Packo

PACKO CATALOGUE 2013
MILK COOLING
EDITION 1

Dear Packo Partner,

With great pride, we present you with our **PACKO 2013 milk cooling catalogue.**

In this bulky update, we focussed on providing very valuable **TECHNICAL** and **COMMERCIAL** information on our cooling tanks, ice builders, cooling units and pasteurizers.

This catalogue can be used by both technical and commercial people as it gives important information on:

- **The Unique Selling Benefits** ('why is our product ideal') of every product, model, etc. to be used in your proposal to the dairy farmer or Dairy
- **Technical information** on installations.
- **Eco-Cool selection list** to make sure to quote the most efficient cooling system.
- Many **pictures** of common and not so common options. A picture says sometimes more than words.

We are confident that this document will help to develop your business, so use it often. As you know, knowledge is power.

Of course, we are available with email, phone or skype if you need any further information. Please do not hesitate to contact us.

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Good luck!
The Packo team

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INTRODUCTION

Packo is considered a pioneer in the field of **MILK COOLING AND PROCESSING**.

For almost 50 years Packo has been producing large numbers of milk cooling tanks, milk collection centres and instant cooling systems, milking machine components, complete mini-dairies and its components: pasteurizers, ice water systems, pumps, etc.

PACKO, a STRONG INTERNATIONAL BRAND:

- Belgian Quality products
- Worldwide experience in Dairy, Food and Pharmaceutical Industries
- Process knowledge in milking, cooling and milk processing
- Strong marketing: 1 group – 1 corporate design
- Large organisation BUT small enough to maintain a close contact between manufacturer and customer
- Satisfied customers & users all over the world
- Flexible product development: wide range of products related to local standards & latest trends

PACKO, your partner in MILK COOLING:

- FULL RANGE of products and options => there is always a solution for all requests and all local circumstances and conditions
- More than 100.000 milk cooling tanks installed worldwide in all climatic conditions
- In house R&D and innovation; continuous investments in laboratory tests
- In house stainless steel sheet laser cutting and welding technology
- Experienced and skilled technical sales team
- Worldwide network of dealers to cover sales and after-sales service
- Using only stainless steel AISI 304 or higher: no aluminium, no carbon steel, no less corrosion-durable stainless steel such as AISI 201
- Certified refrigeration company

The Fullwood Packo Group is also a leading designer, manufacturer and supplier of **MILKING SYSTEMS**. For more information go to www.fullwood.com.

1. MILK COOLING TANKS – GENERAL INFO

Contents

1.1 INTERNATIONAL STANDARDS AND QUALITY LABELS

Certified company

PACKO INOX is *ISO 9001:2008* certified, confirming the good and constantly improving fabrication methods. Independent auditors examine twice yearly the operation methods and the processes by means of specific test cases. Each department of the company is examined.

PACKO INOX is a certified refrigerating company according to EU regulation 303/2008 after a successful audit of AIB-Vinçotte**.**

<u>Important</u>: ALL technicians/companies installing and servicing milk cooling tanks in the EU should be certified according this EU regulation.

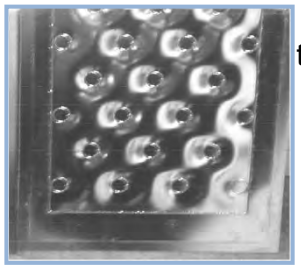
PACKO INOX has a testing area certified by Norme Française according to ***EN 17025***.

High quality products

The PACKO milk cooling tanks are manufactured and are operating according to the applying ***international standards.*** All our products are built according to EN-machine directives.

Both the fabrication method and the finished products are put through different tests and audited by independent and official acknowledged organizations.

The PACKO milk cooling tanks are certified according the ***European standard 1935/2004.*** This guarantees that all parts in contact with the milk are suitable for food. This logo attached is present on each milk cooling tank.



The ***laser welded evaporator*** is the "heart" of the Packo milk cooling tank.
The welds must be perfect and are daily examined and checked according the European standards ***EN1418*** and ***EN 15614.***
All measuring equipment is regularly calibrated by an external certified company.
The quality of the fabricated milk cooling tank also depends on the accuracy of all used tools.

PACKO milk cooling tanks are designed and manufactured according to the ***EN 13732 standard***.
The proof of this is the **NF-** ***KEYMARK label***.
The **NF- Keymark label** is a quality label which proves conformity between products with a high quality standard and the European standards. These recommendations promote performance, efficiency, quality and, if applicable, environmental aspects. With the **Keymark label**, PACKO shows that their products are reliable and safe. It confirms the well functioning of our system for quality management. To comply with this quality there is a yearly external audit of the quality system and the fabrication process whereby all products are inspected on their **performance**, such as e.g. *cooling time, energy consumption and isothermy (insulation value)*. The *cleaning, agitation*, overall *construction* and *sound level* are also being evaluated.

Additionally all our milk cooling tanks meet different **country specific demands**, example the *NZO* (Dutch Dairy Organisation) has certified the *Packo vertical milk cooling tank* and the French *DRIRE-LNE* confirms the *stability* of our milk cooling tanks.

High level of education

PACKO INOX is *ESF* certified:
This label, distributed by the Flemish Agency ESF, states that the company guarantees the maximum quality in their services in the area of education, work experience and employment which should result in the reinforcement of the job market policy.

1.2 PERFORMANCE CLASSES

According to EN13732:

The performance of a tank shall be specified according to the classification given in Tables 1 and 2, based on batch filling.

Classification according to number of milkings

The numeral **«2»** shall designate a tank for two milkings.
The tank is full after 2 milkings or 50% of the tank volume after 1 milking.

The numeral **«4»** shall designate a tank for four milkings.
The tank is full after 4 milkings or 25% of the tank volume after 1 milking.

The numeral **«6»** shall designate a tank for six milkings.
The tank is full after 6 milkings or 16.66% of the tank volume after 1 milking.

Classification according to the ambient temperature – table 1

Classification	Performance ambient temperature
A	38 °C
B	**32 °C**
C	25 °C

Classification according to the milk cooling time – table 2

Classification	Cooling time for ALL milkings from 35°C to 4°C
0	2 hours
I	2.5 hours
II	**3 hours**
III	3.5 hours

Example:

A milk cooling tank 15 000 litres - class 6BII is suitable for the cooling of:

- **2500 litres** of milk per milking (=15000 Litres / **6 milkings**)
- at an ambient temperature of **32°C (=B)**
- from 35 to 4 °C within **3 hours (=II)**

IMPORTANT:

☞ **This classification is only applicable on the milk cooling tanks supplied with the Packo Eco-Cool cooling unit size as mentioned in the selection list (see chapter Eco-Cool cooling unit).**

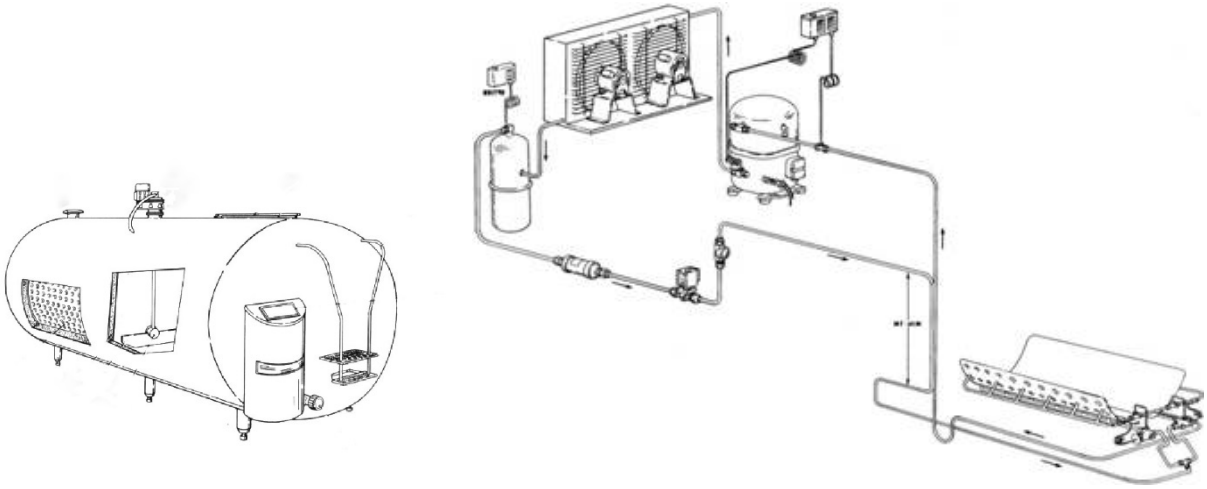
1.3 COOLING SYSTEMS

Direct expansion (DX)

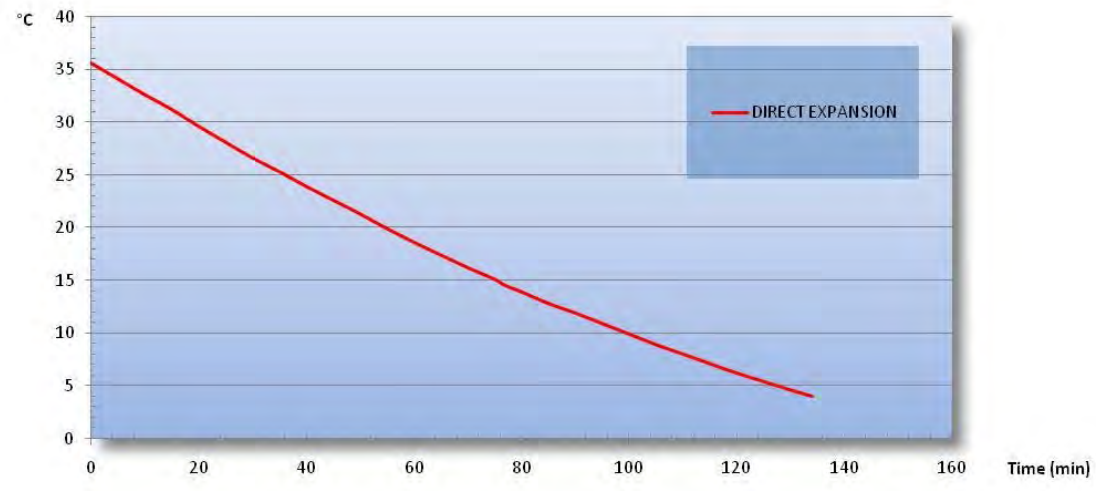
With the **direct expansion** technique the milk is cooled by passing cooling agent through the evaporator which is in direct contact with the milk.
The economic construction with the laser-welded, multi-injection evaporator guarantees a *quick, efficient and trouble-free cooling* and space saving installation.

Thanks to the free evaporation and proper agitation of the milk, the heat exchange is optimal, a high cooling capacity is guaranteed and freezing is prevented, even for relatively small amounts of milk:

- **traditional milking**: delayed start on the Eco-Cool cooling unit; once the 10% volume of the tank is reached, the cooling unit operates continuously at 100%
- **robotic milking or seasonal fluctuations**:
  - if volume < 10%: Soft Start Cooling (SSC) is required: the Eco-Cool cooling unit operates in intervals at 100%
  - if volume > 10%: the Eco-Cool cooling unit operates continuously at 100%



Example cooling graph - DX



(based on an ambient temperature of 32°C)

Ice bank system (IB & DIB)

This unique cooling system was invented (pioneered) by Packo and is the best cooling system in relation to maintain the quality of the milk.

Thanks to the temperature of the ice water of 0.5-1°C, there is no risk of freezing the milk and thanks to the accumulation of energy over several hours, smaller cooling units can be used.

So this system is preferable for cooling:

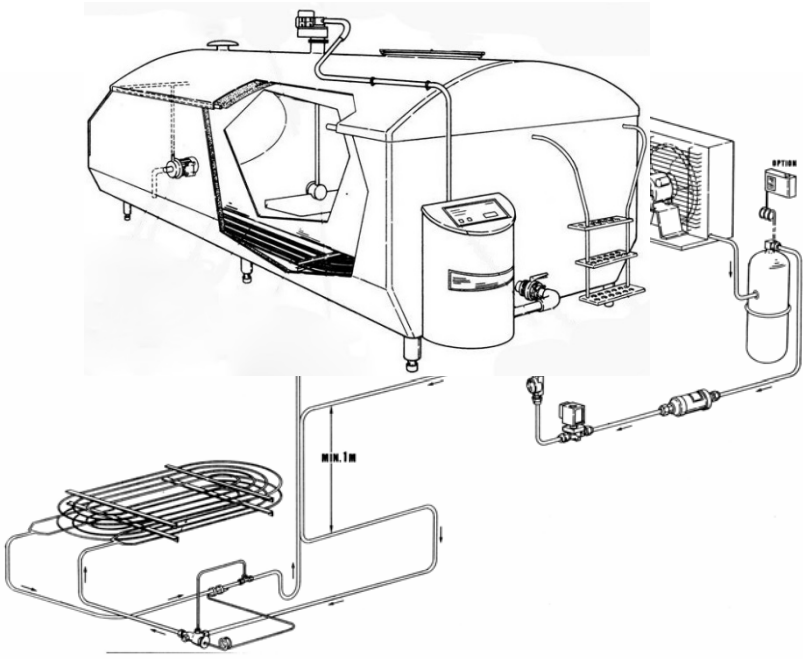
- in milk collection centres
- in combination with robotic milking
- in case of seasonal fluctuations (e.g. goats 'milk).
- on farms with lower amperage electricity supply

Milk cooling with **ice water** has **important advantages** compared to conventional cooling techniques:

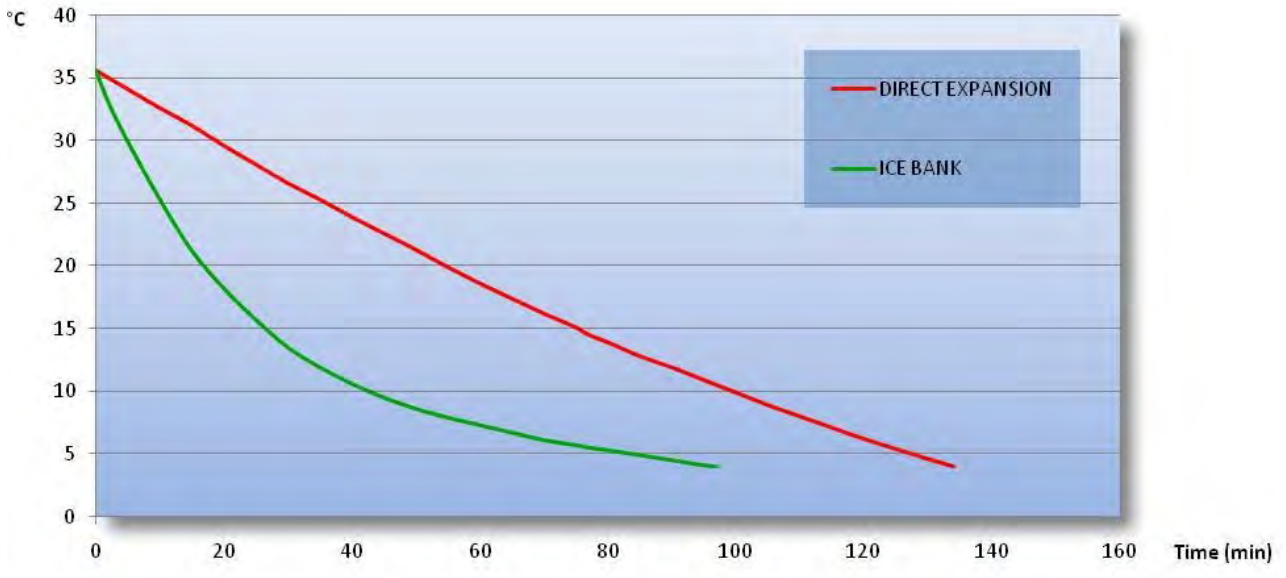
- The cooling from 35 to 10 °C occurs 50% faster compared with DX.
- The ice water intensively cools the milk without any risk of freezing, even with only small volumes of milk in the tank.
- A relatively large amount of energy can be applied at any time. This enables a fluent procedure when cooling activity is in full swing and preserves the balance when it decreases.
- Cooling medium (ice) is available at the start of milking => lower power requirements during milking
- The ice supply can be replenished for hours and by means of relatively small compressors. The electrical power requirement is low.
- Cheap night rates electricity turns the installation into an even more economical system (ideal with the arrival of smart metering systems).
- Easier cleaning of the tank: no drying out of milk residues
- Milk can be collected during milking when using instant cooling

Ice water system with an integrated ice bank (IB-system)

Ice water, provided from an **integrated ice bank system** is used as cooling agent; it is sprayed along the outside of the inner tank containing the milk.



Example cooling graph – IB



(based on an ambient temperature of 32°C)

Ice water system with separate Ice Builder (DIB-system)

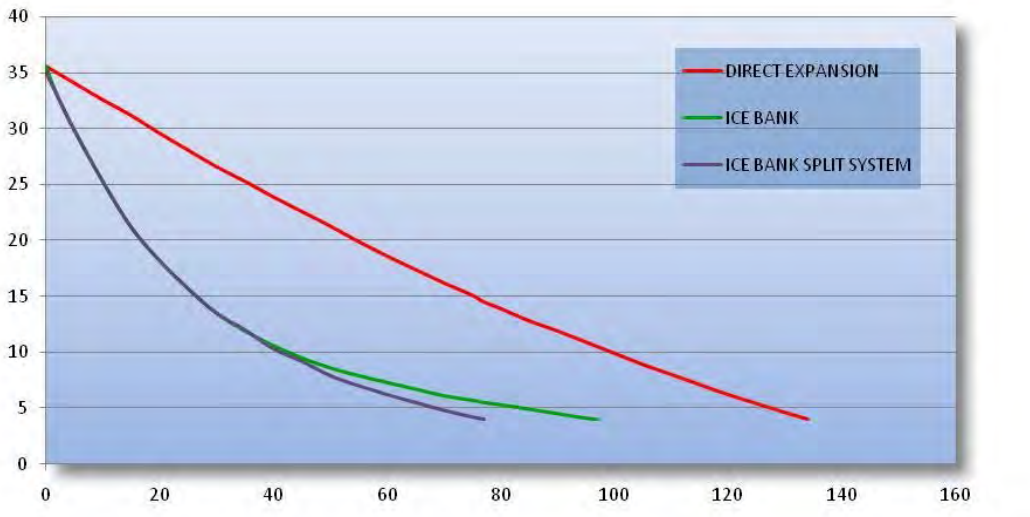
Ice water, provided from an (external) **ice builder** is pumped through a heat exchanger on the outside of the inner tank containing the milk.

Milk cooling with ice water from a separate ice builder has the same advantages as with the “normal” ice bank tanks (*see previous page*).

Extra advantages are:

- The cooling graph is the same as the one for IB down to 10 °C, below that temperature the milk is cooled even faster.
- The DIB tank can be chosen in function of volume of milk, independent from number of milkings.
- The ice capacity can be calculated depending on the circumstances (only ice building during the night or pre-cooling is a possibility).

