLATION / REMOVAL BDC INLINERS

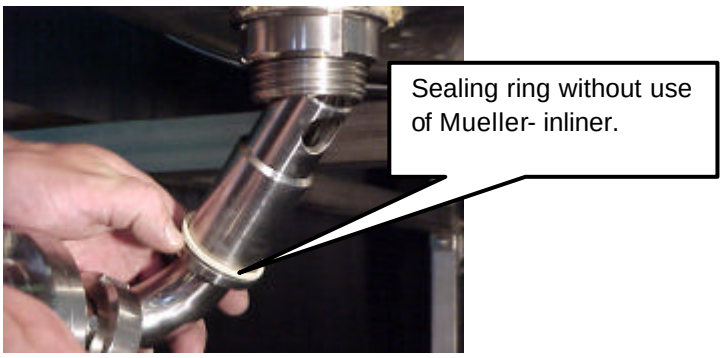
The installation of the BDC inliner is basically the same as the installation of the Mueller inliner. However, the connection has to be put through the transit bush from the inside and then the connection has to be secured with the two moon shells. Then install the rubber sealing ring (see picture 4.18 & 4.19).

Picture 4.18

Picture 4.19

4.5.4 USE WITHOUT INLINER

It is possible to use the Mueller tank without inliner. To do so an additional sealing ring has to be installed (see picture 4.20).

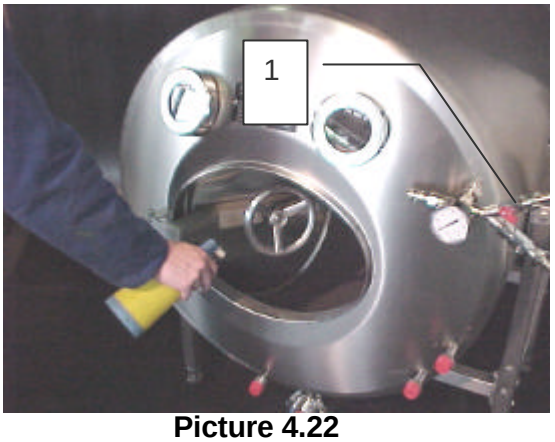


Picture 4.20

4.5.5 PRESSURIZATION

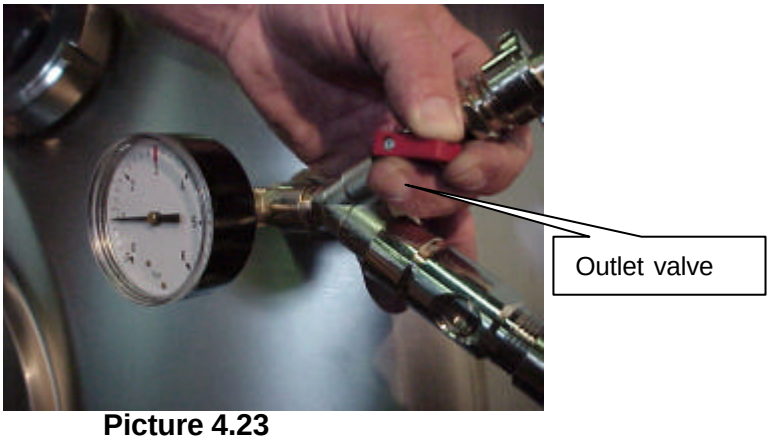
- Clean the manhole and the parts, which have been touched during installation, as described in 4.6 (see picture 4.21 & 4.22).

Picture 4.21



Picture 4.22

- Install the manhole cover again. The hand-twining wheel should not be tightened completely otherwise the cover will not serve as implosion security.
- Bring the beer tank to a pressure of 1 bar (see picture 4.23).



Picture 4.23

<u>CHECK AIRLEAKAGE INLINER:</u>

- Open the valve of the piercing unit, so the air, which is in the inliner can escape.
- Close the valve again and wait for approx. 15 seconds before opening the valve of the piercing unit again. There should be no longer any air escaping. If there is still air escaping the inliner is leaking or the sealing at the outlet bush is insufficient. Replace the inliner by repeating the above mentioned steps if necessary.
- If there is no more air leakage, the tank can be filled with beer.

Take care that the first approx. 100 litres are pumped into the tank steadily.

4.5.6 STORAGE INLINER

- Don't store inliners in the sunlight;
- Don't store inliners next to aroma substances or similar substances;
- Store inliners in a dry place;
- Store inliners in a dark place;
- Store inliners between 4ºC and 20ºC.

4.6 CLEANING OF THE BEER TANK

- Use only soap and water to clean the beer tank.
- Because the beer tank serves for storage of beer, it has to be cleaned regularly.
- In case of spilling and leakage of beer, clean these surfaces directly with water and soap.

Never use chloride containing cleaning agents or solvents!

4.7 DISENGAGING

- Tap the beer.
- Remove all pressure from the system.
- Tap all liquids.
- Clean the whole installation.

With double walled tanks: when storing outdoors empty the cooling spiral totally to avoid the danger of frost.

4.8 FAILURES AND REPAIRS

- See chapter .7: Failures and repairs.

4.9 ENVIRONMENTAL ASPECTS

If the installation must be disassembled and disposed of, this can be done by reversing the order of assembly as set out in the instruction manual.
The parts of the beer tank do not constitute any danger to the environment.

5.0 SERVICE AND GUARANTEE

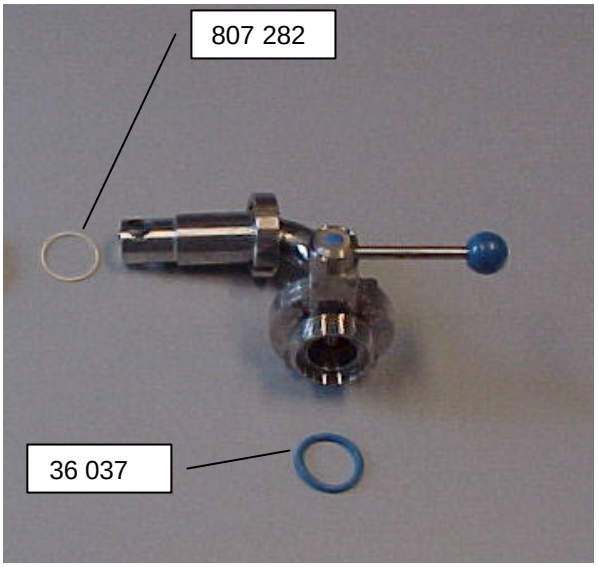
- In accordance with the Metaalunie Voorwaarden (Metaalunie Conditions).