Example cooling graph - DIB



(based on an ambient temperature of 32°C)

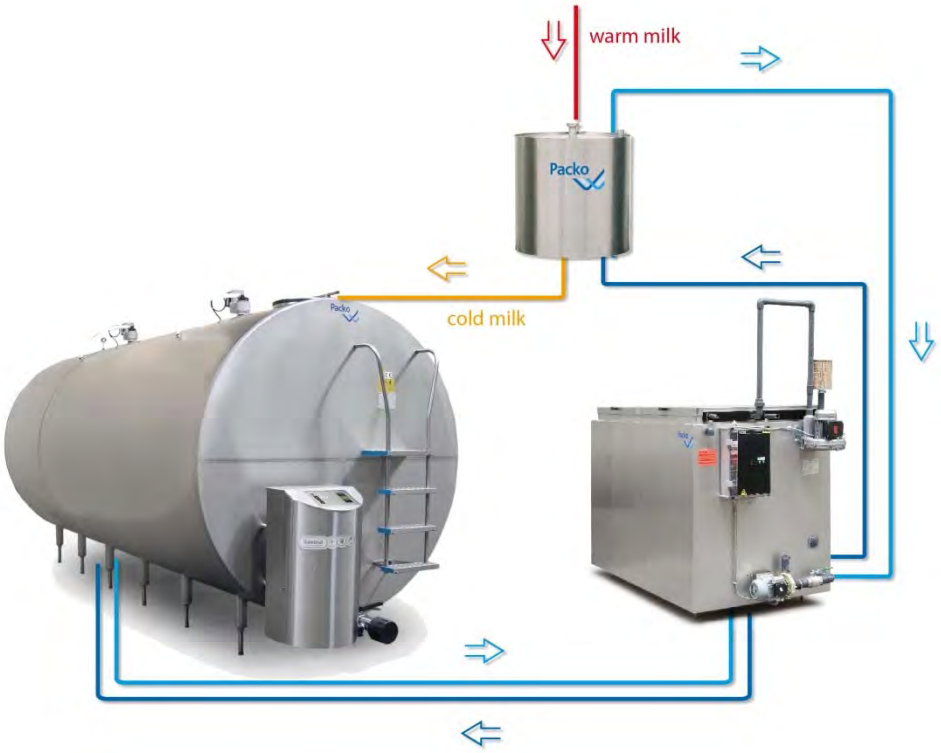
Instant cooling with ice water and tubular cooler

Ice water, provided from an **ice bank tank** (IB) or from an **ice builder (PIB)** is pumped through a tubular cooler (or plate heat exchanger) in counter flow with the milk coming from the milking parlour.

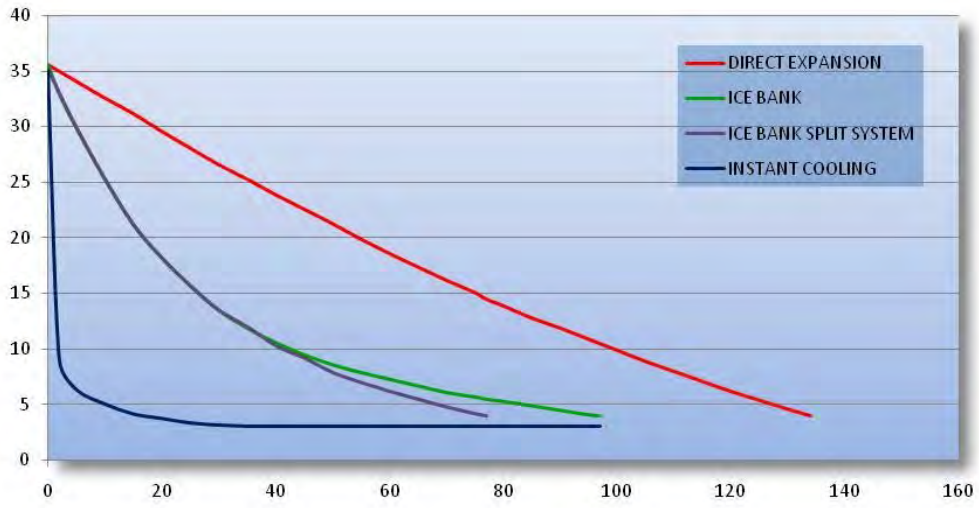
Applying **instant cooling** gives an immediate temperature drop to the milk.

Extra advantages are:

- The milk is cooled immediately below the critical limit of 10°C with ice water. The bacterial growth is halted at once.
- Low blend temperature during subsequent milkings. Less chance of bacterial growth.



Example cooling graph – instant cooling



(based on an ambient temperature of 32°C)

Milk cooling in combination with Automatic Milking Systems (Robotic milking)

Automatic Milking Systems (Robotic milking) are nowadays becoming more popular.

With this type of milking, the cows are milked during ± 20 hours per day. For this reason, the milk cooling tank has to be designed to cool down the milk from 35°C to 3-4°C continuously over these 20 hours and not in 2 periods (batch cooling).

Of course all our tanks with **ice water** (RM/IB, REM/DIB, LEM-LS/DIB and VM/DIB) are **ideal for robotic milking**!
If a client does not have the possibility to install an ice bank system, then a direct expansion system designed with the correct evaporator and cooling unit will cool the milk well.
Therefore, we developed the **DX milk cooling tank range for robotic milking systems**!

The **advantages** for the farmer are:

- Lower investment thanks to the use of a small cooling unit
- With pre-cooling (tubular cooler) even smaller cooling units are possible because of the specially designed evaporator
- Less risk of freezing thanks to the correct dimensioned evaporator jacket. Soft Start Cooling is still necessary.

1.4 CLEANING SYSTEMS

Introduction

The U-shape of horizontal **open tanks** allows very easy **manual cleaning**.
Optional it is possible to have an automatic cleaning on open tanks *(see options for open tanks)* .
Closed tanks are always equipped with an **automatic cleaning system**.

In any cleaning operation there are always 4 factors which are important and which together can produce a good result, namely:

- Mechanical impact: spraying water onto the inner tank wall via a pump through a spray ball
- Chemical effect: adding a cleaning agent and/or disinfectant to the water through a dosing system.
- Temperature: a warm water connection with water of the required temperature (boiler or heating element); minimum cleaning temperature based on the type of cleaning agent in order to have the best result.
- Time: the cleaning cycle runs with a time-controlled program in case of closed tanks (PCV3 or iControl) = minimum cleaning time based on the type of cleaning agent in order to have a correct result.

Sinner's circle

Cleaning programmes

Standard cleaning programme (circulation of cleaning water) – 5 steps**:**

1. *Cold pre-rinsing*: to remove milk residues
2. *Warm pre-rinsing*: to remove the last milk residues and to heat up the tank
3. *Main cleaning*: with warm water and detergent
4. *After rinsing*: with cold water to remove the residue of cleaning media
5. *Final rinsing*: with cold water to remove last residues

The quantity of cleaning water for each step is standard 1% of the tank volume, but deviations can be made according to the size of the milk cooling tank.

ECO-WASH cleaning (flush through system)

The cold water cycles are done with a limited cold water quantity coming from a buffer tank with float valve. This buffer tank is situated behind the tank control unit.

The warm water remains at standard 1% of the tank volume, but deviations can be made according to the size of the milk cooling tank.

The complete ECO-WASH cleaning takes up to half the time of the standard cleaning, resulting in serious water- and energy savings.

Program ECO-WASH:

1. *Cold pre-rinsing*: flush of 20-25 Litres with cold water to remove milk residues
2. *Cold pre-rinsing*: flush of 20-25 Litres with cold water to remove milk residues
3. *Warm rinsing*: 1% of the tank volume with hot water to remove last milk residues and to heat up the tank
4. *Main cleaning*: 1% of the tank volume with hot water and detergent
5. *Cold after rinsing*: flush of 20-25 Litres with cold water to remove the residues of cleaning media
6. *Cold after rinsing*: flush of 20-25 Litres with cold water to remove the residues of cleaning media

Remarks:

- Cleaning cycle will be adjusted to the size of the tank, e.g. the number of pre-rinsing and after rinsing or the amount of water.

  Examples of amount of warm water:

Tank Volume	Filling % HOT water
< 7.000	2 x 1%
7.000 – 15.000 L*	2 x 0,9%
≥ 18.000 L*	2 x 0,7%

  *If the cleaning result is not satisfactory, the amount of warm water should be increased again to 1% each step.

- At the end of each cleaning cycle, the waste water is removed through a drain valve. In some countries it is necessary to evacuate the first pre-rinsing water separately (high percentage of milk residue). *See the option "Eco-drain" in the tanks option lists.*

Packo cleaning system for closed HORIZONTAL tanks – ROTOJET

- Unique rotating ROTOJET spraying system
- Invented by Packo
- Spray ball(s) integrated in agitator blade, centrally located
- Foreseen with grooves => no blockage possible
- The bigger the tank, the more ROTOJETs are mounted
- Turns with agitator motor => less pressure drop => higher flow inside the tank
- Independent from the water pressure
- Agitator paddles are electro polished => smoother surface = better cleaning and more resistant against corrosion of acids
- High impact cleaning pump
- Filling of water on volume

Remark: the cleaning of the TRT (portable tanks) is executed with separate spray ball(s) and an external pressure line

Agitator motor with water coupling - ROTOJETs in agitator blade

Packo cleaning system for VERTICAL tanks

The cleaning of a vertical tank is done by means of ***2 rotating industrial spray balls*** at different level:

- Filling of wash water via volume
- Very powerful rotating spraying balls which are standard used in the food industries
- The spray balls are mounted on a different level *(see picture)*
- Spraying tube not close to the wall, so self-cleaning

Rotating spray balls on different levels

1.5 INSTALLATION REQUIREMENTS

Dairy

- The tank must be placed in a **frost-free** area.
- Put the tank (together with the base plates) on a **sturdy and hard ground** (concrete or tiles), which can take a pressure of 12 N/mm² minimum.
- Make sure the floor has a **slight slope** so no water can stay underneath the milk tank.
- There must be sufficient **lighting** in the dairy.
- Provide sufficient **ventilation** of fresh air in the dairy. The air in stables where animals are kept can contain large quantities of chlorides and ammonia and must be sealed away from the dairy room. So **separate the stables** from the ventilated dairy by a wall or a **closed** door.
- Preferably place the tank with the **outlet towards a door opening** to facilitate milk collection.
- If necessary, you should install a ladder or platform in order to let the installer have access to the milk entry point without risk.
  ☞ *Standard all our closed horizontal tanks (from 2100 L onwards) are equipped with a ladder. If required, a ladder can be mounted on vertical tanks also (option).*

Measurements Dairy

- In order to make regular outside cleaning possible of the tank, keep at least 0.6 meters around the tank free (including e.g. steps, control panel, built on cooling unit,…).
- The recommended distance between the ceiling and the top step of the tank should be minimum 2 metres. This gives enough space for a person entering a tank enough and additionally for air ventilation above and around the tank.
- Preferably, the door should be 20% wider than the maximum width of the milk cooling tank.
- Look for a place to store the cleaning products where they do not block the passage ways. Place the cleaning products at a distance from the tank.

Water supply

Water should be potable *(see also the installation manual)**

☞ **All modifications required to make the water "potable" and to comply with all regulations, are to be born by the customer.*

- Pipe diameter of cold and hot water should be **¾" until connection of tank**.
- Size of the **boiler** should be **minimum 120%** of total warm water used to clean the tank.

standard cleaning		**Eco-Wash**	
horizontal tank	vertical tank	horizontal tank	vertical tank
warm water of min. 60-65°C		warm water of min. 60-65°C	warm water of min. 75°C

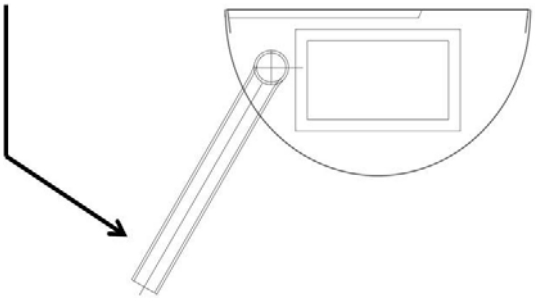
Examples:

- 10000 litres REM tank (10000 x 2 x 1%) x 1.2 -> minimum 240 litres water of 60-65°C is required.
- 25000 litres VM tank (25000 x 2 x 0.7%*) x 1.2 -> minimum 420 litres water of 75°C is required

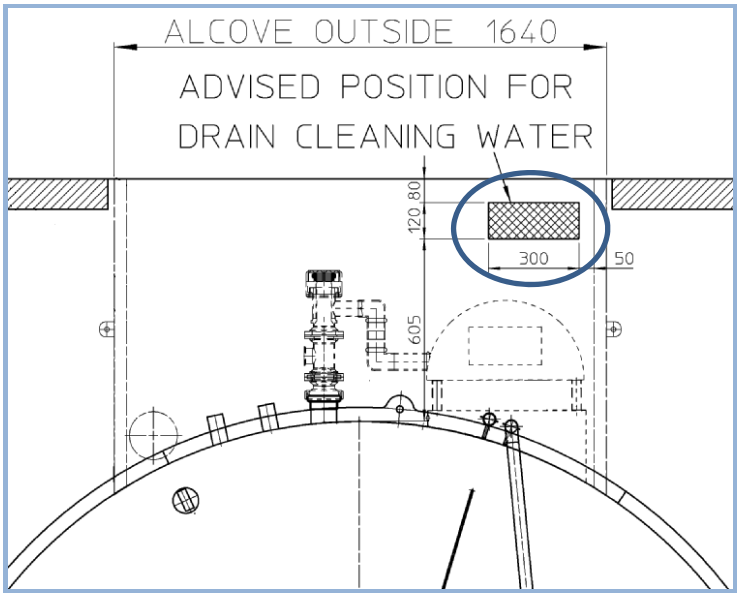
Always consult the information mentioned on the cleaning products containers.

Drain(s)

- A drain should be installed at the side of the milk outlet. Be sure the drain is NOT underneath the tank or the control panel.
- Be sure there are no other drains or drain gutters underneath the tank or the control panel. The fumes evaporating from those drains and drain gutters are very aggressive and could cause corrosion to the installation.
- The rubber elbow on the drain valve outlet points away from the tank and cleaning unit and points towards the drain.



- For vertical tanks (VM) with alcove, this is the advised place for the drain:



Cooling Unit

- Distance between compressor and tank < 10 m (tube length) if not contact Packo
- The cooling unit may be placed both inside and outside. In any case, sufficient air circulation must be provided.
- Make sure there's enough air flow for the fans: do not install the cooling unit in a closed room
- It must be **impossible** for the cooling unit to suck in the exhaust gases of a vacuum pump of the milking machine.
- In cold weather, the front of the condenser may be partly covered. If the condenser is in a place where the temperature is always below 5°C.

  ☞ *You should also implement the option for cooling units in low ambient temperatures.*

Condenser in opening of wall:

If the cooling unit is placed in front of an opening in the wall, the following measures have to be taken:

- The wall in front of the condenser must have an opening at least as large as the condenser itself.
- In the wall opposite to the condenser, a ventilation opening has to be foreseen. This opening in the wall has to have the same or bigger size than the opening in the wall were the condenser is placed.

1.6 INSTALLATION BASICS

1.6.1 General

- Check if the delivery is complete.
- Check if the delivery is conform the order.

In case of remarks, contact Packo Inox.

1.6.2 Area

- Water supply min. ¾" piping

For inside installation:

- Installation in a frost-free area
- Enough ventilation and light

Remark:
If in an area ≤ 1 km distant from the coast side, the tank will be installed *outside* or in an *almost open building*, it is recommended to foresee the outer parts of the tank in AISI316 stainless steel.

☞ In this case, contact Packo Inox.

1.6.3 Drain

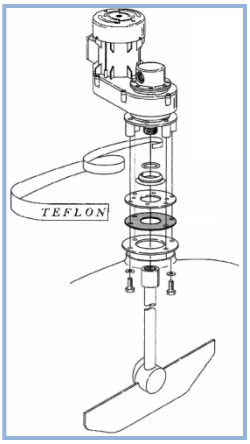
- Drain should be underneath milk outlet
- Drain should not be under tank or control panel

1.6.4 Levelling of the tank

- Level the tank (see measurement table in the installation manual)
- Use the ground plates underneath the legs
- Screw ALL the legs to the ground plates

1.6.5 Positioning of the agitator motor(s)

- If there is no available space above the tank, place the agitator blade inside the tank before putting the tank in place in the dairy
- Agitator motor threads : do not forget the Teflon tape



1.6.6 Positioning of the cooling unit(s)

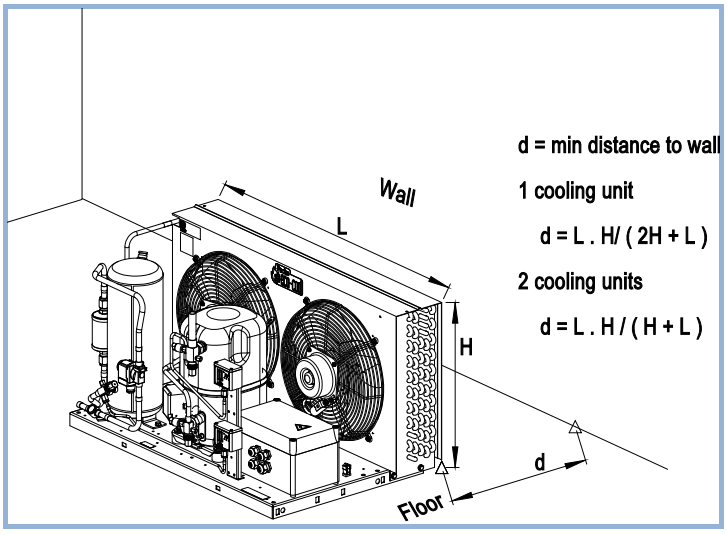
- If the cooling unit is placed in front of a closed wall, the following measures have to be taken:

  Keep a free area between the wall and the condenser equal to the following formula:

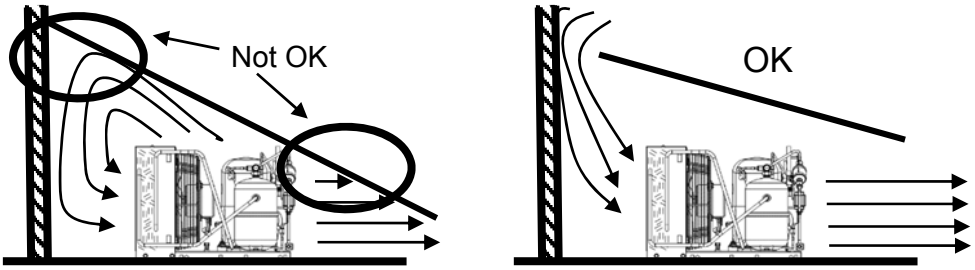
  ☞ For 1 cooling unit: $\frac{L \times H}{2 \times H + L}$

  ☞ For 2 cooling units: $\frac{L \times H}{H + L}$

  L = length, H = height of the condensing unit

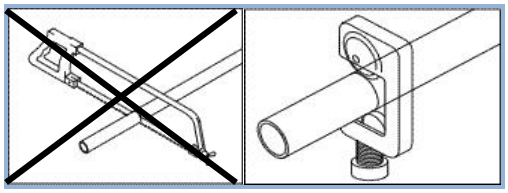


- Make sure there's enough air flow for the fans. Do not put the cooling unit(s) in a closed room.

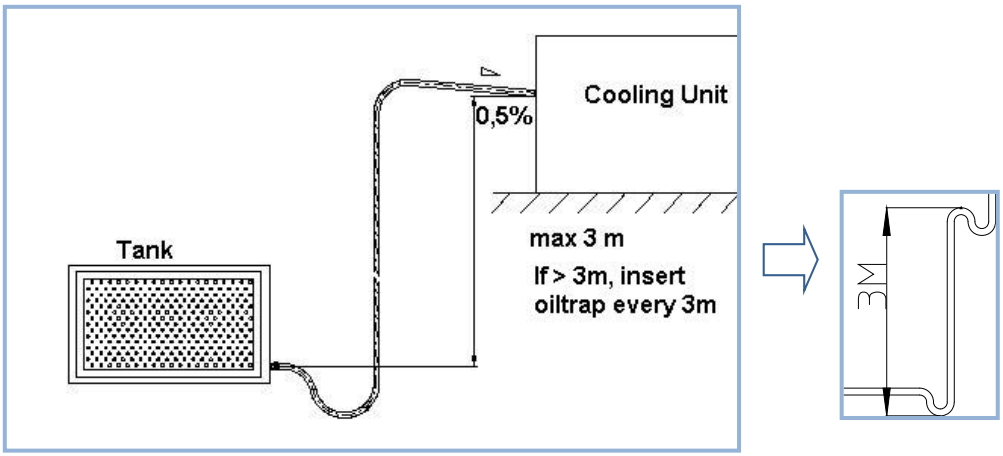


1.6.7 Installation of the cooling unit(s)

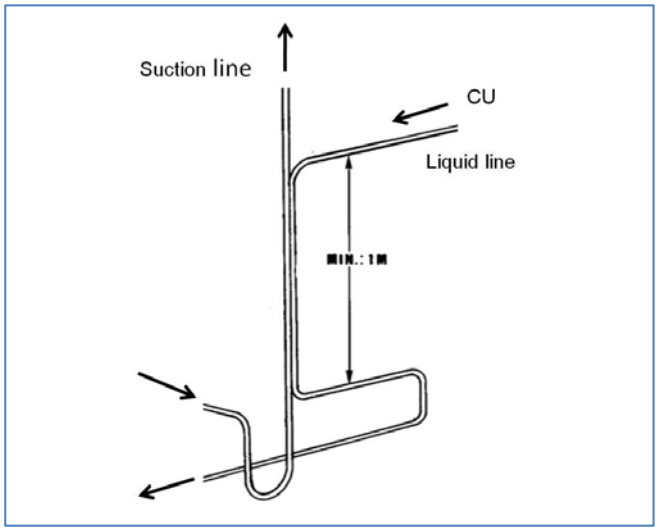
- The cooling unit and the tank must be delivered under nitrogen pressure, if not check for leaks.
- The pipe diameters depend on the type and size of the cooling unit(s)
- Use dehydrated copper pipes
- Distance between compressor and tank < 10 m (tube length) if not contact Packo
- Avoid getting moisture and dirt in the pipes
- Cut the pipes, don't saw



- Blow N_2 through the pipe while welding



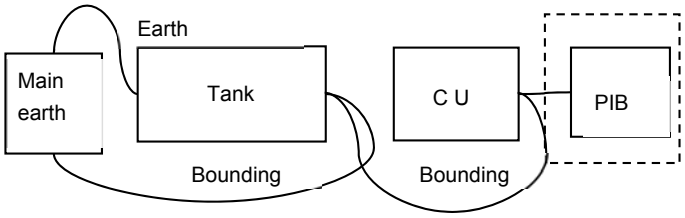
- Make a heat-exchanger: put liquid-line against suction-line for 1 m

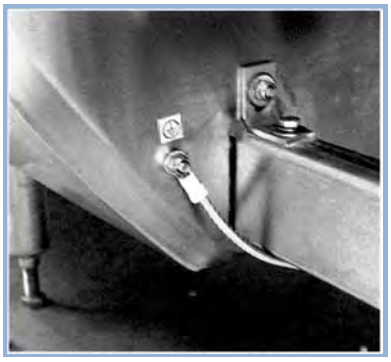


- Vacuum the system fully for at least 1 hour
- Put the system under pressure with the right type and amount of refrigerant

1.6.8 Electrical connection

- Follow the diagrams delivered with the tank.
- Check the electrical contacts to make sure they're tightened securely (no loose contacts)
- Differential cut-out max 30 mA
- Main switch: lockable in the off-position
- Earth resistance ≤ 5 Ohm
- Earth and bounding wire-diameter min. 6mm²





DO NOT connect the bonding to the earth terminal strip in the electrical panel

1.6.9 Commissioning

- Check the parameters: use parameter list delivered with tank
- Cooling test: fill in the test results on the commissioning form
- Cleaning test:
    - Check the clean water volume
    - Check the drain times

2 OPEN MILK COOLING TANKS

Contents

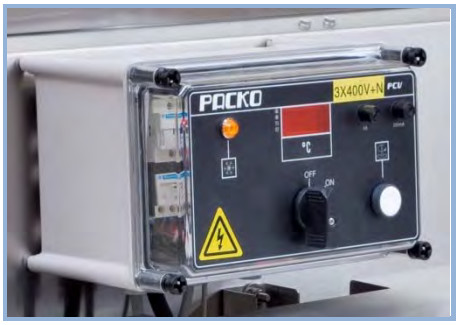
2.1 CONTROL UNITS for OPEN TANKS

The control unit for an open tank has to keep the milk temperature as accurate as possible at a temperature below 4 °C. The homogeneity of the milk is guaranteed by a time controlled agitation at regular intervals.

PCV2-2

Standard large electrical box includes:

- Electronic unit with digital display (temperature indication)
- Fuse to protect electronics
- Well dimensioned switch for operation of the different functions
- Relays and thermal protection for cooling unit
- Push button or selector switch for manual agitation
- Several control LED's for indication of active functions
- Display to indicate error



(1)

(2)

PCV2-2 control unit for OM/DX (1) and for OM/IB (2)

2.2 OPEN model with direct expansion

2.2.1 OM/DX – open model with direct expansion

☞ **<u>Volume</u>: 300 - 3400 Litres**

Milk cooling tank OM/DX

Characteristics tank

- Horizontal **U-shape tank** with large **laser welded evaporator** and efficient circulation of the milk guarantees **maximum cooling performance**
- The cooling tank is designed, manufactured and tested according to international standards and is **conform EN 13732**
- **Space-saving, ergonomic design, easy to clean**
- **Fully constructed of stainless steel 18/10** – AISI 304, hermetically sealed, finished and well polished
- Chassis with **solid leg construction and adjustable feet**
- One-piece cover mounted on pneumatic springs, allowing **easy and safe opening and closing:** for human safety, the agitator motor stops automatically when lifting the cover
- **CFC-free** polyurethane foam **insulation**
- Standard NW 50 outlet with drain plug

Tank control and display

- All electrical tank components 1 ~ 230V – 50Hz (other voltages / frequencies on request)
- Water tight switchbox with well dimensioned ON/OFF switch and controls for the cooling unit
- Milk temperature control with electronic operating unit PCV2-2
- Digital temperature indication with large LED display

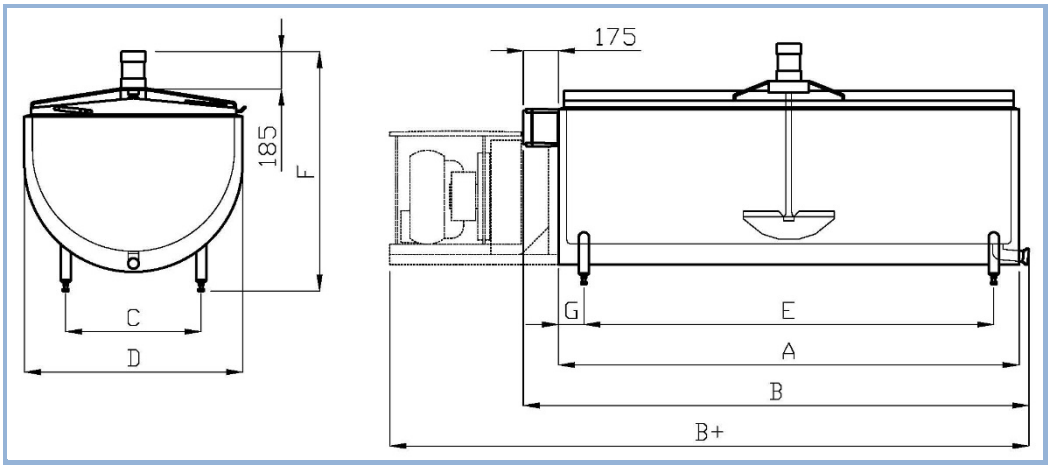
Cooling and agitation

- Thanks to the free evaporation and proper mixing of the milk, the **heat exchange is optimal**
- Special evaporator design enables **optimal heat transfer**, a **high cooling capacity** is guaranteed
- **Efficient agitator** mixes even small quantities of milk
- Cooling pipes pre-mounted with thermostatic expansion valve(s)
- Cooling unit delivered separately or integrated

Cleaning

- The U-shape allows **easy but thorough cleaning** with a minimum of effort

Dimensions milk cooling tank OM/DX



Model	Max. cap.	A	B	B+	C	D	E	F	G	Agitator	Legs	Weight
	Litres	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*Quantity*	*Quantity*	*kg*
300	318	804	1067	1296	580	880	555	1115-1155	125	1	4	120
450	476	1177	1440	1670	580	880	928	1115-1155	125	1	4	136
600	635	1527	1790	2289	580	880	1279	1115-1155	125	1	4	156
800	843	1578	1841	2070	670	1080	1328	1145-1185	125	1	4	184
1000	1054	1928	2191	2420	670	1080	1678	1145-1185	125	1	4	210
1200	1264	2278	2541	2770	670	1080	2028	1145-1185	125	1	4	230
1500	1617	1943	2206	2410/2803*	800	1441	1668	1272-1392	138	1	4	260
1800	1930	2327	2590	3362	800	1441	2052	1272-1392	138	1	4	290
2300	2385	2676	2939	3711	800	1441	2401	1325-1445	138	1	6	330
2750	2875	3250	3505	4055	800	1441	2 x 1449,5	1325-1445	139,5	2	6	415
3400	3520	3250	3505	4055	800	1441	2 x 1451	1430-1550	138	2	6	447

*4/2 milkings
☞Available in 2 & 4 milkings
☞B+ = with built on cooling unit

2.2.2 OM/IB – open model with ice water cooling

☞ **<u>Volume</u>: 600 - 2300 Litres**

Milk cooling tank OM/IB

Characteristics tank

- Horizontal **U-shape tank** guarantees **maximum cooling performance**
- The cooling tank is designed, manufactured and tested according to international standards and is **conform EN 13732**
- Evaporator coils in the ice bank are made of copper tubing
- **Space-saving, ergonomic design, easy to clean**
- **Fully constructed of stainless steel 18/10** – AISI 304, hermetically sealed, finished and well polished
- Chassis with **solid leg construction and adjustable feet**
- One-piece (up to 1800 L) cover mounted on pneumatic springs, allowing **easy and safe opening and closing**
- **CFC free** polyurethane foam **insulation**
- Standard NW 50 outlet with drain plug

Tank control and display

- All electrical tank components 1 ~ 230V – 50Hz (other voltages / frequencies on request)
- Water tight switch box with well dimensioned ON/OFF switch and controls for the cooling unit
- Milk temperature control with electronic operating unit PCV2-2
- Digital temperature indication with large LED display

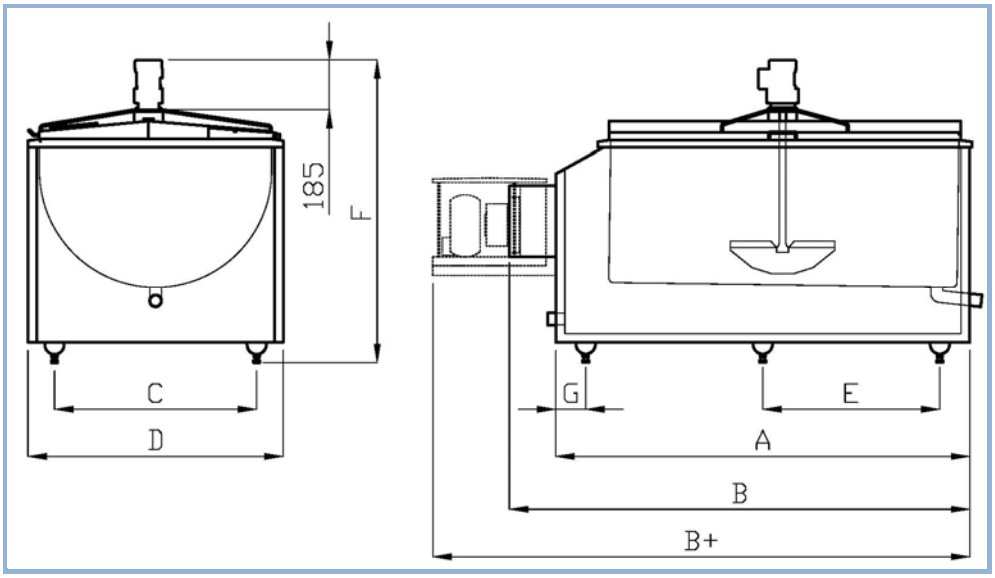
Cooling and agitation

- As ice water is used as a cooling agent, it is impossible for even the smallest quantities of milk to freeze
- The continuous cold water supply in the ice bank means that the **time required** to cool down from 35°C to 10°C is approximately **50 % less** compared to direct expansion
- Ice water pump mounted on the tank for the ice water circulation: internal ≤ 1.200 L, external ≥ 1.500 L tank
- **Energy and money saving by using off-peak electricity during the night**, in addition low power demand of the cooling unit
  ☞ *option: time clock*
- Thanks to the free evaporation and proper mixing of the milk, the **heat exchange is optimal**
- **Efficient agitator** mixes even small quantities of milk
- Cooling pipes pre-mounted with thermostatic expansion valve(s)
- Cooling unit delivered separately or integrated

Cleaning

- The U-shape allows **easy but thorough cleaning** with a minimum of effort
- The vessel always remains moist inside thanks to the ice water spraying on the sides of the milk tank; this allows easier cleaning of the vessel

Dimensions milk cooling tank OM/IB



Model	Max. cap.	A	B	B+	C	D	E	F	G	Legs	Weight
	Litres	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*Quantity*	*kg*
600	633	1382	1632	1972	870	1098	1124	1250-1300	129	4	192
800	845	1782	2032	2372	870	1098	1524	1250-1300	129	4	242
1000	1055	2132	2382	2722	870	1098	1874	1250-1300	129	4	270
1200	1265	2482	2732	3072	870	1098	1112	1250-1300	129	6	300
1500	1585	2152	2402	-	1238	1461	965	1380-1430	111	6	327
1800	1885	2532	2782	-	1238	1461	1155	1380-1430	111	6	395
2300	2398	2882	3132	-	1238	1461	1330	1380-1430	111	6	490

☞ Available in 2 & 4 milkings
☞ B+ = with built on cooling unit

2.3 Options for OPEN model milk cooling tanks

2.3.1 Individual calibration of the tank

In many countries the payment for the milk is based on the measurement of the milk quantity in the tank.

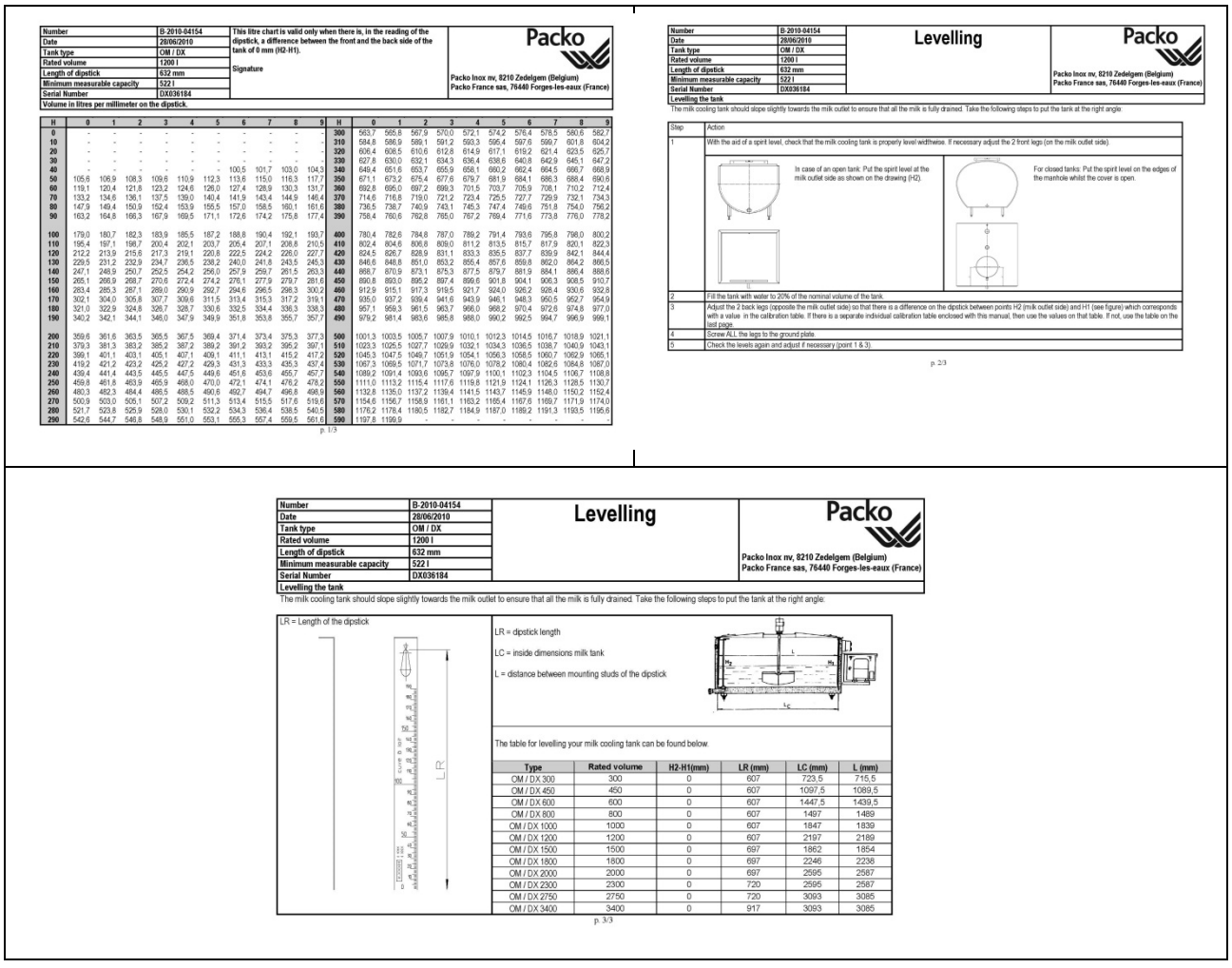
This is done based on the reading of the dipstick and the calibration chart.

A calibration (or volume) chart used for payment purpose can only be made when the tank has been individually calibrated. In other cases an indication table is provided which cannot be used for payments.

Description

- Individually placing the tank in its reference position
- Tank batch filling with calibrated quantities of cold water (<10°C)
- Calculation of a volume table (mm – litres)
- Volume table printed on waterproof chart

Example of calibration chart of a 1200 OM/DX:



Number	B-2010-04154
Date	28/06/2010
Tank type	OM / DX
Rated volume	1200 l
Length of dipstick	632 mm
Minimum measurable capacity	522 l
Serial Number	DX036184

This litre chart is valid only when there is, in the reading of the dipstick, a difference between the front and the back side of the tank of 0 mm (H2-H1).

Signature

Packo Inox nv, 8210 Zedelgem (Belgium)
Packo France sas, 76440 Forges-les-eaux (France)

Volume in litres per millimeter on the dipstick.