6.0 PART LIST

CONTENTS:

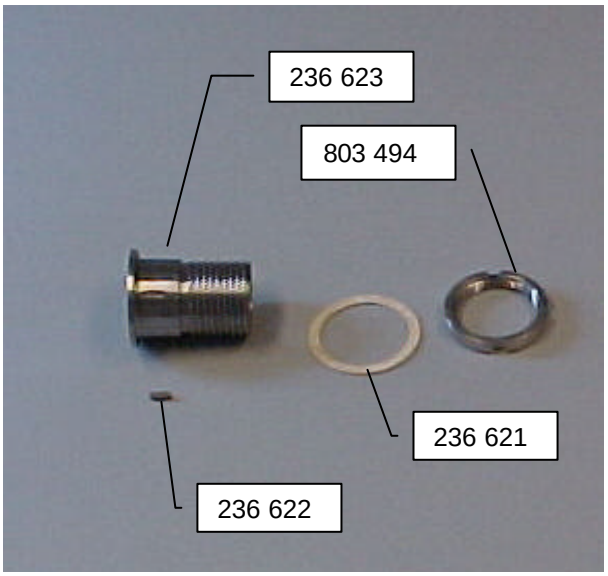
6.1 MUELLER PIERCING UNIT 90º

803 821	Mueller piercing unit 90º
807 017	O-ring
807 282	O-ring



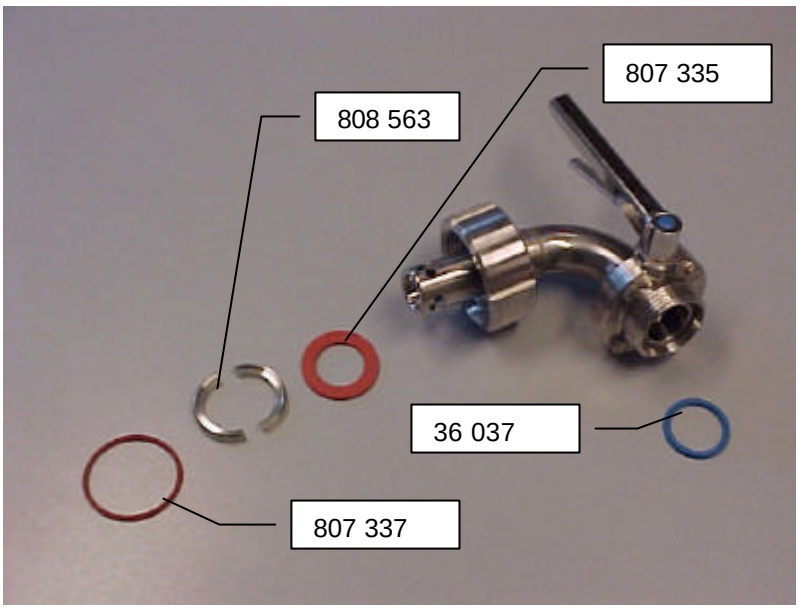
6.2 TRANSIT BUSH FOR MUELLER PIERCING UNIT 90º

	Transit bush for Mueller piercing unit 90º
236 622	Pin
236 623	Threaded bush
236 621	O-ring
803 494	Cap nut



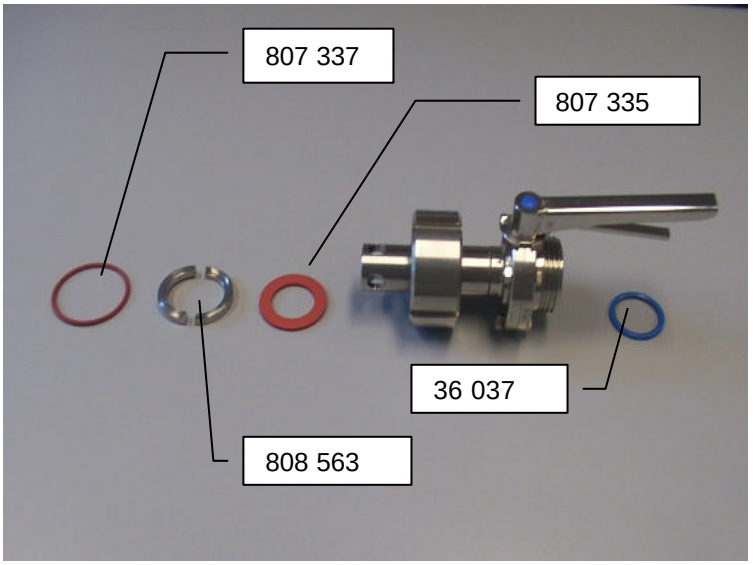
6.3 BDC PIERCING UNIT 90º

3475 0141	BDC piercing unit 90º
36 037	O-ring
807 335	O-ring
807 337	O-ring
808 563	Filling disks



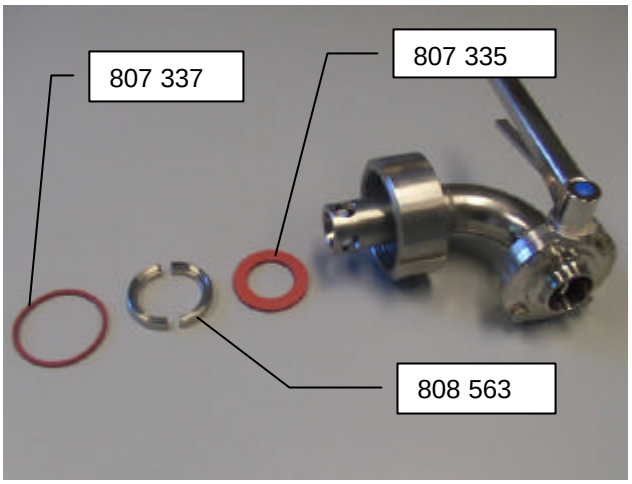
6.4 BDC PIERCING UNIT STRAIGHT

3475 0142	BDC piercing unit straight
36 037	O-ring
807 335	O-ring
807 337	O-ring
808 563	Filling disks