H	0	1	2	3	4	5	6	7	8	9	H	0	1	2	3	4	5	6	7	8	9
0	-	-	-	-	-	-	-	-	-	-	300	563,7	565,8	567,9	570,0	572,1	574,2	576,4	578,5	580,6	582,7
10	-	-	-	-	-	-	-	-	-	-	310	584,8	586,9	589,1	591,2	593,3	595,4	597,6	599,7	601,8	604,2
20	-	-	-	-	-	-	-	-	-	-	320	606,4	608,5	610,6	612,8	614,9	617,1	619,2	621,4	623,5	625,7
30	-	-	-	-	-	-	-	-	-	-	330	627,8	630,0	632,1	634,3	636,4	638,6	640,8	642,9	645,1	647,2
40	-	-	-	-	-	-	100,5	101,7	103,0	104,3	340	649,4	651,6	653,7	655,9	658,1	660,2	662,4	664,5	666,7	668,9
50	105,6	106,9	108,3	109,6	110,9	112,3	113,6	115,0	116,3	117,7	350	671,1	673,2	675,4	677,6	679,7	681,9	684,1	686,3	688,4	690,6
60	119,1	120,4	121,8	123,2	124,6	126,0	127,4	128,9	130,3	131,7	360	692,8	695,0	697,2	699,3	701,5	703,7	705,9	708,1	710,2	712,4
70	133,2	134,6	136,1	137,5	139,0	140,4	141,9	143,4	144,9	146,4	370	714,6	716,8	719,0	721,2	723,4	725,5	727,7	729,9	732,1	734,3
80	147,9	149,4	150,9	152,4	153,9	155,5	157,0	158,5	160,1	161,6	380	736,5	738,7	740,9	743,1	745,3	747,4	749,6	751,8	754,0	756,2
90	163,2	164,8	166,3	167,9	169,5	171,1	172,6	174,2	175,8	177,4	390	758,4	760,6	762,8	765,0	767,2	769,4	771,6	773,8	776,0	778,2
100	179,0	180,7	182,3	183,9	185,5	187,2	188,8	190,4	192,1	193,7	400	780,4	782,6	784,8	787,0	789,2	791,4	793,6	795,8	798,0	800,2
110	195,4	197,1	198,7	200,4	202,1	203,7	205,4	207,1	208,8	210,5	410	802,4	804,6	806,8	809,0	811,2	813,5	815,7	817,9	820,1	822,3
120	212,2	213,9	215,6	217,3	219,1	220,8	222,5	224,2	226,0	227,7	420	824,5	826,7	828,9	831,1	833,3	835,5	837,7	839,9	842,1	844,4
130	229,5	231,2	232,9	234,7	236,5	238,2	240,0	241,8	243,5	245,3	430	846,6	846,8	851,0	853,2	855,4	857,6	859,8	862,0	864,2	866,5
140	247,1	248,9	250,7	252,5	254,2	256,0	257,9	259,7	261,5	263,3	440	868,7	870,9	873,1	875,3	877,5	879,7	881,9	884,1	886,4	888,6
150	265,1	266,9	268,7	270,6	272,4	274,2	276,1	277,9	279,7	281,6	450	890,8	893,0	895,2	897,4	899,6	901,8	904,1	906,3	908,5	910,7
160	283,4	285,3	287,1	289,0	290,9	292,7	294,6	296,5	298,3	300,2	460	912,9	915,1	917,3	919,5	921,7	924,0	926,2	928,4	930,6	932,8
170	302,1	304,0	305,8	307,7	309,6	311,5	313,4	315,3	317,2	319,1	470	935,0	937,2	939,4	941,6	943,9	946,1	948,3	950,5	952,7	954,9
180	321,0	322,9	324,8	326,7	328,7	330,6	332,5	334,4	336,3	338,3	480	957,1	959,3	961,5	963,7	966,0	968,2	970,4	972,6	974,8	977,0
190	340,2	342,1	344,1	346,0	347,9	349,9	351,8	353,8	355,7	357,7	490	979,2	981,4	983,6	985,8	988,0	990,2	992,5	994,7	996,9	999,1
200	359,6	361,6	363,5	365,5	367,5	369,4	371,4	373,4	375,3	377,3	500	1001,3	1003,5	1005,7	1007,9	1010,1	1012,3	1014,5	1016,7	1018,9	1021,1
210	379,3	381,3	383,2	385,2	387,2	389,2	391,2	393,2	395,2	397,1	510	1023,3	1025,5	1027,7	1029,9	1032,1	1034,3	1036,5	1038,7	1040,9	1043,1
220	399,1	401,1	403,1	405,1	407,1	409,1	411,1	413,1	415,2	417,2	520	1045,3	1047,5	1049,7	1051,9	1054,1	1056,3	1058,5	1060,7	1062,9	1065,1
230	419,2	421,2	423,2	425,2	427,2	429,3	431,3	433,3	435,3	437,4	530	1067,3	1069,5	1071,7	1073,8	1076,0	1078,2	1080,4	1082,6	1084,8	1087,0
240	439,4	441,4	443,5	445,5	447,5	449,6	451,6	453,6	455,7	457,7	540	1089,2	1091,4	1093,6	1095,7	1097,9	1100,1	1102,3	1104,5	1106,7	1108,8
250	459,8	461,8	463,9	465,9	468,0	470,0	472,1	474,1	476,2	478,2	550	1111,0	1113,2	1115,4	1117,6	1119,8	1121,9	1124,1	1126,3	1128,5	1130,7
260	480,3	482,3	484,4	486,5	488,5	490,6	492,7	494,7	496,8	498,9	560	1132,8	1135,0	1137,2	1139,4	1141,5	1143,7	1145,9	1148,0	1150,2	1152,4
270	500,9	503,0	505,1	507,2	509,2	511,3	513,4	515,5	517,6	519,6	570	1154,6	1156,7	1158,9	1161,1	1163,2	1165,4	1167,6	1169,7	1171,9	1174,0
280	521,7	523,8	525,9	528,0	530,1	532,2	534,3	536,4	538,5	540,5	580	1176,2	1178,4	1180,5	1182,7	1184,9	1187,0	1189,2	1191,3	1193,5	1195,6
290	542,6	544,7	546,8	548,9	551,0	553,1	555,3	557,4	559,5	561,6	590	1197,8	1199,9	-	-	-	-	-	-	-	-

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Number	B-2010-04154
Date	28/06/2010
Tank type	OM / DX
Rated volume	1200 l
Length of dipstick	632 mm
Minimum measurable capacity	522 l
Serial Number	DX036184

Levelling

Packo Inox nv, 8210 Zedelgem (Belgium)
Packo France sas, 76440 Forges-les-eaux (France)

Levelling the tank

The milk cooling tank should slope slightly towards the milk outlet to ensure that all the milk is fully drained. Take the following steps to put the tank at the right angle

Step	Action
1	With the aid of a spirit level, check that the milk cooling tank is properly level widthwise. If necessary adjust the 2 front legs (on the milk outlet side).
	In case of an open tank: Put the spirit level at the milk outlet side as shown on the drawing (H2).
	For closed tanks: Put the spirit level on the edges of the manhole whilst the cover is open.
2	Fill the tank with water to 20% of the nominal volume of the tank.
3	Adjust the 2 back legs (opposite the milk outlet side) so that there is a difference on the dipstick between points H2 (milk outlet side) and H1 (see figure) which corresponds with a value in the calibration table. If there is a separate individual calibration table enclosed with this manual, then use the values on that table. If not, use the table on the last page.
4	Screw ALL the legs to the ground plate.
5	Check the levels again and adjust if necessary (point 1 & 3).

p. 2/3

Number	B-2010-04154
Date	28/06/2010
Tank type	OM / DX
Rated volume	1200 l
Length of dipstick	632 mm
Minimum measurable capacity	522 l
Serial Number	DX036184

Levelling

Packo Inox nv, 8210 Zedelgem (Belgium)
Packo France sas, 76440 Forges-les-eaux (France)

Levelling the tank

The milk cooling tank should slope slightly towards the milk outlet to ensure that all the milk is fully drained. Take the following steps to put the tank at the right angle:

LR = Length of the dipstick

LR = dipstick length

LC = inside dimensions milk tank

L = distance between mounting studs of the dipstick

The table for levelling your milk cooling tank can be found below.

Type	Rated volume	H2-H1(mm)	LR (mm)	LC (mm)	L (mm)
OM / DX 300	300	0	607	723,5	715,5
OM / DX 450	450	0	607	1097,5	1089,5
OM / DX 600	600	0	607	1447,5	1439,5
OM / DX 800	800	0	607	1497	1489
OM / DX 1000	1000	0	607	1847	1839
OM / DX 1200	1200	0	607	2197	2189
OM / DX 1500	1500	0	697	1862	1854
OM / DX 1800	1800	0	697	2246	2238
OM / DX 2000	2000	0	697	2595	2587
OM / DX 2300	2300	0	720	2595	2587
OM / DX 2750	2750	0	720	3093	3085
OM / DX 3400	3400	0	917	3093	3085

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2.3.2 Outlet butterfly valve

- Instead of drain plug
- Advised in EU-countries

2.3.3 Tank equipped for 2 cooling units

- Instead of standard 1 cooling unit
- Splitting up the cooling pipes

2.3.4 Tank with automatic cleaning

- In some cases automatic cleaning can be required
- The tank is equipped with
    - a separate spray ball mounted on the standard cover
    - complete control unit PCV3 *(see chapter closed tanks)* with temperature control, cleaning program and cleaning pump
    - 2 dosing pumps for detergent

☞ Kindly note that during cleaning, cleaning water can escape through the cover

OM/IB milk cooling tank with automatic cleaning

BELOW OPTIONS ARE ONLY FOR OM/IB MILK COOLING TANKS !!

2.3.5 Time clock

- Time clock for the use of night rate electricity

2.3.6 Set instant cooling

- Including an external ice water pump
- Including manual valves to choose the consumer: the milk tank or an external consumer such as a pre-cooler

External ice water pump mounted on the tank

2.3.7 Stainless steel hood ice water pump

- Stainless steel hood for the external ice water pump
- Only for OM/IB tanks ≥ 1500 L

Stainless steel hood protects the ice water pump

3. CLOSED MILK COOLING TANKS

Contents

3.1 CONTROL UNITS for CLOSED TANKS

The control unit for a closed tank has to ***keep the milk temperature*** as accurate as possible at a temperature below 4 °C.

The ***homogeneity of the milk is guaranteed*** by a time controlled agitation at regular intervals.

It has also to make sure that the tank is ***cleaned thoroughly***.

As all these data are logged, there is a full traceability of all activities.
☞ *only with iControl control unit*

This information assures the farmer that his ***milk is stored safely*** or warns the farmer when there is a risk of losing milk quality.

In the exceptional case the PCB of the digital control unit iControl or PCV3 is faulty, it is still possible to cool the milk thanks to the **manual operation** for the functioning of the cooling unit(s) and, in the case of IB/DIB-tanks, for the ice building and the operation of the ice water pump(s).

Therefore there is no risk on loss of quality of the milk and eventual repairs at night, on sundays or holidays can be avoided, definitely in remote areas.

Activation:		
	Cooling/agitating	**Ice accumulation**
DX-tanks	X*	
IB/DIB-tanks	X**	X

* cooling = operation of the cooling unit(s)

**cooling = circulation of the ice water

Control box for an IB-tank

In case of faulty automatic dosing pumps or in case of the connection of new drums, it is possible **to operate the dosing pumps manually**. Then you are sure the tank will be perfectly cleaned. You can dose the detergent by means of one push button per installed dosing pump. This can be useful when starting new drums: pushing until all air is removed from the hoses and the detergent is ready to be dosed for the next cleaning.

Push buttons for 3 dosing pumps

3.1.1 iCONTROL

The iControl is the standard control unit for all closed milk cooling tanks (except for the transportable tank TRT).

The *iControl* is a state of the art electronic control, very reliable and with the possibility to integrate all available applications.

It is the **central brain of the milk cooling tank**. The *iControl* stands for information logging, intelligent software and a clear and simple interaction between user, milk cooling tank and milking system.

Informative

First milk cooling tank with a **7" touch screen !**

ALL information is **1 touch away**.

The standard functions cooling, cleaning and agitation can be completed with extra's such as the tank guard, the volume indicator, the eco-line items, the special options required for robotic milking and PC-communication.

Visualisations

- High resolution 7" touch screen
- Detailed analysis of the logging information and set parameters about the cooling, cleaning, agitation,….
- Data converted into graph form

Easy interchange of data

Easy and fast interchange without adjusting the parameters: each milk cooling tank has its own ID installed on one SD-card.

Intelligent

Safeguarding the milk quality is the key topic!

Cooling

- No interference required: automatic start-up of the cooling after cleaning
- Milk quality preserved thanks to the built-in back-up features such a second milk temperature probe
- Less energy consumption:
  - direct expansion cooling system in combination with Eco-Cool technology
  - ice bank cooling system:
    - intelligent ice buildingaccording to the real requirements[1]
    - a 24 hr time clock for optimal use of night rate electricity
    - A safe and gentle cooling of the milk in combination with robotic milking or in case of seasonal fluctuations in the milk supply, thanks to the Soft Start Cooling
      ☞ *SSC only required in case of DX-tanks*
- Flexible cooling:
  - two temperature set points - ideal for cheese makers
  - deep cooling in case the milk is collected shortly after milking

Cleaning

- Optimal water consumption thanks to the individual setting of water volume per cleaning step
- Automatic adjustment of cleaning times according to the type and volume of the tank and the chosen amount of cleaning water
- Ready for future developments in cleaning agents: fine dosing of detergent

Possible to integrate the *tank guard* to double check the cooling, cleaning and agitation with logging possibilities on PC.

Diagnostic ability

Integration of installation, maintenance and service diagnostics.
In the rare case of problems, the iControl will spontaneously propose a possible solution to the problem.

[1] Not yet available

Announcements

The iControl is able to announce important services for the dealer as well for the dairy farmer. These announcements help to safeguard the good, efficient and economical operation of the milk cooling tank, e.g.:

- When the condenser of the cooling unit has to be cleaned.
- When a check-up of the cooling is required
- When the filter of the air blower on the ice builder should be replaced
- Many more…

Interactive

A two-way communication between iControl, milking system and PC makes your life easier !

"internal" interaction

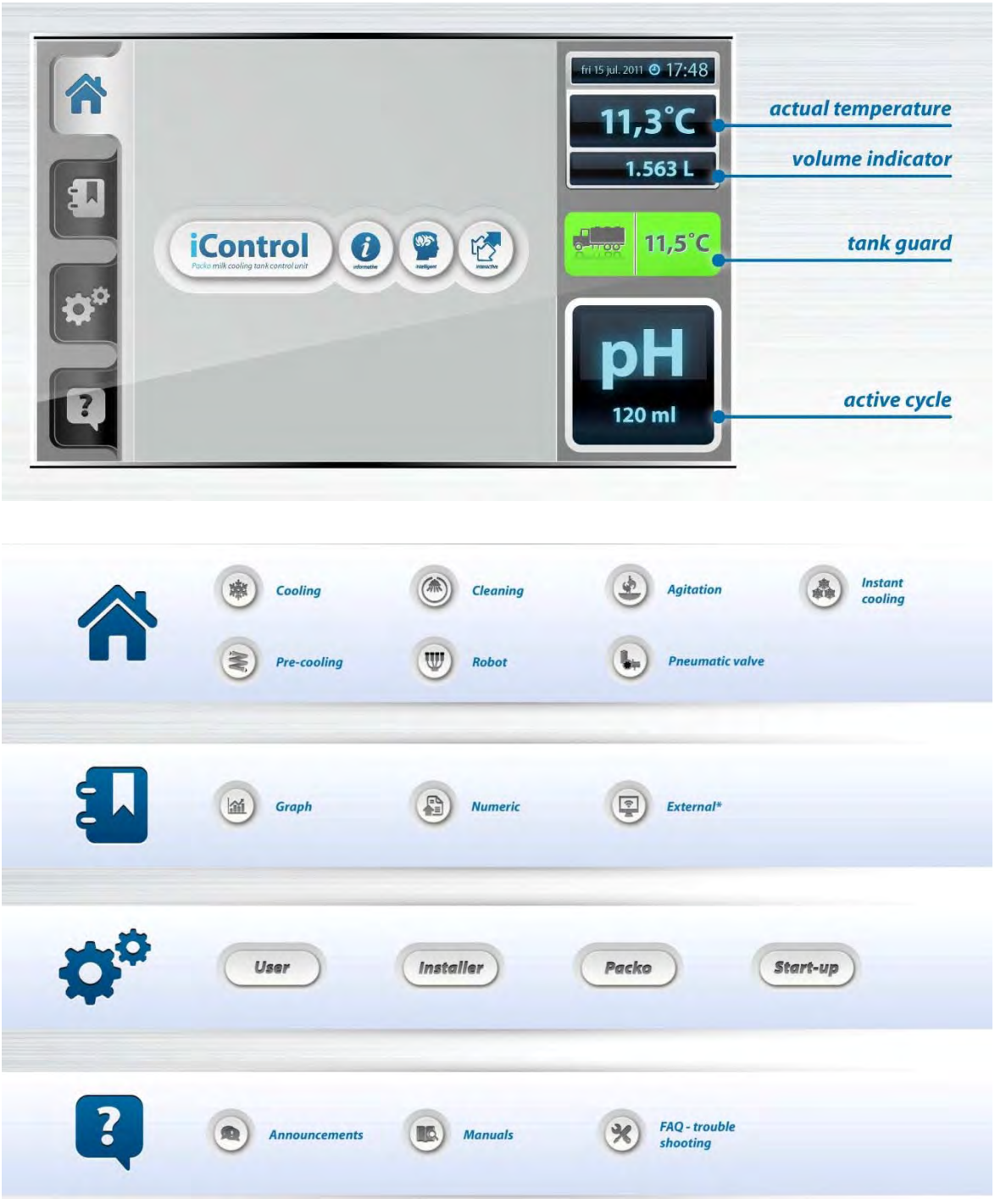
- Easy consultation of information: all user's and maintenance manuals, spare parts, lists, drawings, graphs,… available immediately in the language of the user
- Water flow is ALWAYS measured even with very pure mountain water
- ALL parameters, such as communication with Eco-Tronic and Eco-Cool cooling unit can be loaded up via the iControl - no extra tools required
- Reading out the volume indication of the milk quantity stored in the milk cooling tank

"external" interaction

- Stay up to date via your mobile phone. It is possible to receive text messages to follow-up the cooling and cleaning of the milk cooling tank[2]
- Integration of the communication between milking system, buffer tank and milk cooling tank:
  - ⇨ Automatic "start of the cooling" after start-up milking system
  - ⇨ In case no milk is entering the milk cooling tank e.g. due to the cleaning or breakdown of the milking system. No needless operation of the cooling unit resulting in energy saving
- Possible to upload external information in the iControl e.g. updates
- Possible to check all data from behind your desk[3]
- Changing the user parameters of the iControl from a distance

[2] Not yet available

[3] Not yet available



Main menus in the iControl unit

Ready for the future!

With the iControl control unit, Packo responds to the needs en trends of today and tomorrow.

- First control unit with touch screen
- All applications are integrated in 1 control unit: standard functions as cooling, cleaning and agitation are already extended with:
    - Software Oculus tank guard
    - Software communication with milking system, e.g. milking robot
    - Software Soft Start Cooling
- In the course of 2013/2014 also integration of:
    - Manuals and other external documentation
    - Communication with PC and mobile phone from a distance
- In 2014 also integration of:
    - Ice thickness regulation of RMIB milk cooling tanks
    - Software of the volume indicator
    - Communication with the Eco-Cool cooling unit and Eco-Tronic electronic injection: uploaden of the parameters via iControl
- Registration of information and conversion of data in surveyable graphs
- Intelligent software
- Clear and easy interaction between user, milk cooling tank and milk system
- Easy and fast exchange of parameters: each milk cooling tank has its own ID installed on a SD-card

The quality of the milk is secured

- Automatic start-up of the cooling after the cleaning of the milk cooling tank
- Second temperature probe as supplementary monitoring of the milk temperature: in case of a faulty probe 1 => announcement on the screen and automatic measurement via probe 2
- “Gentle cooling” thanks to the Soft Start Cooling e.g. combination of DX-tank and robotic milking
- “Flexible cooling” thanks to
    - 2 temperature set points : ideal for cheese makers
    - Deep cooling in case the milk is collected shortly after milking
- Diagnostic ability
- Automatic adjustment of the cleaning times according to the type and volume of the milk cooling tank and the chosen amount of cleaning water
- Announcements to the installer and to the dairy farmer regarding check-ups and maintenance, e.g. cleaning of the condenser, check-up of the cooling. These announcements guards the good, efficient and economical operation of the tank.

Energy savings

- “Smart” cooling of the RMIB-tanks and PIB: intelligent ice accumulation according to the real requirements
- Optimal water consumption during the cleaning thanks to the individual setting of the water volume per cleaning step
- Automatic start-up of the cooling after the start-up of the milking robot

Communication

- Integration of the communication between the milking system, the buffer tank and the milk cooling tank
- Possible to upload external information in the iControl
- Possible to check all data from behind your desk
- Changing the parameters from a distance

3.1.2 PCV3

The PCV3 control unit can be chosen as an alternative on all closed milk cooling tanks.

The PCV3 is a modern very reliable electronic tank control. It offers all the basic functions, milk temperature control, cooling, agitation and cleaning.

Characteristics

- **LED display** with continuous, accurate display of temperature
- **User friendly**, intuitive finger-touch buttons
- Green LED's indicate the different functions in action, the chosen set point (T1 or T2), and the choice of acid (A) or alkaline product (B)
- A red LED (⚠ warning) shows a possible error
- During cleaning the vertical LED's (1 to 5) indicate the different steps during the cleaning of the tank. A green LED (OK) is lit when the cleaning cycle has finished correctly.
- If an error is active, the error code is shown in the LED display, alternating with the temperature indication (no logging).

Remark:
Options such as tank guard Oculus, ECO-WASH, robotic milking, more than 1 ice water pump or in-line heating functions are not available with PCV3. In this case, the **iControl** unit remains the correct choice.

See the comparison between iControl and PCV3 on the next page.

3.1.3 Comparison PCV3 – iCONTROL

Parameters cooling & agitation	PCV3	iControl
Delayed start first milking	✓	✓
Set point 1	✓	✓
Set point 2	✓	✓
Set point 2, automatically switching over set point 1after 1st milking		✓
Differential	✓	✓
Display calibration	✓	✓
On-Off security compressor	✓	✓
Deep cooling	✓	✓
Manual cooling short	✓	✓
Manual cooling long	✓	✓
Clock agitation before collecting		✓
Pre-cooling		✓
Instant cooling via single ice water pump	✓	✓
Instant cooling via second ice water pump		✓
Maximum cooling time	✓	✓
Language		✓
Frequency (power supply)		✓
Low milk temperature		✓
Connection robot		✓

Parameters cleaning	PCV3	iControl
Pause cleaning	✓	✓
Cleaning cycle:		
ECO-WASH - 2 dosing pumps		✓
ECO-WASH - 3 dosing pumps		✓
2 dosing pumps	✓	✓
3 dosing pumps	✓	✓
Minimum temperature	✓	✓
Service	✓	✓
Time delay RN sensor		✓
Selection cleaning agents	✓	✓
Dosage cleaning agent + water	✓	✓
ECO-drain (second outlet valve)	✓	✓
In line heating cleaning water		✓
Conductivity		✓
Maximum filling time	✓	✓
Adjustment flow dosing pumps		✓
Automatic drain		✓

General functions	PCV3	iControl
Tank nominal volume		✓
Display contrast		✓
Logging		✓
Diagnostics	✓	✓
Date & time		✓
SMS communication		✓
ID-card		✓
Upgrade software version	✓	✓
Display (4 LED's)	✓	
Display touch screen		✓
FAQ's and operating manuals		✓

3.2 Closed model milk cooling tanks

The Packo closed milk cooling tanks can be installed **in combination with all types of milking systems**: *traditional and Automatic Milking Systems (Robotic milking)*.

Robotic milking is nowadays more popular than ever. With this type of milking, the cows are milked during +/- 20 hours per day. For this reason, the milk cooling tank has to be designed to cool down the milk from 35°C to 4°C continuously (in less than 1 hour) and not in 2 or 3 batches as in case of the traditional milking systems.

In case of **DX-milk cooling tanks** (direct expansion), the corresponding evaporator and cooling unit will be designed with the correct proportions according to the type of milking system.

Ice water cooling (IB and DIB milk cooling tanks) is the best solution for robotic milking. Ice water cooling is ideal for cooling smaller volumes when entering the milk cooling tank as freezing out the milk is impossible.

3.2.1 REM/DX & RS/DX – closed horizontal model with direct expansion

☞ **Main advantages of this model:**

- Elliptical shape => evaporator is covered quickly and used even with small amounts of milk => resulting in a optimal heat exchange
- Adapted to the type of milking and the number of milkings
- RS/DX: short model in order to save space

☞ **Volume: 1050 - 15000 Litres**

Milk cooling tank REM/DX

Characteristics tank

- Horizontal tank with **laser welded, multi-injection, free flow evaporator** which results in an **high efficient heat transfer**
- Fully **constructed of stainless steel 18/10 – AISI 304** => **high resistance against eventual corrosion**
- Chassis with **solid leg construction** and **adjustable feet** (standard 2 % slope)
- **CFC-free** polyurethane foam for an **excellent insulation** and **extra strength** to the tank
- **Flat manhole and swivelling cover** with rubber seal => no extra height required of the ceiling
- Detachable air vent
- 2 milk inlet openings, 80 mm (1 in the manhole cover, 1 at the back)
- **Big tank outlet 80 mm**, **self-washing outlet** with butterfly valve DN 65 or 80 and road tanker connection NW 50 or 65 (the butterfly valve is generally 1 size bigger than the road tanker connection)
  ☞ *Option: road tanker connection NW 80 (butterfly valve DN80)*
  ☞ *Other milk road tanker connections on request, e.g. SMS, DS, RJT or IDF*
  Self-washing outlet:
  => **no risk on contamination of the milk during collection**
  => easy to upgrade (no welding). Increased second hand value.
  ☞ *For REM/DX 2100 and smaller: tank outlet 50 mm, self washing outlet with butterfly valve DN 50 and road tanker connection NW 50*
  ☞ *Option: bottom filling*
- All models above 2100 litres have a stainless steel ladder

Tank control iControl and display

- All electrical tank components 1 ~ 230V 50Hz
  ☞ *Other voltages / frequencies on request*
- Protected against faulty electrical connections
- Milk temperature control with electronic operating unit iControl
  ☞ *See 3.1.1 iControl control unit*
- Full automatic logging of cooling, agitation, cleaning and alarms

☞ *Option: PCV3-control unit*

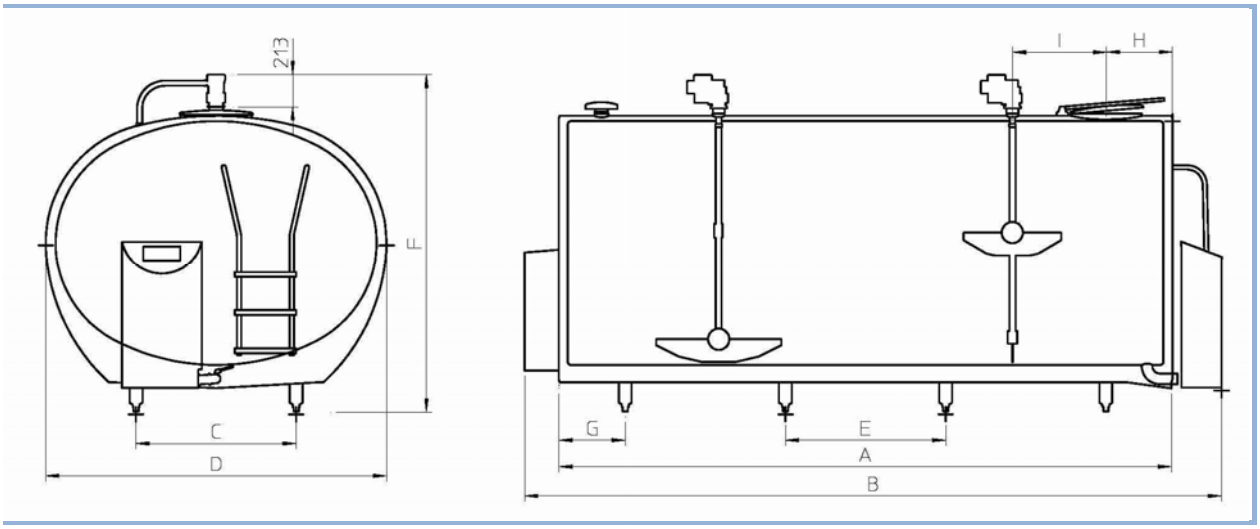
Cooling and agitation

- Thanks to the free evaporation and proper mixing of the milk the **heat exchange is optimal**
- A high cooling capacity is guaranteed
- The number of agitator motors depends on the volume of the tank
  ☞ *see table tank dimensions*
- Cooling pipes pre-mounted with thermostatic expansion valve(s)
  ☞ *Option: Eco-Tronic electronic injection*

Cleaning

- 2 automatic dosing pumps for alkaline & acid are standard
  ☞ *Option: third dosing pump*
- Automatic water level control for optimal filling (independent from the water pressure !!) and low water usage
- **High pressure dynamic Packo-ROTOJET system** with spray ball(s) in agitator blade(s) which are electro polished
- Vertically mounted stainless steel cleaning pump Packo FP66, no risk of freezing
  ☞ Pump motor power 1.5 kW, 1 ~ 230V 50Hz

Dimensions milk cooling tank REM/DX & RS/DX(1)



Model	Max. cap.	A	B(2)	C	D	E	F(3) (4)	G	H	I	Legs	Weight
	Litres	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*Quantity*	*kg*
1050	1125	1398	1944	670	1308	932	1550-1585	233	432	430	4	220
1300	1393	1704	2250	670	1308	845	1550-1585	430	432	470	4	295
1700	1715	2070	2616	670	1308	1210	1550-1585	430	432	603	4	365
2100	2140	2553	3099	670	1308	1690	1550-1585	432	432	845	4	412
2600	2653	1912	2458	750	1660	1210	1852-1972	351	431	524	4	437
3100	3186	2272	2818	750	1660	1440	1852-1972	416	431	704	4	500
3800	3944	2504	3050	934	1800	1690	1840-1960	407	431,5	820	4	590
4400	4562	2874	3420	934	1800	1050	1840-1960	387	431,5	1005	6	667
5000	5128	3214	3760	934	1800	1210	1840-1960	397	431,5	1175	6	730
RS 5000(1)	5102	2380	3026	1050	2100	1050	2058-2178	397	426,5	758	6	750
6150	6321	2894	3440	1050	2100	1050	2058-2178	397	431,5	1015	6	854
7200	7369	3354	3900	1050	2100	1210	2058-2178	467	431,5	1245	6	901
RS 8000(1)	8159	3145	3686	1050	2233	870	2208-2328	265	431,5	1138	8	1065
8200	8406	3809	4355	1050	2100	1050	2058-2178	330	431,5	555,5	8	1090
9000	9566	3681	4227	1050	2233	1050	2208-2328	266	431,5	531	8	1160
10000	10482	4021	4567	1050	2233	1050	2208-2328	436	431,5	616	8	1229
12000	12602	4810	5356	1050	223	1050	2208-2328	305	431,5	812	10	1450
15000	15762	5986	6532	1050	2233	1050	2208-2328	368	431,5	1113	12	1800

(1) RS/DX = short model
(2) With Eco-Wash: B + 190 mm
(3) With tankguard Oculus: F + 25 mm
(4) F=min. and max. height leg screw when tank is placed fully horizontal

☞REM-RS/DX 1050-5000 1 agitator incorporating 1 ROTOJET spray ball
☞REM-RS/DX 6150-8000 1 agitator incorporating 2 ROTOJET spray balls
☞REM/DX 8200-15000 2 agitators incorporating 4 ROTOJET spray balls

3.2.2 LEM/DX & LS/DX – closed horizontal model with direct expansion

☞ **Main advantages of this model:**

- Round shape, special design for big volumes
- Optimal contact between the milk and the evaporator
- Adapted to the type of milking and the number of milkings
- LS/DX: short model in order to save space

☞ **Volume: 10250 – 31600 Litres**

Milk cooling tank LEM/DX

Characteristics tank

- Horizontal tank with **laser welded, multi-injection, free flow evaporator** which results in an **high efficient heat transfer**
- Fully **constructed of stainless steel 18/10 – AISI 304** => **high resistance against eventual corrosion**
- Chassis with **solid leg construction** and **adjustable feet** (standard 2 % slope)
- **CFC-free** polyurethane foam for an **excellent insulation** and **extra strength** to the tank
- **Flat manhole and swivelling cover** with rubber seal => no extra height required of the ceiling
- Detachable air vent
- **Agitator motor** specially designed for tanks with bigger diameters (P-motors)
- 2 milk inlet openings, 80 mm (1 in the manhole cover, 1 at the back)
- **Big tank outlet 80 mm**, **self-washing outlet** with butterfly valve DN 65 or 80 and road tanker connection NW 50 or 65 (the butterfly valve is generally 1 size bigger than the road tanker connection)
  ☞ *Option: road tanker connection NW 80 (butterfly valve DN80)*
  ☞ *Other milk road tanker connections on request, e.g. SMS, DS, RJT or IDF*
  Self-washing outlet:
  => **no risk on contamination of the milk during collection**
  => easy to upgrade (no welding). Increased second hand value.
  ☞ *Option: bottom filling*
- All models have a stainless steel ladder

Tank control iControl and display

- All electrical tank components 1 ~ 230V 50Hz
  ☞ *Other voltages / frequencies on request*
- Protected against faulty electrical connections
- Milk temperature control with electronic operating unit iControl
  ☞ *See 3.1.1 iControl control unit*
- Full automatic logging of cooling, agitation, cleaning and possible errors

☞ *Option: PCV3-control unit*

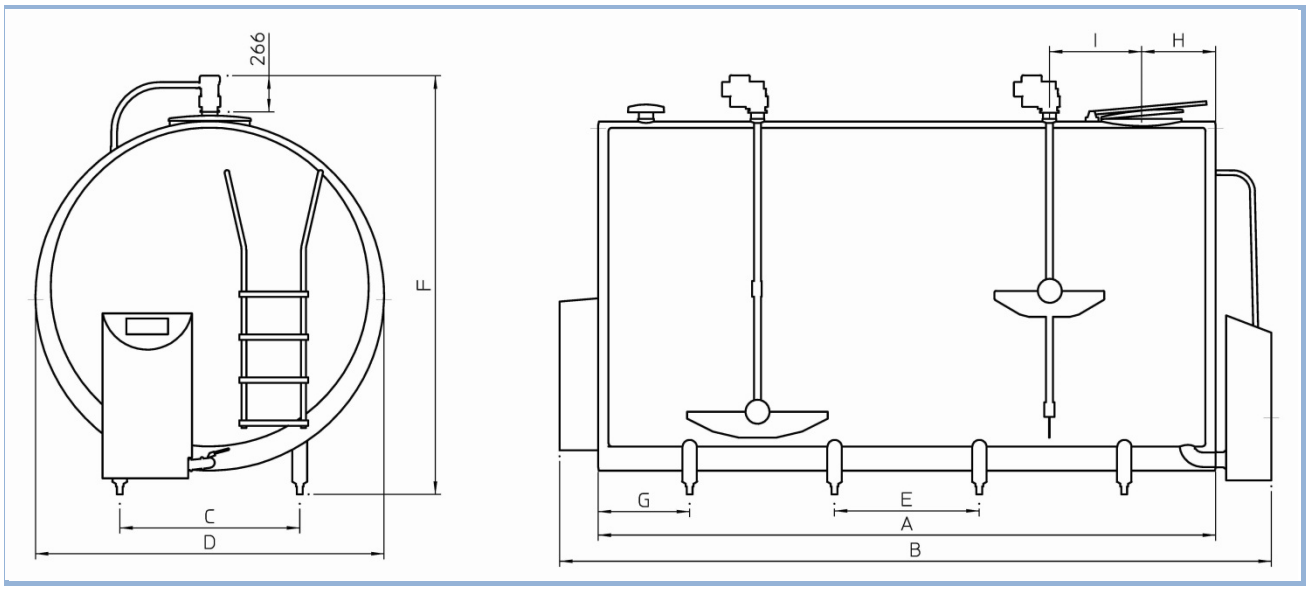
Cooling and agitation

- Thanks to the free evaporation and proper mixing of the milk the **heat exchange is optimal**
- A high cooling capacity is guaranteed
- The number of agitator motors depends on the volume of the tank
  ☞ *see table tank dimensions*
- Cooling pipes pre-mounted with **ECO-TRONIC** electronic expansion valve(s)
  => faster regulation and extra energy saving
  ☞ *Only from 18.000 L onwards standard mounted*

Cleaning

- 2 automatic dosing pumps for alkaline & acid are standard
  ☞ *Option: Third dosing pump*
- Automatic water level control for optimal filling (independent from the water pressure !!) and low water usage
- **High pressure dynamic Packo-ROTOJET system** with spray ball(s) in agitator blade(s) which are electro polished
- Vertically mounted stainless steel cleaning pump Packo FP66, no risk of freezing
  ☞ Pump motor power: 1.5 kW, 1 ~ 230V 50Hz

Dimensions milk cooling tank LEM/DX & LS/DX(1)



Model LEM/DX	Max. cap.	A	B(2)	C	D	E	F(3) (4)	G	H	I	Agitators	Legs	Weight
	Litres	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*Quantity*	*Quantity*	*kg*
18000	18578	6324	6870	1050	2133	845	2603-2723	627	432	1193	2	14	1975
22000	22522	7619	8165	1050	2133	845	2603-2723	430	432	892.5	3	18	2245
25500	26450	9179	9725	1050	2133	845	2603-2723	787	432	1193	3	20	2550
31600	32915	11084	11630	1050	2133	845	2603-2723	472	432	1473	3	26	3200

Model LS/DX(1)	Max. cap.	A	B(2)	C	D	E	F(3) (4)	G	H	I	Agitators	Legs	Weight
	Litres	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*Quantity*	*Quantity*	*kg*
10250	10507	3659	4205	1050	2133	845	2603-2723	562	445	577	2	8	1196
13100	13718	3473	3847	1050	2500	820	2970-3090	420,5	406	1230	1	8	1325
14500	14820	3636	4205	1050	2500	714	2970-3090	391	420,5	1398	1	10	1421
15500	15879	3812	4358	1050	2500	804	2970-3090	299	420,5	585,5	2	10	1562
17650	18055	4421	4967	1050	2500	714	2970-3090	427	420,5	694	2	12	1750
21500	22001	5386	5955	1050	2500	750	2970-3090	443	420,5	973,5	2	14	2078
25500	26025	6376	6945	1050	2500	750	2970-3090	563	420,5	1665	2	16	2453
30450	31064	7676	8205	1050	2500	813	2970-3090	503	420,5	878	3	18	2925

(1) LS/DX = short model
(2) With Eco-Wash: B + 190 mm
(3) With tankguard Oculus: F + 25 mm
(4) F=min. and max. height leg screw when tank is placed fully horizontal

☞Each agitator is incorporating 2 ROTOJET spray balls

3.2.3 VM/DX – closed vertical model with direct expansion

☞ **Main advantages of this model:**

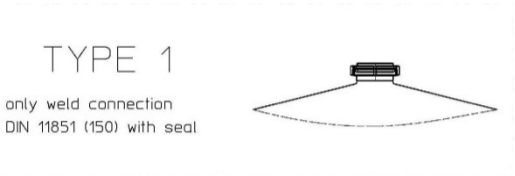
- Outside installation => place saving, minimal building costs
- Adapted to the type of milking and the number of milkings

☞ **Volume: 12000 - 35000 Litres**

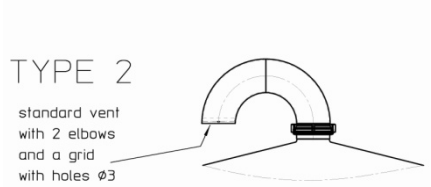
Milk cooling tank VM/DX with alcove

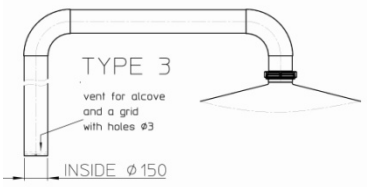
Characteristics tank

- Vertical tank with **laser welded, multi-injection, free flow evaporator** on **bottom AND/OR jacket** (depending on tank volume and number of milkings) which results in an **high efficient heat transfer**
  - ☞ *Pre-cooling to 23°C or below with well water is required in combination with traditional milking*
- Fully **constructed of stainless steel 18/10 – AISI 304** => **high resistance against eventual corrosion**
- **Solid construction** to bear all the weight of the milk
- **Insulation** with **polyurethane foam 50 mm** => excellent insulation (adapted to the outdoors climate conditions) + extra strength to the tank (instead of rock wool)
- **Tank lower bottom** has a **thick layer of insulation** => no risk of temperature losses
- **Moisture and condensate free finishing** which results in an insulation maintaining its efficiency in all conditions
- **Safety precautions** on top of the tank: connections for safety belt + safety rail
  - ☞ *Option: Stainless steel ladder with safety cage*
- **Connection vent** diameter **150 mm** => no risk on an eventual implosion of the tank during milk collection and cleaning: threaded part with seal for the connection of the vents



  - ☞ *Options: vent with bend 180 ° or leading the vent inside the dairy (alcove)*





- Control unit mounted on the tank or supplied separately
- **Manhole** in the jacket of the tank
  - ☞ *Option: self-cleaning sampling valve mounted in the manhole cover*
  - ☞ *Option: supplementary manhole cover on top of the tank + ladder*
- **Lower bottom with slope** towards the big outlet => no risk on vortex or air intake during emptying of the tank
- **Bottom filling**
- **Big tank outlet 80 mm**, **self-washing outlet** with butterfly valve DN 65 or 80 and road tanker connection NW 50 or 65 (the butterfly valve is generally 1 size bigger than the road tanker connection)
  - ☞ *Option: road tanker connection NW 80 (butterfly valve DN80)*
  - ☞ *Other milk road tanker connections on request, e.g. SMS, DS, RJT or IDF*

  Self-washing outlet:
  => **no risk on contamination of the milk during collection**
  => **easy to upgrade** (no welding). Increased second hand value.