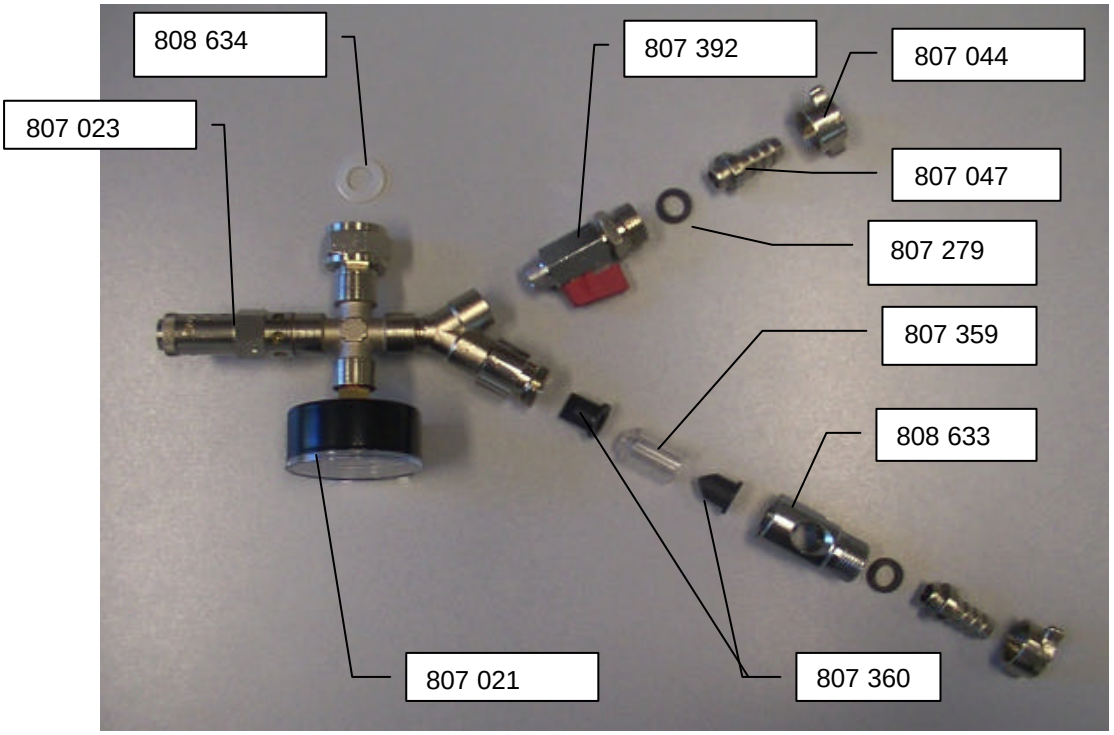
6.5 BDC PIERCING UNIT 90º WELD / WELD

3475 0144	BDC piercing unit
807 335	O-ring
807 337	O-ring
808 563	Filling disks



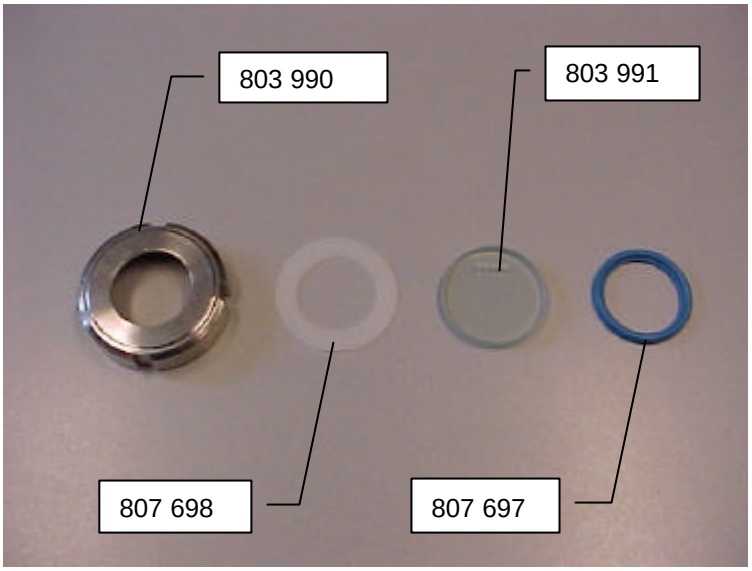
6.6 SAFETY PRESSURISE FITTING

804 043	Safety pressurise fitting
807 021	Manometer
807 023	Safety valve
807 044	Winged nut
807 047	Hose attachment
807 279	Sealing ring
807 359	Holder lip valve
807 360	Lip valve
807 392	Ball valve
808 633	Casing non-return valve
808 634	Rubber sealing ring



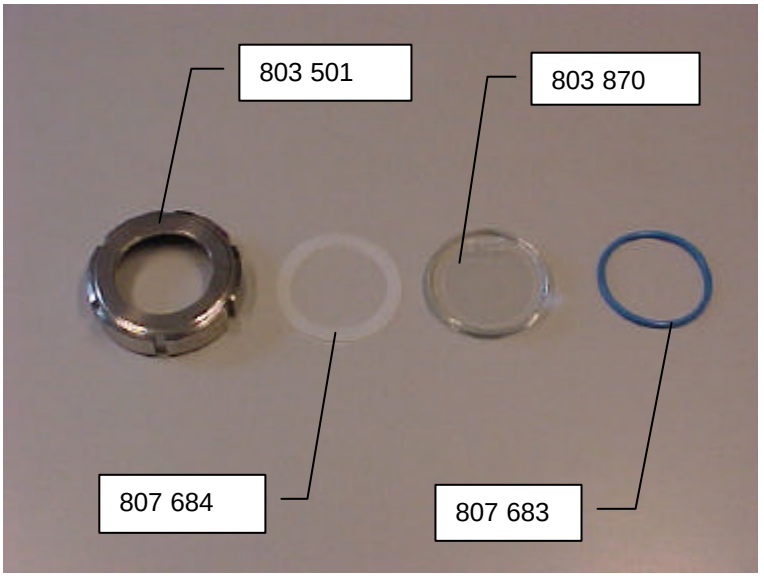
6.7 SIGHT GLASS DN50

	Sightglass DN50
803 990	Swivel sight glass
803 991	Sight glass
807 697	O-ring
807 698	Sealing disk