Alcove *(option)*

- An alcove facilitates the installation of the tank
- The tank is positioned to face a large opening in the wall of the dairy
- The tank control unit remains mounted on the tank
- Easy access from the dairy to the tank control unit, the tank outlet and the manhole cover
- The vent can also be leaded inside the dairy via the alcove
- The alcove is completely insulated and fixed on the floor

Alcove

Tank control iControl and display

- All electrical tank components 1 ~ 230V 50Hz
  ☞ *Other voltages / frequencies on request*
- Protected against faulty electrical connections
- Milk temperature control with electronic operating unit iControl
  ☞ *See 3.1.1 iControl control unit*
- Full automatic logging of cooling, agitation, cleaning and possible errors

☞ *Option: PCV3-control unit*

Cooling and agitation

- Thanks to the free evaporation and proper mixing of the milk the heat exchange is optimal
- A high cooling capacity is guaranteed
- Solid agitator motor on top of the tank protected by a lockable and aerated stainless steel hood
- Agitator paddle with 2 blades at different level for complete homogenisation of the milk; paddle is guided to the bottom of the tank; paddle is electro polished
- Cooling pipes pre-mounted with **ECO-TRONIC** electronic expansion valve(s) and protected by a stainless steel hood => **faster installation and extra energy savings**

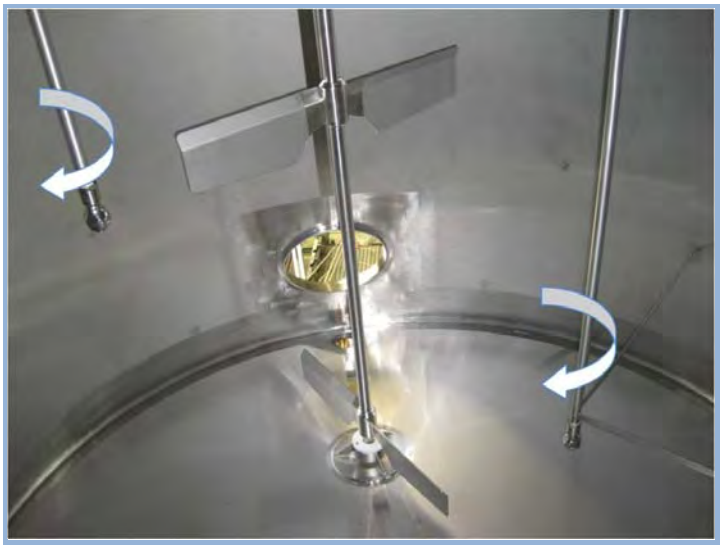
Cleaning

- 2 automatic dosing pumps for alkaline & acid are standard

☞ *Option: third dosing pump*

- Automatic water level control for optimal filling and low water usage
- High pressure dynamic cleaning system with 2 rotating industrial spray balls installed at 2 different levels
- Vertically mounted stainless steel cleaning pump Packo FP66, no risk of freezing

☞ Pump motor power: 1.5 kW, 1 ~ 230V 50Hz



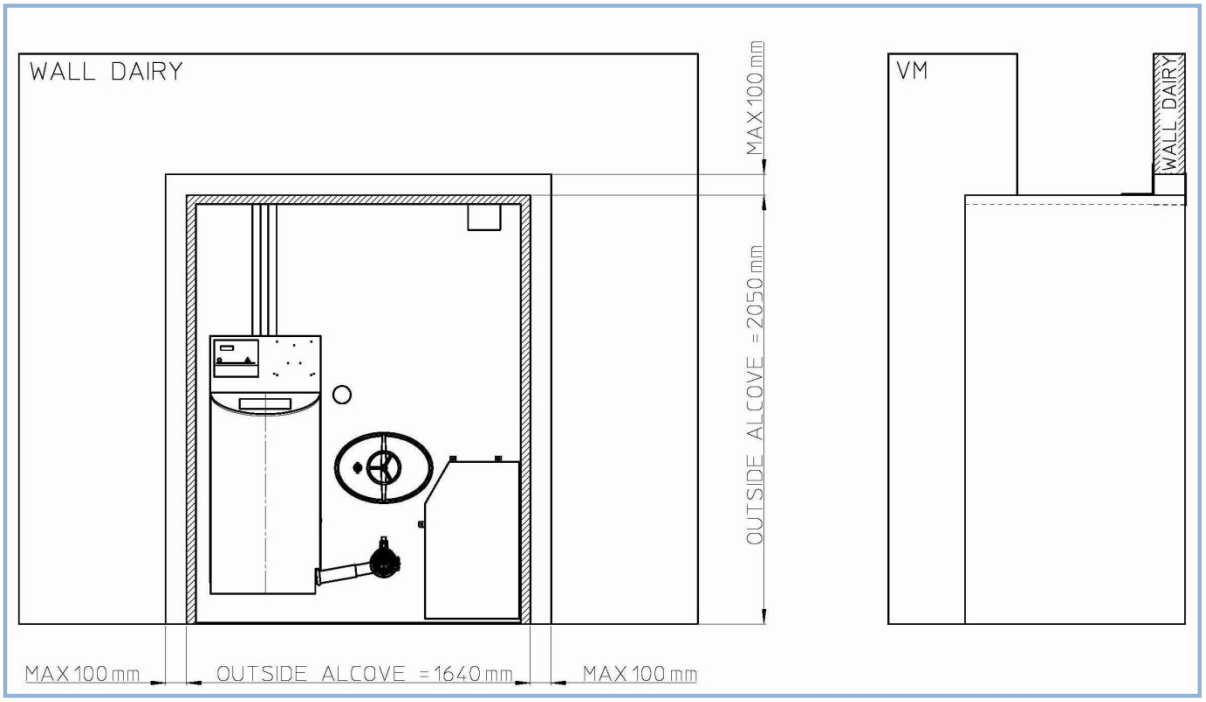
Double agitator paddle and two spray balls at different level

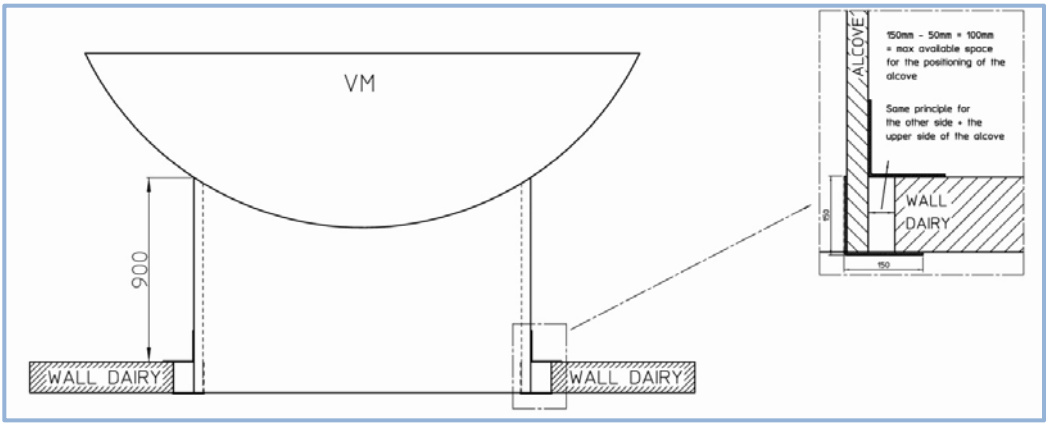
Dimensions milk cooling tank VM/DX

Model	**Max. Cap** with top manhole	**Max. Cap** without top manhole	**F**	**F'**	**H**	**I**	**J**	**Weight** With control unit & alcove	**Weight** Without control unit & alcove
	Litres	*Litres*	*mm*	*mm*	*mm*	*mm*	*mm*	*kg*	*kg*
12000	12622	13117	2850	3160	260	2050	1640	2043	1820
15500	16123	16618	3380	3690	260	2050	1640	2153	1930
18000	18587	19082	3755	4065	260	2050	1640	2263	2040
21000	21658	22153	4220	4530	260	2050	1640	2393	2170
25000	25787	26282	4840	5150	260	2050	1640	2543	2320
30000	30985	31480	5630	5940	260	2050	1640	2818	2595
35000	36104	36599	6405	6715	260	2050	1640	3033	2810

☞ 6 fixation holes Ø 30 mm, evenly spread over the circumference (6 x 60°) – fitting material not included

Information on the installation of the alcove





☞ **<u>Remarks</u>:**

- **The level of the concrete floor should minimal be the same as the level of the floor inside the dairy with a slope away from the dairy.**
- **Consult the local authorities regarding the possible requirement of building permit !**

3.2.4 RM/IB – closed horizontal model with ice water cooling

☞ **Main advantages of this model:**

- Compact system
- Using cheaper night rate to build the ice water
- Ideal for robotic milking, goat and sheep milking, milk collection, seasonal fluctuations in the milk supply
- Very safe and reliable system
- Faster cooling of the milk

☞ **Volume: 1600 - 7150 Litres**

Milk cooling tank RM/IB

Characteristics tank

- Horizontal tank with **efficient evaporator made of copper tubes** which results in an **high efficient heat transfer**
- Ice water storage for minimal 1 milking
- Fully **constructed of stainless steel 18/10 – AISI 304** => **high resistance against eventual corrosion**
- Chassis with **solid leg construction** and **adjustable feet** (standard 2 % slope)
- **CFC-free** polyurethane foam for an **excellent insulation** and **extra strength** to the tank
- **Flat manhole and swivelling cover** with rubber seal => no extra height required of the ceiling
- Detachable air vent
- 2 milk inlet openings, 80 mm (1 in the manhole cover, 1 at the back)
- **Big tank outlet 80 mm**, **self-washing outlet** with butterfly valve DN 65 or 80 and road tanker connection NW 50 or 65 (the butterfly valve is generally 1 size bigger than the road tanker connection)
  ☞ *Option: road tanker connection NW 80 (butterfly valve DN80)*
  ☞ *Other milk road tanker connections on request, e.g. SMS, DS, RJT or IDF*
  Self-washing outlet:
  => **no risk on contamination of the milk during collection**
  => easy to upgrade (no welding). Increased second hand value.
  ☞ *Option: bottom filling*
- All models have a stainless steel ladder

Tank control iControl and display

- All electrical tank components 1 ~ 230V 50Hz
  ☞ *Other voltages / frequencies on request*
- Protected against faulty electrical connections
- Milk temperature control with electronic operating unit iControl
  ☞ *See 3.1.1 iControl control unit*
- Time clock for use of night rate electricity integrated
- Full automatic logging of cooling, agitation, cleaning and possible errors

☞ *Option: PCV3-control unit*

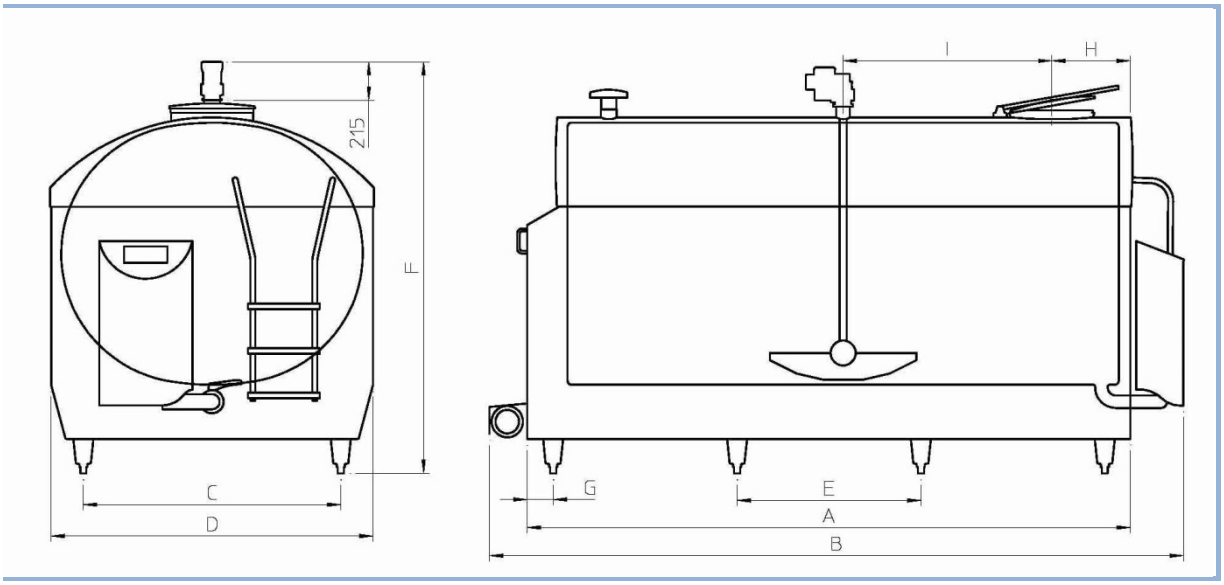
Cooling and agitation

- An **integrated ice builder** provides the ice water circulated by a single phase ice water pump
  ☞*Option: 3-phase ice water pump*
- The amount of ice is controlled by a special ice thickness sensor
- Executed with 2 ice thickness sensors: 50% or 100% use of its cooling capacity, e.g. 50% is used in low milk yield periods or when the tank size is foreseen for future expansion
- **Very fast cooling** with **no risk of freezing** even the smallest quantities of milk
- A high cooling capacity is guaranteed
- The number of agitator motors depends on the volume of the tank
  ☞ *see table tank dimensions*
- Cooling pipes pre-mounted with thermostatic expansion valve(s)

Cleaning

- 2 automatic dosing pumps for alkaline & acid are standard
  ☞ *Option: third dosing pump*
- Automatic water level control for optimal filling and low water usage (not depending on the water pressure)
- **High pressure dynamic Packo-ROTOJET system** with spray ball(s) in agitator blade(s) which are electro polished
- Vertically mounted stainless steel cleaning pump Packo FP66, no risk of freezing
  ☞ *Pump motor power: 1.5 kW, 1 ~ 230V 50Hz*

Dimensions milk cooling tank RM/IB



Dimensions RM/IB – 2 milkings

Model	Max. cap.	A	B(1)	C	D	E	F(4) (5)	G	H	I	Agitators	Legs	Weight
	Litres	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*Quantity*	*Quantity*	*kg*
1600	1678	2185	2765	925	1300	1895	1825 - 1945	547	445	572	1(2)	4	464
2200	2237	2818	3398	925	1300	1264	1825 - 1945	547	445	888,5	1(2)	6	584
2800	2813	2010	2590	1440	1800	860	2179 - 2299	604	445	492,5	1(2)	6	682
3300	3367	2350	2930	1440	1800	1030	2179 - 2299	604	450	654,5	1(2)	6	750
3800	3881	2665	3245	1440	1800	1188	2179 - 2299	604	450	812	1(2)	6	830
4400	4484	3035	3615	1440	1800	1372	2179 - 2299	604	450	997	1(2)	6	980
5000	5039	3375	3955	1440	1800	1028	2179 - 2299	604	450	1167	1(2)	8	1076
6000	6038	4000	4580	1440	1800	1236.5	2173 - 2293	604	450	687,5	2(3)	8	1240

Dimensions RM/IB – 4, 6 milkings and robotic milking

Model	Max. cap.	A	B(1)	C	D	E	F(4) (5)	G	H	I	Agitators	Legs	Weight
	Litres	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*Quantity*	*Quantity*	*kg*
1600	1678	2185	2765	925	1300	1895	1630 - 1750	372	445	572	1(2)	4	429
2200	2237	2818	3398	925	1300	1264	1630 - 1750	372	445	888,5	1(2)	6	525
2800	2813	2010	2590	1440	1800	860	1996 - 2116	409	445	492,5	1(2)	6	601
3300	3367	2350	2930	1440	1800	1030	1996 - 2116	409	450	654,5	1(2)	6	655
3800	3881	2665	3245	1440	1800	1188	1996 - 2116	409	450	812	1(2)	6	730
4400	4484	3035	3615	1440	1800	1372	1996 - 2116	409	450	997	1(2)	6	860
5000	5039	3375	3955	1440	1800	1028	1996 - 2116	409	450	1167	1(2)	8	940
6000	6163	3375	3955	1440	1800	1028	2269 - 2389	409	450	687,5	1(2)	8	1050
7150	7320	4000	4580	1440	1800	1236.5	2269 - 2389	409	450	687,5	2(3)	8	1300

(1) With Eco-Wash: B + 190 mm
(2) Incorporating 1 ROTOJET spray ball
(3) Incorporating 2 ROTOJET spray balls each
(4) With tankguard Oculus: F + 25 mm
(5) F=min. and max. height leg screw when tank is placed fully horizontal

3.2.5 REM/DIB & RS/DIB – closed horizontal model with ice water cooling (split system)

☞ **Main advantages of this model:**

- Oval form to assure the optimal contact between the milk and the evaporator
- Type of ice builder adapted to the number of milkings and type of milking
- Using cheaper night rate to build the ice water
- Very safe and reliable system
- Faster cooling of the milk
- RS/DIB: short model in order to save space

☞ **Volume: 3800 - 15000 Litres**

Milk cooling tank REM/DIB

Characteristics tank

- Horizontal tank with **laser welded, multi-injection, free flow heat exchanger** which results in an **high efficient heat transfer** using **ice water**
- Fully **constructed of stainless steel 18/10 – AISI 304** => **high resistance against eventual corrosion**
- Chassis with **solid leg construction** and **adjustable feet** (standard 2 % slope)
- **CFC-free** polyurethane foam for an **excellent insulation** and **extra strength** to the tank
- **Flat manhole and swivelling cover** with rubber seal => no extra height required of the ceiling
- Detachable air vent
- 2 milk inlet openings, 80 mm (1 in the manhole cover, 1 at the back)
- **Big tank outlet 80 mm**, **self-washing outlet** with butterfly valve DN 65 or 80 and road tanker connection NW 50 or 65 (the butterfly valve is generally 1 size bigger than the road tanker connection)
  ☞ *Option: road tanker connection NW 80 (butterfly valve DN80)*
  ☞ *Other milk road tanker connections on request, e.g. SMS, DS, RJT or IDF*
  Self-washing outlet:
  => **no risk on contamination of the milk during collection**
  => easy to upgrade (no welding). Increased second hand value.
  ☞ *Option: bottom filling*
- All models have a stainless steel ladder