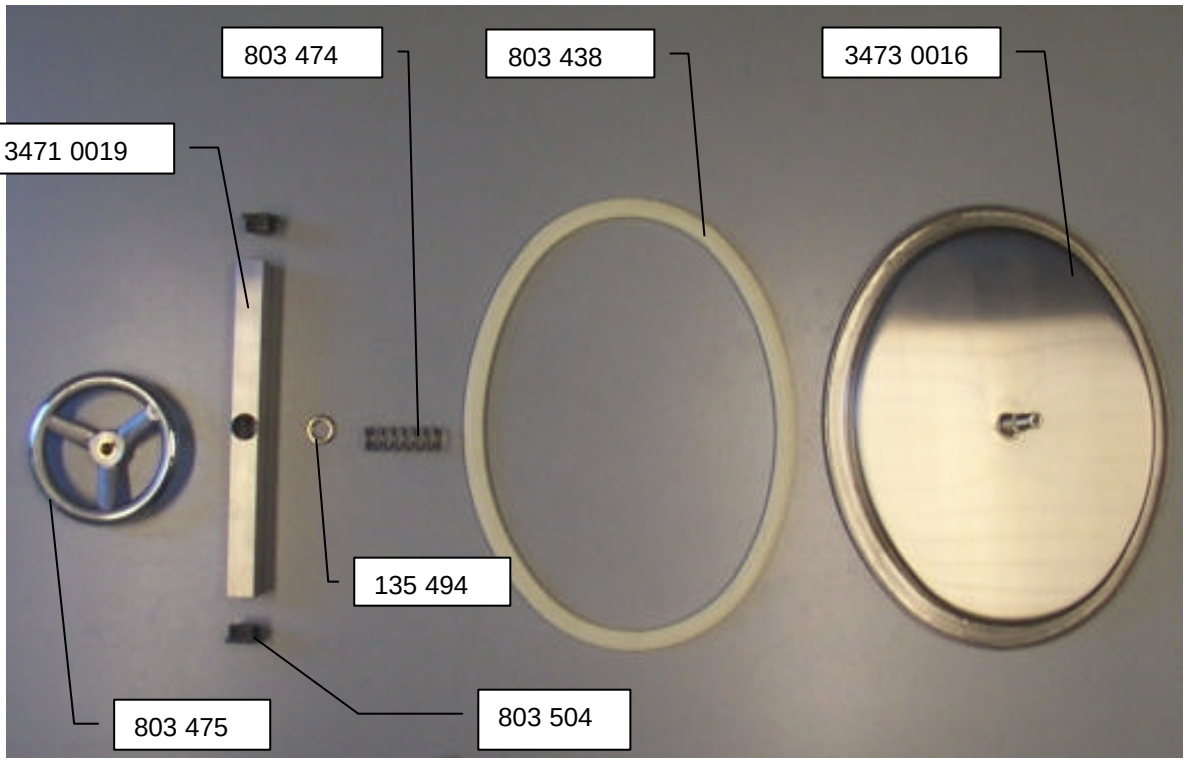
6.8 SIGHT GLASS DN80

	Sightglass DN80
803 501	Swivel sight glass
803 870	Sight glass
807 683	Sealing ring
807 684	Sealing ring



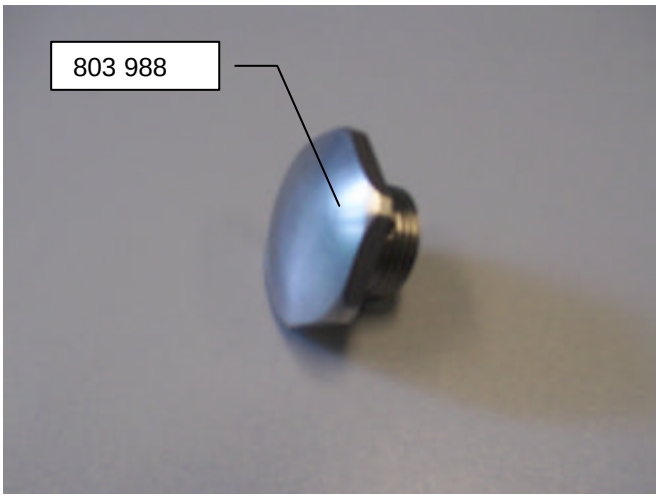
6.9 MANHOLE COVER

3475 0553	Manhole cover
803 438	Sealing ring
803 474	Spring
803 475	Handwheel
803 504	Sealing lid
135 494	Sealing ring
34710019	Clamp
34730016	Manhole lid



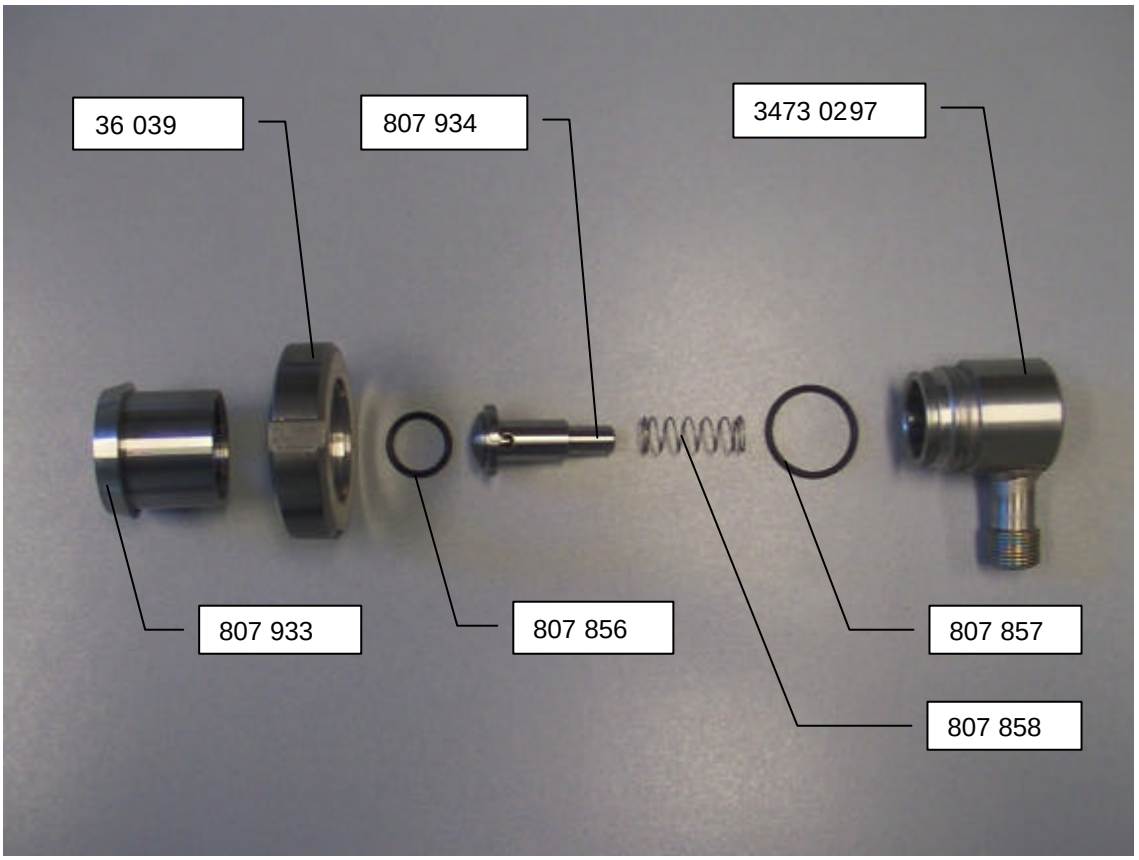
6.10 CO2 CONNECTION

803 988	CO2 distributor



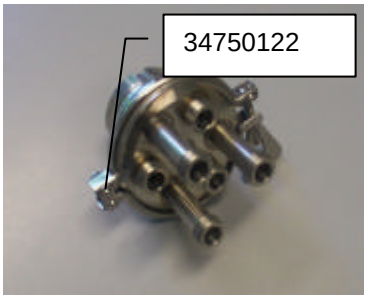
6.11 BEER DISTRIBUTOR (1 LINE)

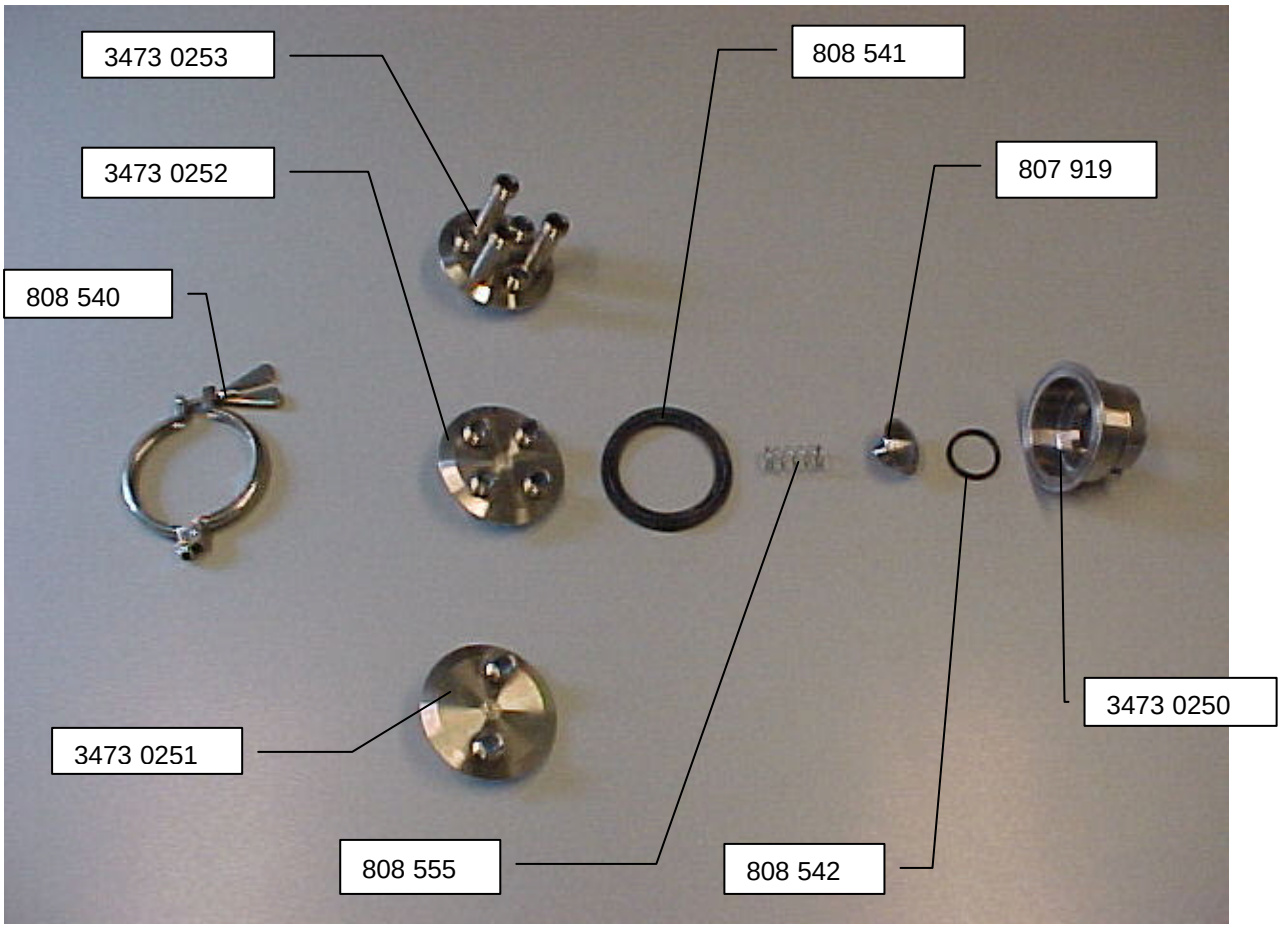
3475 0566	Beer distributor (1-line)
807 856	O-ring
807 857	O-ring
807 858	Spring
36 039	Swivel nut
807 933	Clamp casing
807 934	Non-return valve
3473 0297	Casing



6.12 BEER DISTRIBUTOR (2-/ 4- /6- LINES)

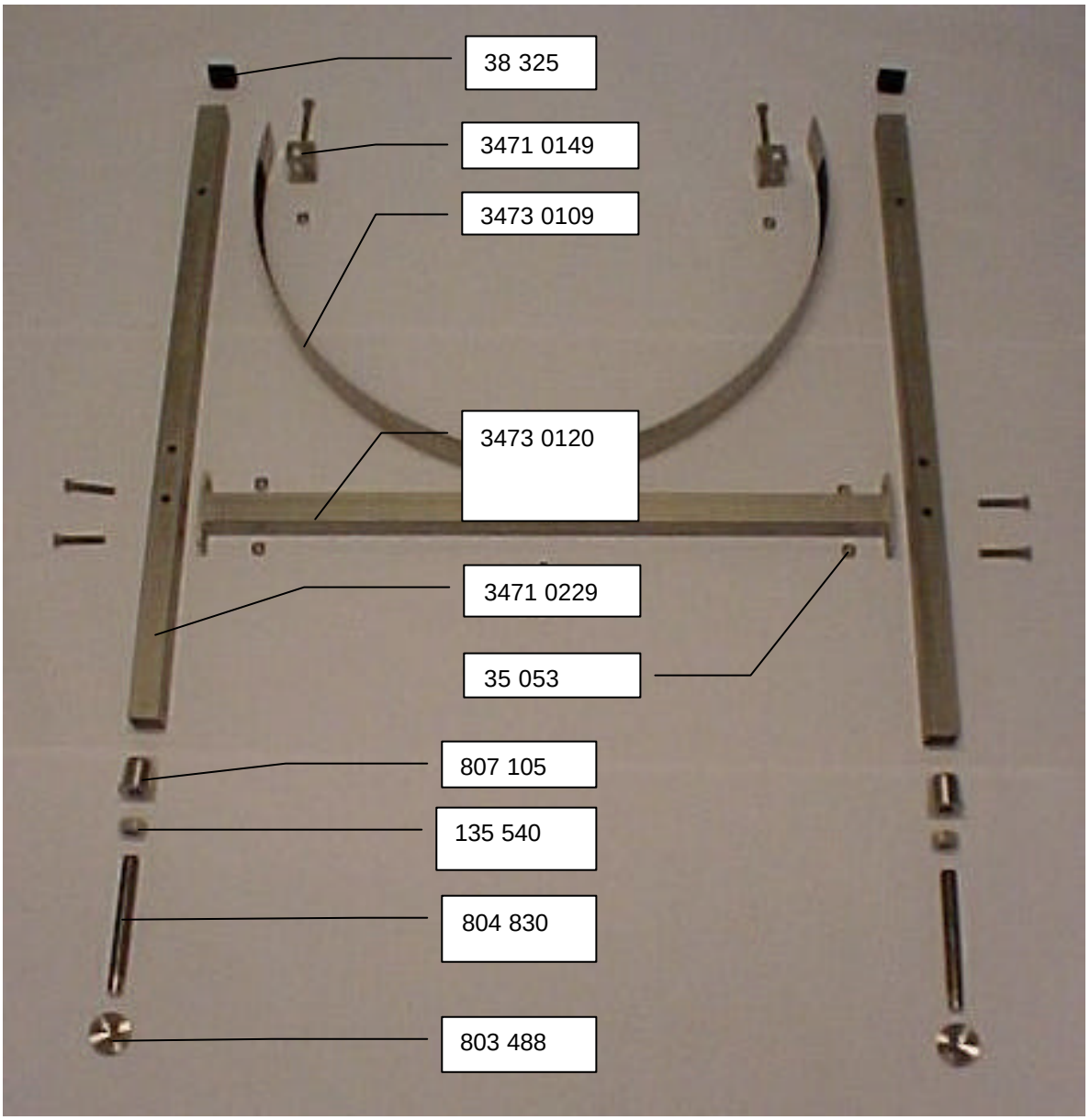
3475 0120	**Beer distributor (2 lines)**
3475 0121	**Beer distributor (4 lines)**
3475 0122	**Beer distributor (6 lines)**
807 919	Non-return valve
808 540	Clamping ring
808 541	Sealing ring
808 542	O-ring
808 555	Spring
3473 0250	Casing
3473 0251	Distributor plate (2-lines)
3473 0252	Distributor plate (4-lines)
3473 0253	Distributor plate (6-lines)