Tank control iControl and display

- All electrical tank components 1 ~ 230V 50Hz
  ☞ *Other voltages / frequencies on request*
- Protected against faulty electrical connections
- Milk temperature control with electronic operating unit iControl
  ☞ *See 3.1.1 iControl control unit*
- Full automatic logging of cooling, agitation, cleaning and possible errors

☞ *Option: PCV3-control unit*

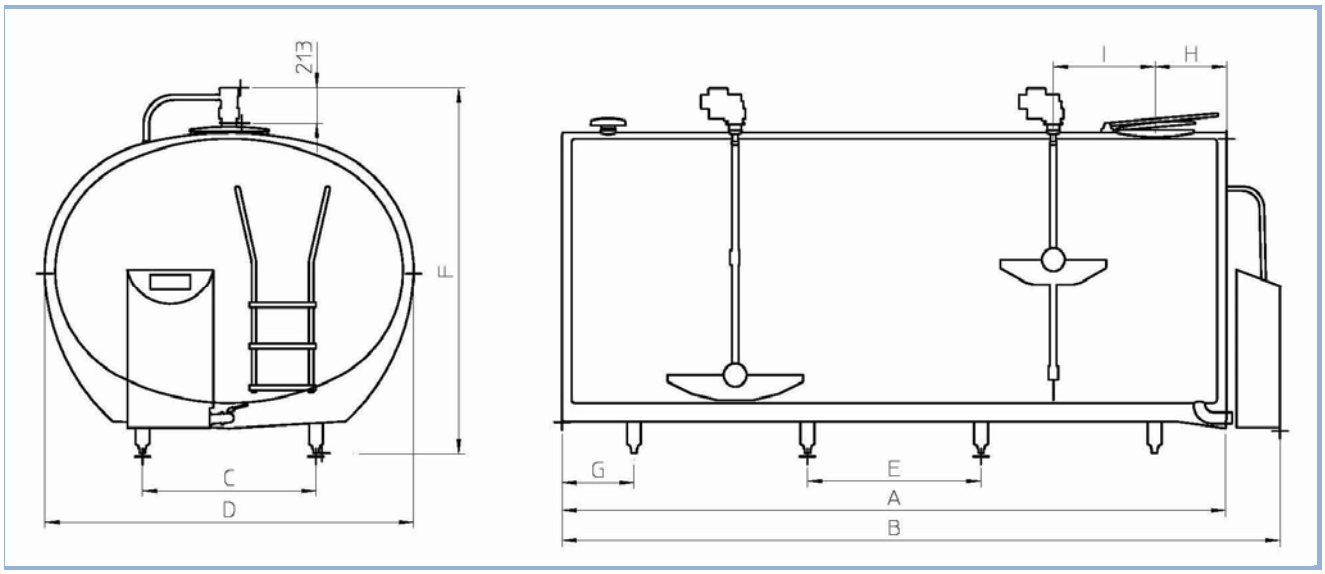
Cooling and agitation

- Special laser welded heat exchanger for ice water results in an efficient cooling
- A **separate ice builder** provides the ice water
- **Very fast cooling** with **no risk of freezing** even the smallest quantities of milk
- A high cooling capacity is guaranteed
- The number of agitator motors depends on the volume of the tank
  ☞ *see table tank dimensions*
- Connection ice water with distributor for a fast and easy installation
- Tank ≥ 14.500 litres has two separate cooling circuits
  ☞ *ALWAYS add a supplementary ice water pump on the PIB*

Cleaning

- 2 automatic dosing pumps for alkaline & acid are standard
  ☞ *Option: third dosing pump*
- Automatic water level control for optimal filling and low water usage (not depending on the water pressure)
- **High pressure dynamic Packo-ROTOJET system** with spray ball(s) in agitator blade(s) which are electro polished
- Vertically mounted stainless steel cleaning pump Packo FP66, no risk of freezing
  ☞ Pump motor power: 1.5 kW, 1 ~ 230V 50Hz

Dimensions milk cooling tank REM/DIB & RS/DIB(1)



Model	Max. cap.	A	B(2)	C	D	E	F(4) (5)	G	H	I	Agitators	Legs	Weight
	Litres	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*Quantity*	*Quantity*	*kg*
3800	3944	2504	3050	934	1800	1690	1840-1960	407	431,5	820	1	4	590
4400	4562	2874	3420	934	1800	1050	1840-1960	387	431,5	1005	1	6	667
5000	5128	3214	3760	934	1800	1210	1840-1960	397	431,5	1175	1	6	730
RS 5000(1)	5102	2380	3026	1050	2100	1050	2058-2178	397	426,5	758	1	6	750
6150	6321	2894	3440	1050	2100	1050	2058-2178	397	431,5	1015	1(3)	6	854
7200	7369	3354	3900	1050	2100	1210	2058-2178	467	431,5	1245	1(3)	6	901
RS 8000(1)	8159	3145	3686	1050	2233	870	2208-2328	265	431,5	1138	1(3)	8	1065
8200	8406	3809	4355	1050	2100	1050	2058-2178	330	431,5	555,5	2(3)	8	1090
9000	9566	3681	4227	1050	2233	1050	2208-2328	266	431,5	531	2(3)	8	1160
10000	10482	4021	4567	1050	2233	1050	2208-2328	436	431,5	616	2(3)	8	1229
12000	12602	4810	5356	1050	2233	1050	2208-2328	305	431,5	812	2(3)	10	1450
15000	15762	5986	6532	1050	2233	1050	2208-2328	368	431,5	1113	2(3)	12	1800

(1) RS/DIB = short model
(2) With Eco-Wash: B + 190 mm
(3) Incorporating 2 ROTOJET spray balls each
(4) With tankguard Oculus: F + 25 mm
(5) F=min. and max. height leg screw when tank is placed fully horizontal

Corresponding ice builders PIB

	Traditional milking – PIB has energy storage for the cooling of 1 milking					
	2 milkings		4 milkings		6 milkings	
	*No pre-cooling with well water**	*Pre-cooling with well water to 23°C*	*No pre-cooling with well water*	*Pre-cooling with well water to 23°C*	*No pre-cooling with well water*	*Pre-cooling with well water to 23°C*
RS 8000	PIB 160	PIB 80	PIB 80	PIB 40	PIB 60	PIB 40
8200	PIB 160	PIB 80	PIB 80	PIB 40	PIB 60	PIB 40
9000	PIB 160	PIB 120	PIB 80	PIB 60	PIB 60	PIB 40
10000	PIB 230	PIB 120	PIB 80	PIB 60	PIB 60	PIB 40
12000	PIB 230	PIB 120	PIB 120	PIB 60	PIB 80	PIB 40
15000	PIB 370	PIB 160	PIB 120	PIB 80	PIB 80	PIB 60

☞ *for ≥ 14.500 L tank: 2 cooling circuits -> always add a supplementary ice water pump on the PIB*

* If well water is not available for the pre-cooling of the milk to 23°C, partial instant cooling below 10°C is required outside the milk cooling tank (use of a tubular cooler or plate cooler for ice water).

	Robotic milking					
	Collection every day		Collection every 2 days		Collection every 3 days	
	No pre-cooling with well water	*Pre-cooling with well water to 23°C*	*No pre-cooling with well water*	*Pre-cooling with well water to 23°C*	*No pre-cooling with well water*	*Pre-cooling with well water to 23°C*
RS 8000	PIB 120	PIB 60	PIB 60	PIB 25	PIB 25	PIB 25
8200	PIB 120	PIB 60	PIB 60	PIB 25	PIB 25	PIB 25
9000	PIB 120	PIB 60	PIB 60	PIB 40	PIB 40	PIB 25
10000	PIB 120	PIB 60	PIB 60	PIB 40	PIB 40	PIB 25
12000	PIB 120	PIB 80	PIB 60	PIB 40	PIB 60	PIB 25
15000	PIB 230	PIB 120	PIB 120	PIB 60	PIB 60	PIB 40

☞ *for ≥ 14.500L tank: 2 cooling circuits -> always add a supplementary ice water pump on the PIB*

IMPORTANT:

- Pre-cooling to 23°C using well water with a tubular cooler or a plate heat exchanger is always advisable, because of the possible energy savings. In this case a smaller ice builder can be purchased.
- On request: Corresponding ice builder in case of building energy for the cooling of 2 milkings with traditional milking.

3.2.6 LEM/DIB & LS/DIB – closed horizontal model with ice water cooling (split system)

☞ **Main advantages of this model:**

- Round shape, special design for bigger sizes of tanks cooling with ice water
- Type of ice builder adapted to the number of milkings and type of milking
- Using cheaper night rate to build the ice water
- Very safe and reliable system
- Faster cooling of the milk
- LS/DIB: short model in order to save space

☞ **Volume: 10250 - 31600 Litres**

Milk cooling tank LEM/DIB

Characteristics tank

- Horizontal tank with **laser welded, multi-injection, free flow heat exchanger** which results in an **high efficient heat transfer** using **ice water**
- Fully **constructed of stainless steel 18/10 – AISI 304** => **high resistance against eventual corrosion**
- Chassis with **solid leg construction** and **adjustable feet** (standard 2 % slope)
- **CFC-free** polyurethane foam for an **excellent insulation** and **extra strength** to the tank
- **Flat manhole and swivelling cover** with rubber seal => no extra height required of the ceiling
- Detachable air vent
- 2 milk inlet openings, 80 mm (1 in the manhole cover, 1 at the back)
- **Big tank outlet 80 mm**, **self-washing outlet** with butterfly valve DN 65 or 80 and road tanker connection NW 50 or 65 (the butterfly valve is generally 1 size bigger than the road tanker connection)
  ☞ *Option: road tanker connection NW 80 (butterfly valve DN80)*
  ☞ *Other milk road tanker connections on request, e.g. SMS, DS, RJT or IDF*
  Self-washing outlet:
  => **no risk on contamination of the milk during collection**
  => easy to upgrade (no welding). Increased second hand value.
  ☞ *Option: bottom filling*
- All models have a stainless steel ladder

Tank control iControl and display

- All electrical tank components 1 ~ 230V 50Hz
  ☞ *Other voltages / frequencies on request*
- Protected against faulty electrical connections
- Milk temperature control with electronic operating unit iControl
  ☞ *See 3.1.1 iControl control unit*
- Full automatic logging of cooling, agitation, cleaning and possible errors

☞ *Option: PCV3-control unit*

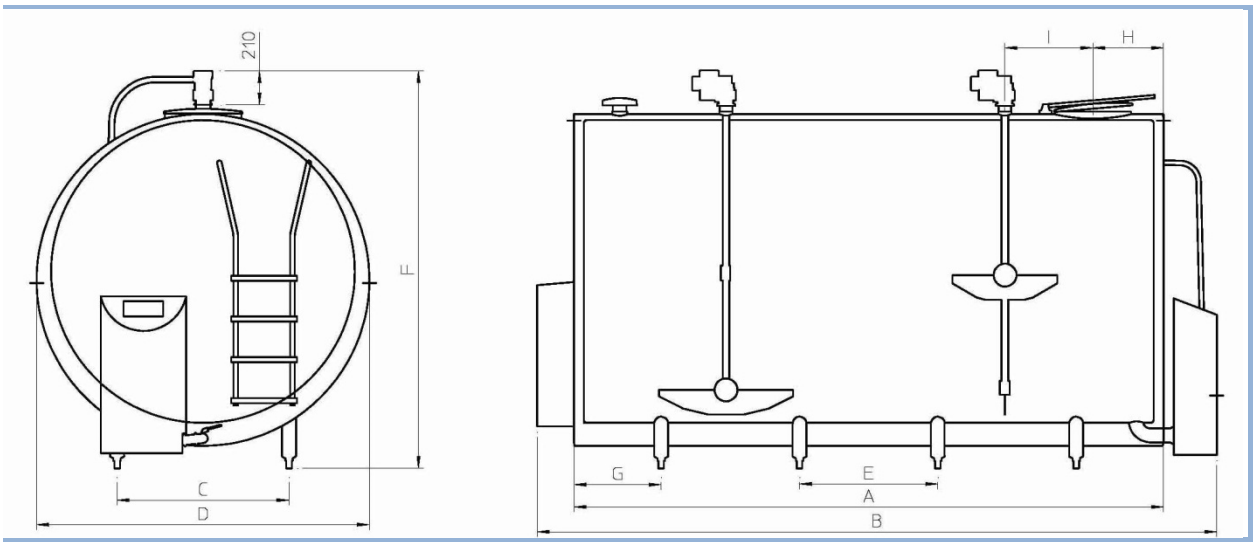
Cooling and agitation

- Special laser welded heat exchanger for ice water results in an efficient cooling
- A **separate ice builder** provides the ice water
- **Very fast cooling** with **no risk of freezing** even the smallest quantities of milk
- A high cooling capacity is guaranteed
- The number of agitator motors depends on the volume of the tank
  ☞ *see table tank dimensions*
- Connection ice water with distributor for a fast and easy installation
- Tanks ≥14.500 litres onwards have two separate cooling circuits
  ☞ *ALWAYS add a supplementary ice water pump on the PIB*

Cleaning

- 2 automatic dosing pumps for alkaline & acid are standard
  ☞ *Option: third dosing pump*
- Automatic water level control for optimal filling and low water usage (not depending on the water pressure)
- **High pressure dynamic Packo-ROTOJET system** with spray ball(s) in agitator blade(s) which are electro polished
- Vertically mounted stainless steel cleaning pump Packo FP66, no risk of freezing
  ☞ Pump motor power: 1.5 kW, 1 ~ 230V 50Hz

Dimensions milk cooling tank LEM/DIB & LS/DIB(1)



Model LEM/DIB	Max. cap.	A	B(2)	C	D	E	F(3) (4)	G	H	I	Agitators	Legs	Weight
	Litres	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*Quantity*	*Quantity*	*kg*
18000	18578	6324	6870	1050	2133	845	2603-2723	627	432	1193	2	14	1975
22000	22522	7619	8165	1050	2133	845	2603-2723	430	432	892,5	3	18	2245
25500	26450	9179	9725	1050	2133	845	2603-2723	787	432	1193	3	20	2550
31600	32915	11084	11630	1050	2133	845	2603-2723	472	432	1473	3	26	3200

Model LS/DIB(1)	Max. cap.	A	B(2)	C	D	E	F(3) (4)	G	H	I	Agitators	Legs	Weight
	Litres	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*Quantity*	*Qty*	*kg*
10250	10507	3659	4205	1050	2133	845	2603-2723	562	445	577	2	8	1196
13100	13718	3473	3847	1050	2500	714	2970-3090	420,5	406	1230	1	8	1325
14500	14820	3636	4205	1050	2500	714	2970-3090	391	420,5	1398	1	10	1421
15500	15879	3812	4358	1050	2500	804	2970-3090	299	420,5	585,5	2	10	1562
17650	18055	4421	4967	1050	2500	714	2970-3090	427	420,5	694	2	12	1680
21500	22001	5386	5955	1050	2500	750	2970-3090	443	420,5	973,5	2	14	2078
25500	26025	6376	6945	1050	2500	750	2970-3090	563	420,5	1665	2	16	2453
30450	31064	7676	8205	1050	2500	813	2970-3090	503	420,5	878	3	18	2925

(1) LS/DIB = short model
(2) With Eco-Wash: B + 190 mm
(3) With tankguard Oculus: F + 25 mm
(4) F=min. and max. height leg screw when tank is placed fully horizontal

☞Each agitator is incorporating 2 ROTOJET spray balls

Corresponding ice builders PIB

	Traditional milking – PIB has energy storage for the cooling of 1 milking					
	2 milkings		4 milkings		6 milkings	
LEM/DIB	*No pre-cooling with well water**	*Pre-cooling with well water to 23°C*	*No pre-cooling with well water**	*Pre-cooling with well water to 23°C*	*No pre-cooling with well water*	*Pre-cooling with well water to 23°C*
18000	PIB 370	PIB 230	PIB 160	PIB 120	PIB 120	PIB 60
22000	PIB 370	PIB 230	PIB 230	PIB 120	PIB 120	PIB 80
25500	PIB 370	PIB 370	PIB 230	PIB 160	PIB 160	PIB 80
31600	-	PIB 370	PIB 370	PIB 160	PIB 230	PIB 120

* If well water is not available for the pre-cooling of the milk to 23°C, partial instant cooling below 10°C is required outside the milk cooling tank (use of a tubular cooler or plate cooler for ice water).

☞ *These tanks have 2 cooling circuits -> always add a supplementary ice water pump on the PIB*

	Traditional milking – PIB has energy storage for the cooling of 1 milking					
	2 milkings		4 milkings		6 milkings	
LS/DIB	*No pre-cooling with well water**	*Pre-cooling with well water to 23°C*	*No pre-cooling with well water**	*Pre-cooling with well water to 23°C*	*No pre-cooling with well water*	*Pre-cooling with well water to 23°C*
10250	PIB 230	PIB 120	PIB 120	PIB 60	PIB 60	PIB 40
13100	PIB 230	PIB 160	PIB 120	PIB 80	PIB 80	PIB 60
14500	PIB 370	PIB 160	PIB 120	PIB 80	PIB 80	PIB 60
15500	PIB 370	PIB 160	PIB 160	PIB 80	PIB 120	PIB 60
17650	PIB 370	PIB 230	PIB 160	PIB 120	PIB 120	PIB 60
21500	PIB 370	PIB 230	PIB 230	PIB 120	PIB 120	PIB 80
25500	PIB 370	PIB 370	PIB 230	PIB 160	PIB 160	PIB 80
30450	-	PIB 370	PIB 370	PIB 160	PIB 230	PIB 120

* If well water is not available for the pre-cooling of the milk to 23°C, partial instant cooling below 10°C is required outside the milk cooling tank (use of a tubular cooler or plate cooler for ice water).

☞ *The tanks from 14.500 L onwards have 2 cooling circuits -> always add a supplementary ice water pump on the PIB*

	Robotic milking					
	2 milkings		4 milkings		6 milkings	
LEMD/IB	*No pre-cooling with well water*	*Pre-cooling with well water to 23°C*	*No pre-cooling with well water*	*Pre-cooling with well water to 23°C*	*No pre-cooling with well water*	*Pre-cooling with well water to 23°C*
18000	PIB 230	PIB 120	PIB 120	PIB 60	PIB 60	PIB 40
22000	PIB 230	PIB 160	PIB 120	PIB 80	PIB 120	PIB 60
25500	PIB 230	PIB 230	PIB 160	PIB 120	PIB 120	PIB 60
31600	PIB 370	PIB 230	PIB 230	PIB 120	PIB 120	PIB 80

☞ *These tanks have 2 cooling circuits -> always add a supplementary ice water pump on the PIB*

	Robotic milking					
	2 milkings		4 milkings		6 milkings	
LS/DIB	*No pre-cooling with well water*	*Pre-cooling with well water to 23°C*	*No pre-cooling with well water*	*Pre-cooling with well water to 23°C*	*No pre-cooling with well water*	*Pre-cooling with well water to 23°C*
10250	PIB 120	PIB 60	PIB 60	PIB 40	PIB 40	PIB 25
13100	PIB 160	PIB 120	PIB 80	PIB 60	PIB 60	PIB 25
14500	PIB 230	PIB 120	PIB 120	PIB 60	PIB 60	PIB 40
15500	PIB 230	PIB 120	PIB 120	PIB 60	PIB 60	PIB 40
17650	PIB 230	PIB 120	PIB 120	PIB 60	PIB 60	PIB 40
21500	PIB 230	PIB 160	PIB 120	PIB 80	PIB 120	PIB 60
25500	PIB 230	PIB 230	PIB 120	PIB 120	PIB 120	PIB 60
30450	PIB 370	PIB 230	PIB 230	PIB 120	PIB 120	PIB 80

☞ *The tanks from 14.500 L onwards have 2 cooling circuits -> always add a supplementary ice water pump on the PIB*

IMPORTANT:

- Pre-cooling with well water to 23°C with a tubular cooler or a plate heat exchanger is always advisable, because of the possible energy savings. In this case a smaller ice builder can be purchased.
- On request: Corresponding ice builder in case of building energy for the cooling of 2 milkings with traditional milking.