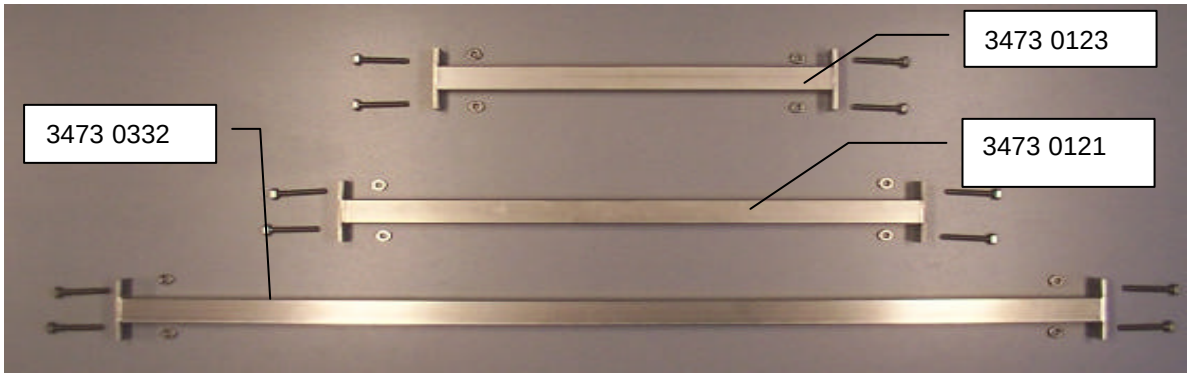


6.13 FRAME BEER TANK DOUBLE WALLED (D=860 mm)

500 litre: 3475 0057 1000 litre: 3475 0052 1600 litre: 3475 0126

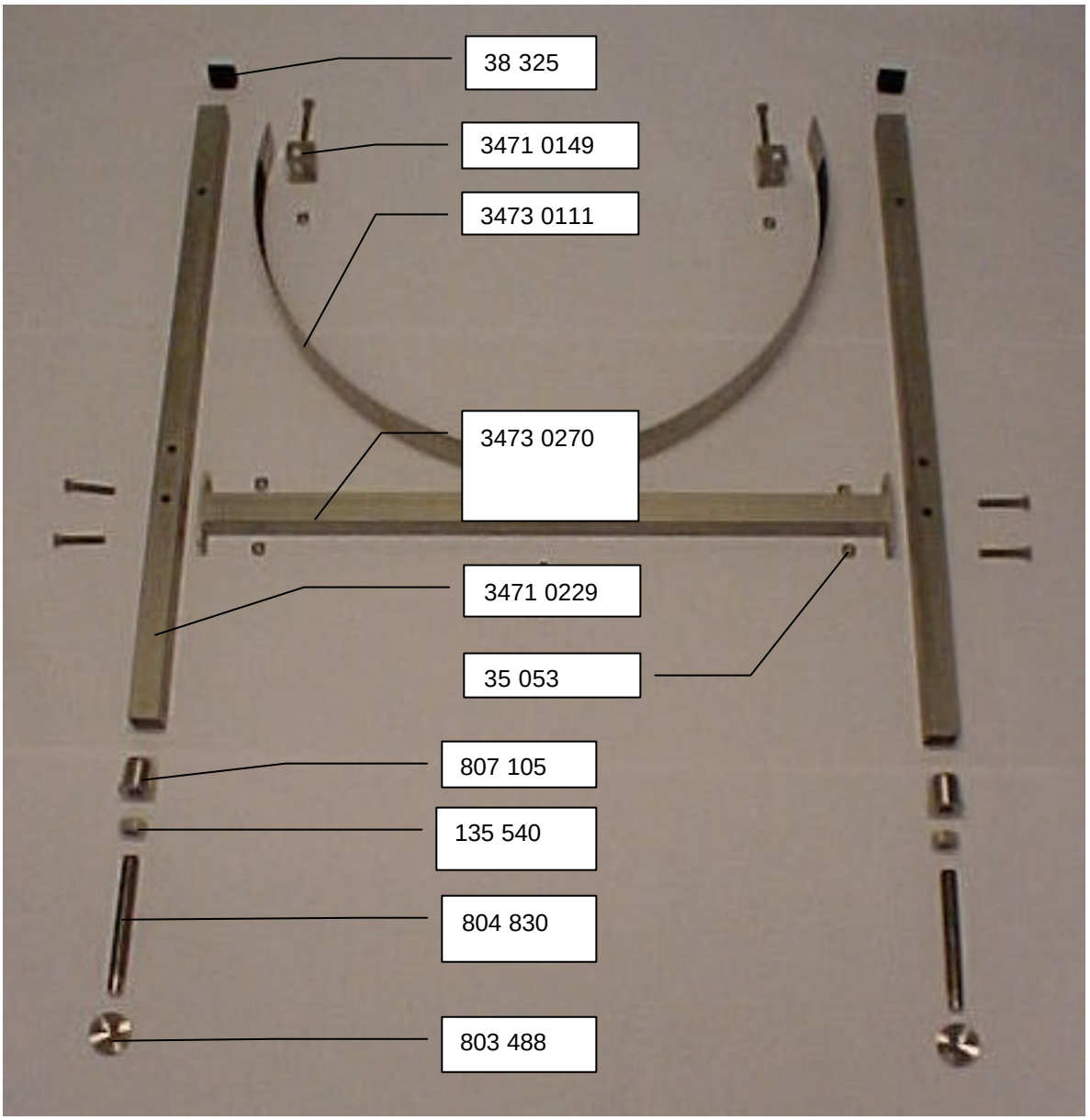


Lateral girders:

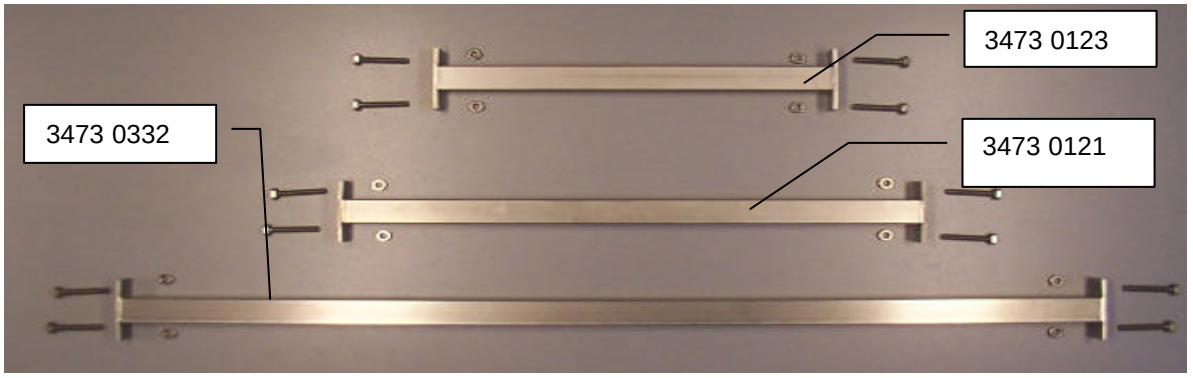


6.14 FRAME BEER TANK SINGLE WALLED (D=790 mm)

500 litre: 3475 0077 1000 litre: 3475 0075

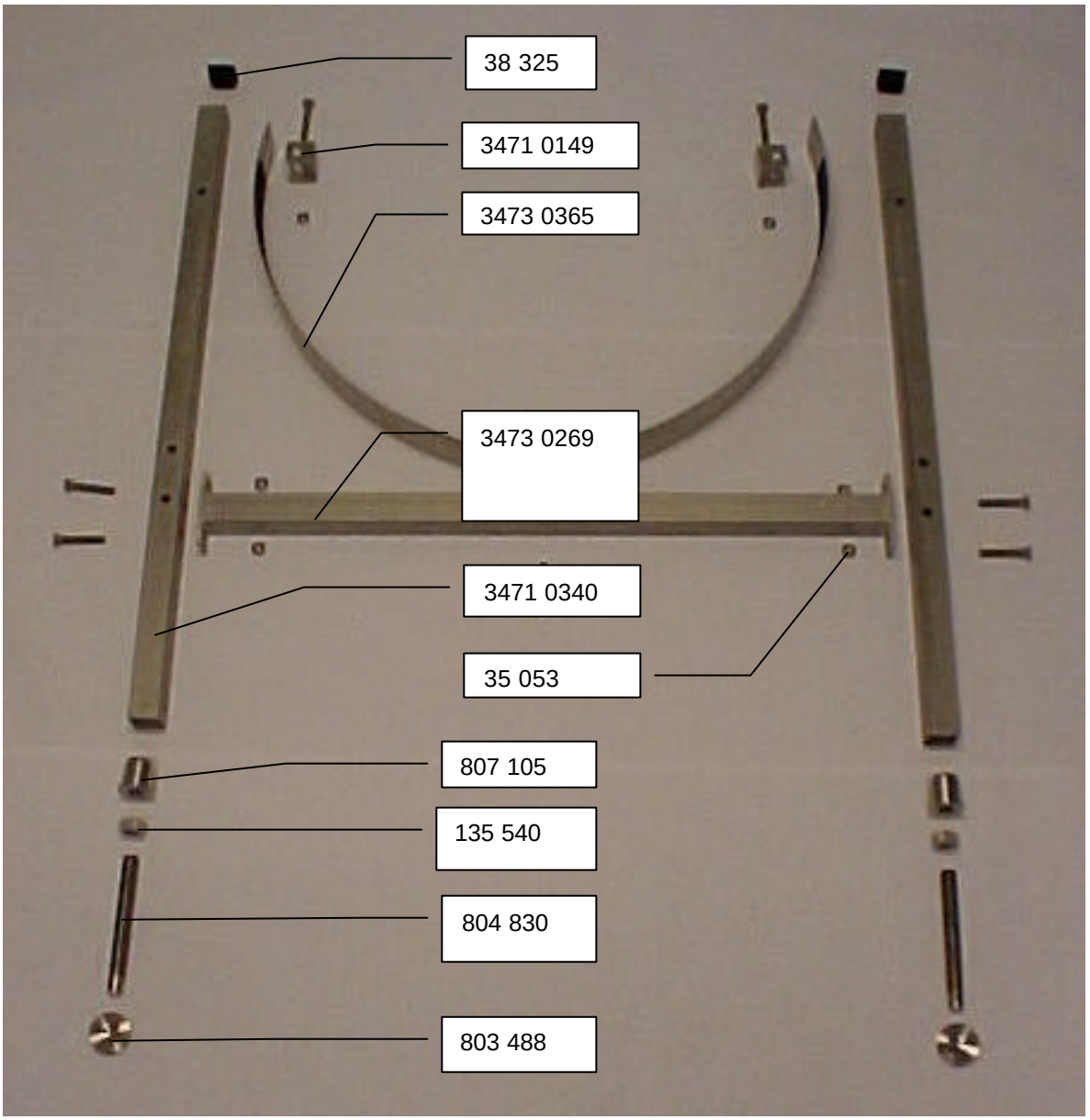


Lateral girders:

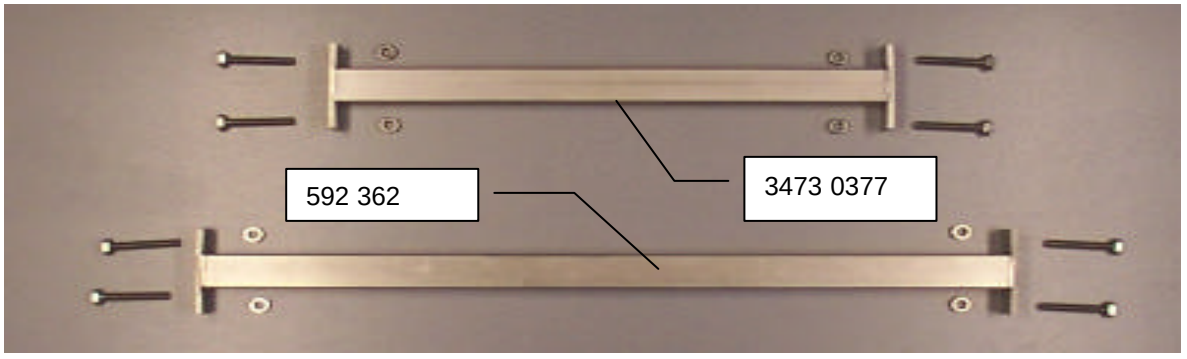


6.15 FRAME BEER TANK DOUBLE WALLED (D=700 mm)

250 litre: 3475 0113 500 litre: 3475 0105

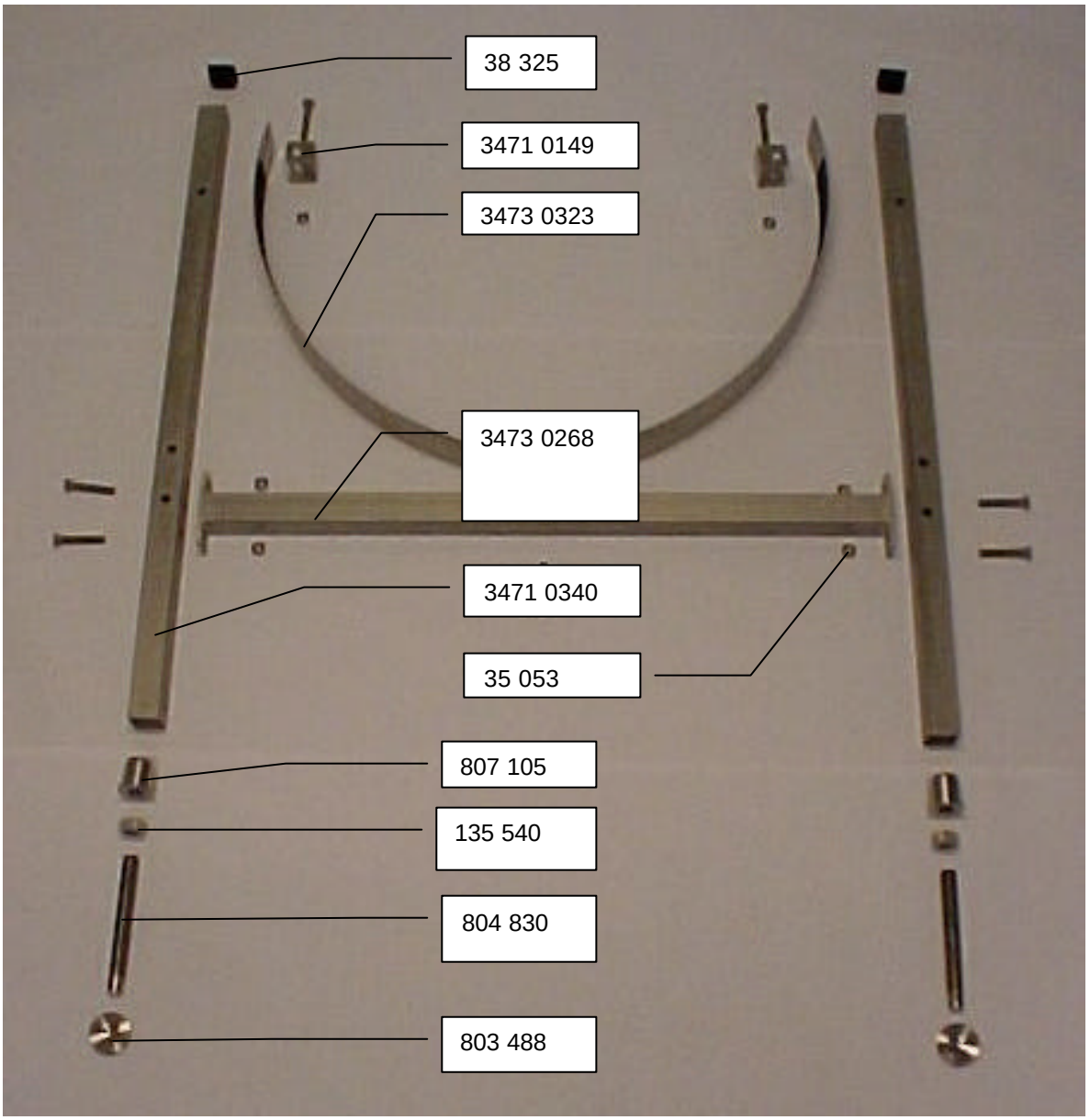


Lateral girders:

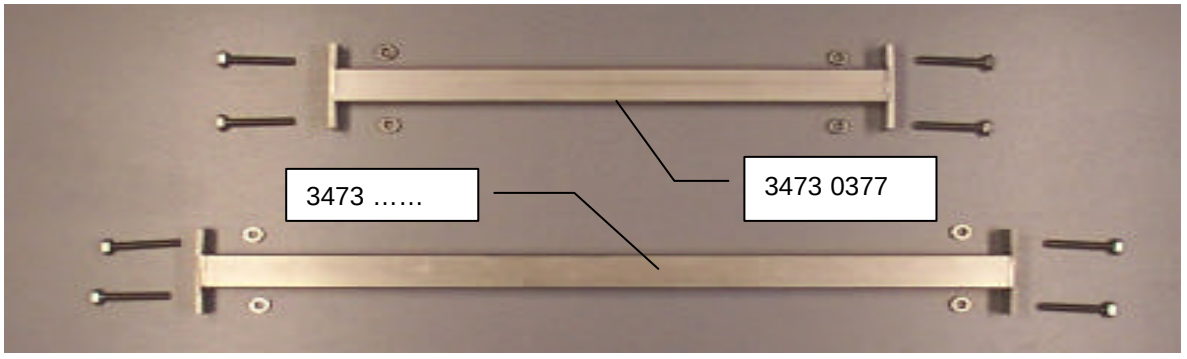


6.16 FRAME BEER TANK SINGLE WALLED (D=630 mm)

250 litre: 3475 0088 500 litre: 3475 0090



Lateral girders:



7.0 FAILURE LIST

Complaint	Cause	Immediate cause	Solution
Tank does not pressurize / pressure decreases	Manhole cover is leaking	Sealing ring broken	Replace ring
		Hand-twining wheel not tightened	Inspect the position of the clamping bar and tighten the hand-twining wheel
	Piercing unit	Coupling nut not tightened	Fix the coupling nut with a hook spanner
	Pressure outlet valve	Outlet valve not closed	Close outlet valve
	CO2 fitting is leaking	Plastic sealing ring is broken	Replace plastic sealing ring
	Sight glass is leaking	Sealing ring is broken	Replace sealing ring
	Safety pressurize fitting dropping too quickly	Safety pressurise valve is broken	Replace safety pressurise fitting
		Safety pressurize valve not well adjusted	Turn out/screw in the safety pressurize valve
Refrigeration is not running	No supply of refrigerant	Valves are still closed	Open valves
		Pump is not running	Turn on pump
No or too little pressure on the tap pipe	CO2 inlet not correct	Pressure to low	Increase pressure
		Compressor is not running	Turn on Compressor
Beer leakage at piercing unit	Piercing unit not well connected	Sealing ring is broken	Replace sealing ring
		Moon shells forgotten	Install moon shells
	Inliner not well connected	Outlet Inliner damaged	Replace Inliner