3.2.7 VM/DIB – closed vertical model with ice water cooling (split system)

☞ **Main advantages of this model:**

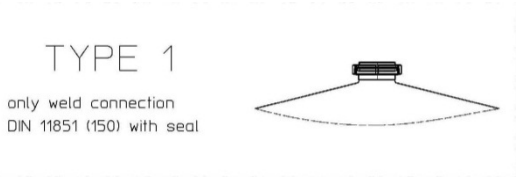
- Outside installation => place saving, minimal building costs
- Adapted to the type of milking and the number of milkings
- Type of ice builder adapted to the number of milkings and type of milking
- Using cheaper night rate to build the ice water
- Very safe and reliable system
- Faster cooling of the milk

☞ **Volume: 12000 - 35000 Litres**

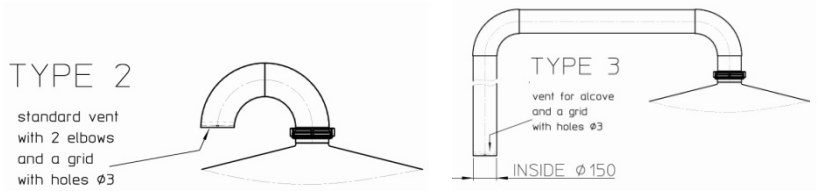
Milk cooling tank VM/DIB

Characteristics tank

- Vertical tank with **laser welded, multi-injection, free flow heat exchanger** on **bottom** which results in an **high efficient heat transfer** using **ice water**
- This tank is mainly a milk storage tank. The milk must be instant cooled to a temperature **below 10°C before entering the tank**.
- Fully **constructed of stainless steel 18/10 – AISI 304** => **high resistance against eventual corrosion**
- **Solid construction** to bear all the weight of the milk
- **Insulation** with **polyurethane foam 50 mm** => excellent insulation (adapted to the outdoors climate conditions) + extra strength to the tank
- **Tank lower bottom** has a **thick layer of insulation** => no risk of temperature losses
- **Moisture and condensate free finishing** which results in an insulation maintaining its efficiency in all conditions
- **Safety precautions** on top of the tank: connections for safety belt + safety rail
  ☞ *Optional: Stainless steel ladder with safety cage*
- **Connection vent** diameter **150 mm** => no risk on an eventual implosion of the tank during milk collection and cleaning: threaded part with seal for the connection of the vents



☞ *Options: vent with bend 180 ° or leading the vent inside the dairy (alcove)*



- Control unit mounted on the tank or supplied separately
- Manhole in the jacket of the tank
  ☞ *Optional: self-cleaning sampling valve mounted in the manhole cover*
  ☞ *Optional: supplementary manhole cover on top of the tank*
- Bottom filling
- **Lower bottom with slope** towards the big outlet => no risk on vortex or air intake during emptying of the tank
- **Big tank outlet 80 mm**, **self-washing outlet** with butterfly valve DN 65 or 80 and road tanker connection NW 50 or 65 (the butterfly valve is generally 1 size bigger than the road tanker connection)
  ☞ *Option: road tanker connection NW 80 (butterfly valve DN80)*
  ☞ *Other milk road tanker connections on request, e.g. SMS, DS, RJT or IDF*
  Self-washing outlet:
  => no risk on contamination of the milk during collection
  => easy to upgrade (no welding). Increased second hand value.

Alcove *(optional)*

- An alcove facilitates the installation of the tank
- The tank is positioned to face a large opening in the wall of the dairy
- The tank control unit remains mounted on the tank
- The tank control unit, the tank outlet and the manhole cover are easily be reached from the inside
- The vent is also be leaded inside the dairy via the alcove
- The alcove is completely insulated and fixed on the floor

Alcove

Tank control iControl and display

- All electrical tank components 1 ~ 230V 50Hz
  ☞ *Other voltages / frequencies on request*
- Protected against faulty electrical connections
- Milk temperature control with electronic operating unit iControl
  ☞ *See 3.1.1 iControl control unit*
- Two adjustable set points (3.2 °C and 4.5 °C)
- Full automatic logging of cooling, agitation, cleaning and possible errors

☞ *Option: PCV3-control unit*

Cooling and agitation

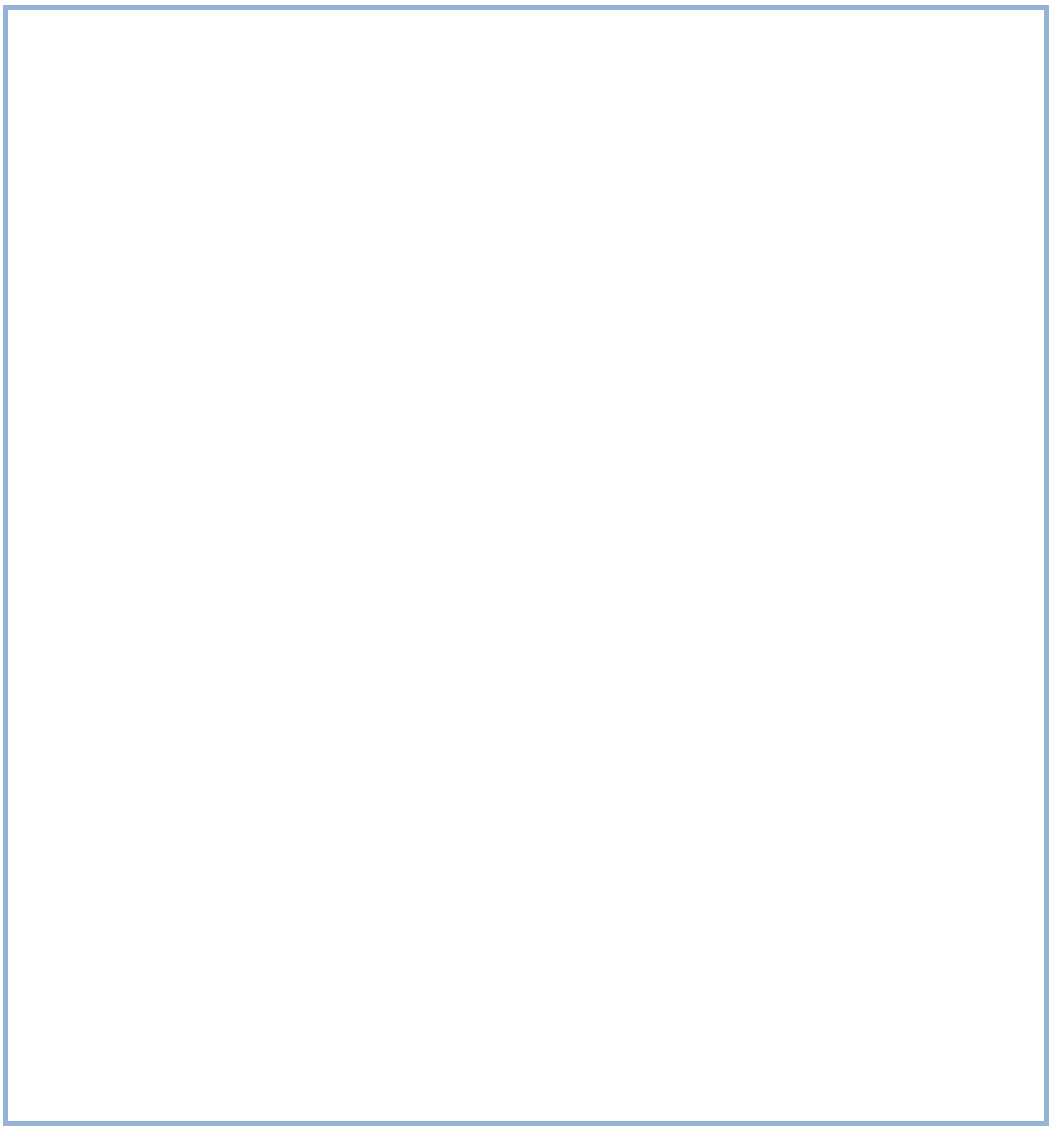
- Special laser welded heat exchanger for ice water results in an efficient cooling
- Connection ice water with distributor for a fast and easy installation
- A **separate ice builder** provides the ice water
- **Very fast cooling** with **no risk of freezing** even the smallest quantities of milk
- A high cooling capacity is guaranteed
- Solid agitator motor on top of the tank protected by a lockable and aerated stainless steel hood
- Agitator paddle with 2 blades on different level for complete homogenisation of the milk; paddle is guided to the bottom of the tank; paddle is electro polished

Cleaning

- 2 automatic dosing pumps for alkaline & acid are standard
  ☞ *Option: third dosing pump*
- Automatic water level control for optimal filling and low water usage
- High pressure dynamic cleaning system with 2 rotating industrial spray balls installed at 2 different levels
- Vertically mounted stainless steel cleaning pump Packo FP66, no risk of freezing
  ☞ Pump motor power: 1.5 kW, 1 ~ 230V 50Hz

Double agitator paddle and two spray balls at different level

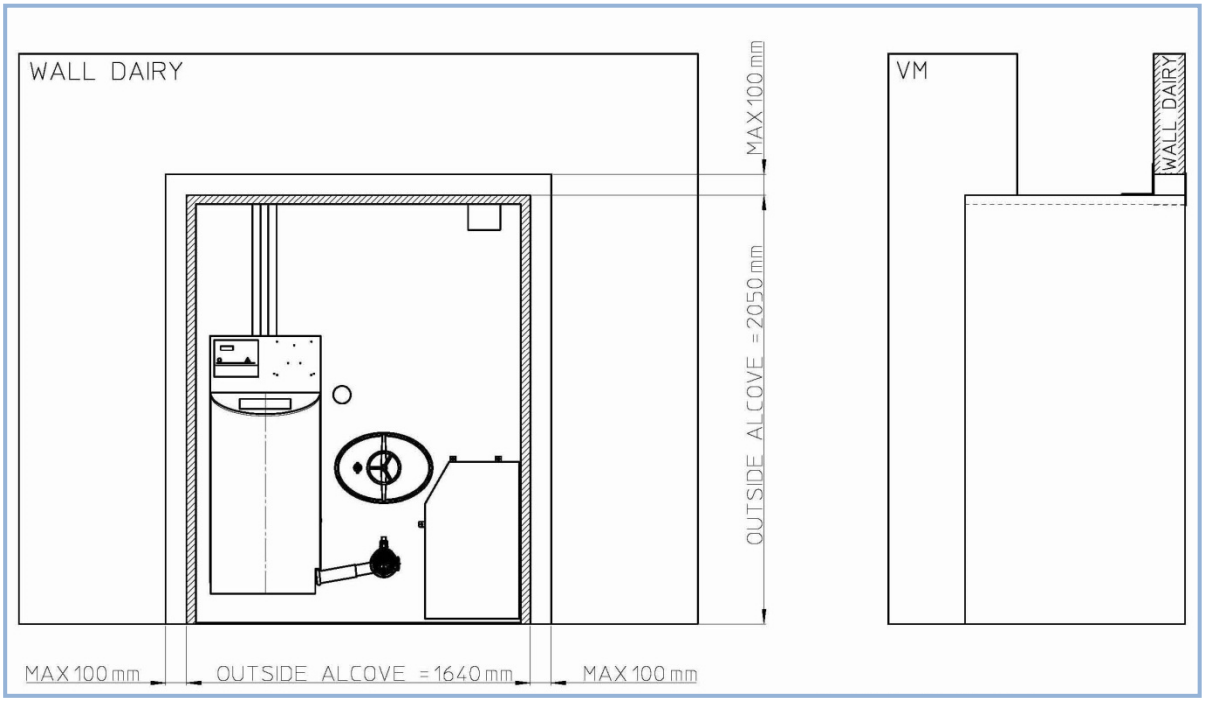
Dimensions milk cooling tank VM/DIB

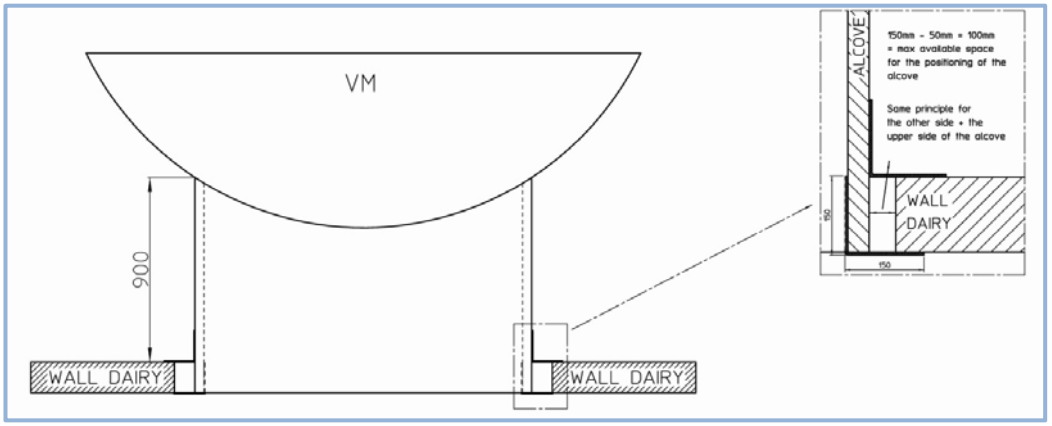


Model	**Max. Cap** with top manhole	**Max. Cap** without top manhole	**F**	**F'**	**H**	**I**	**J**	**Weight** With control unit & alcove	**Weight** Without control unit & alcove
	Litres	*Litres*	*mm*	*mm*	*mm*	*mm*	*mm*	*kg*	*kg*
12000	12622	13117	2850	3160	260	2050	1640	1993	1770
15500	16123	16618	3380	3690	260	2050	1640	2103	1880
18000	18587	19082	3755	4065	260	2050	1640	2213	1990
21000	21658	22153	4220	4530	260	2050	1640	2343	2120
25000	25787	26282	4840	5150	260	2050	1640	2463	2240
30000	30985	31480	5630	5940	260	2050	1640	2738	2515
35000	36104	36599	6405	6715	260	2050	1640	2953	2730

☞ 6 fixation holes Ø 30 mm, evenly spread over the circumference (6 x 60°)

Information on the installation of the alcove





☞ **Remarks**:

- **The level of the concrete floor should minimal be the same as the level of the floor inside the dairy with a slope away from the dairy.**
- **Consult the local authorities regarding the possible requirement of building permit !**

Corresponding ice builders PIB

	Traditional milking – PIB has energy storage for the cooling of 1 milking					
	2 milkings		4 milkings		6 milkings	
VM/DIB	*No-pre-cooling with well water to 23°C**	*Pre-cooling with well water to 23°C**	*No-pre-cooling with well water to 23°C**	*Pre-cooling with well water to 23°C**	*No-pre-cooling with well water to 23°C**	*Pre-cooling with well water to 23°C**
12000	PIB 230	PIB 160	PIB 120	PIB 60	PIB 80	PIB 40
15500	PIB 370	PIB 160	PIB 120	PIB 80	PIB 120	PIB 60
18000	PIB 370	PIB 230	PIB 160	PIB 120	PIB 120	PIB 60
21000	PIB 370	PIB 230	PIB 230	PIB 120	PIB 120	PIB 80
25000	-	PIB 370	PIB 230	PIB 160	PIB 160	PIB 80
30000	-	PIB 370	PIB 370	PIB 160	PIB 230	PIB 120
35000	-	PIB 370	PIB 370	PIB 230	PIB 230	PIB 120

* Partial instant cooling below 10°C is required outside the milk cooling tank (use of a tubular cooler or plate cooler for ice water).

	Robotic milking					
	2 milkings		4 milkings		6 milkings	
VM/DIB	*No-pre-cooling with well water to 23°C**	*Pre-cooling with well water to 23°C**	*No-pre-cooling with well water to 23°C**	*Pre-cooling with well water to 23°C**	*No-pre-cooling with well water to 23°C**	*Pre-cooling with well water to 23°C**
12000	PIB 120	PIB 120	PIB 60	PIB 40	PIB 60	PIB 25
15500	PIB 230	PIB 120	PIB 120	PIB 60	PIB 60	PIB 40
18000	PIB 230	PIB 120	PIB 120	PIB 60	PIB 60	PIB 40
21000	PIB 230	PIB 160	PIB 120	PIB 80	PIB 80	PIB 60
25000	PIB 230	PIB 230	PIB 120	PIB 120	PIB 120	PIB 60
30000	PIB 370	PIB 230	PIB 230	PIB 120	PIB 120	PIB 80
35000		PIB 230	PIB 230	PIB 120	PIB 120	PIB 120

* Partial instant cooling below 10°C is required outside the milk cooling tank (use of a tubular cooler or plate cooler for ice water).

IMPORTANT:

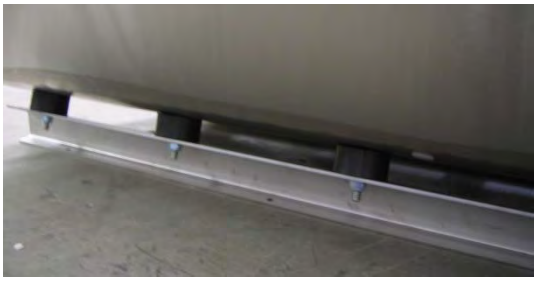
- Pre-cooling to 23°C using well water with a tubular cooler or a plate heat exchanger is always advisable, because of the possible energy savings. In this case a smaller ice builder can be purchased.
- On request: Corresponding ice builder in case of building energy for the cooling of 2 milkings with traditional milking.

3.2.8 TRT – transportable horizontal model with ice water cooling (split system)

☞ **<u>Volume:</u> 1050 - 2500 Litres**

Manhole cover with vent, agitator motor, connection for spray ball

Hoses for in- and outlet ice water
Outlet combination with cleaning pump



Frame with shock absorbers

E.g. Separate control box with cleaning program with 2 dosing pumps, to be mounted on the wall.
To be connected with the cleaning pump.

Milk cooling tank TRT

Characteristics tank

- Horizontal tank with **laser welded, multi-injection, free flow heat exchanger** which results in an **high efficient heat transfer** using **ice water**
- Fully **constructed of stainless steel 18/10 – AISI 304** => **high resistance against eventual corrosion**
- **CFC-free** polyurethane foam for an **excellent insulation** and **extra strength** to the tank
- Supplied with **two galvanised steel bars** and **rubber shock absorbers** for the connection with the trailer
  ☞ *Trailer is not included; has to be ordered in the country of destination according to the local legislation*
- **Flat manhole and swivelling cover**
  - with rubber seal => no extra height required of the ceiling
  - with 4 extra tightening clips to avoid milk spilling during transport
- Detachable air vent
- 1 milk inlet opening 80 mm in the manhole cover
- **Tank outlet 50 mm** with butterfly valve DN 50 and road tanker connection NW 50
  ☞ *Other milk road tanker connections on request, e.g. SMS, DS, RJT or IDF*

Tank control PCV3 and display

- All electrical tank components 1 ~ 230V 50Hz
  ☞ *Other voltages / frequencies on request*
- Milk temperature control with electronic operating unit PCV3
  ☞ *See 3.1.2 PCV3 control unit*
- The counter plug is mounted on the control box
- The plug is always included in the supply

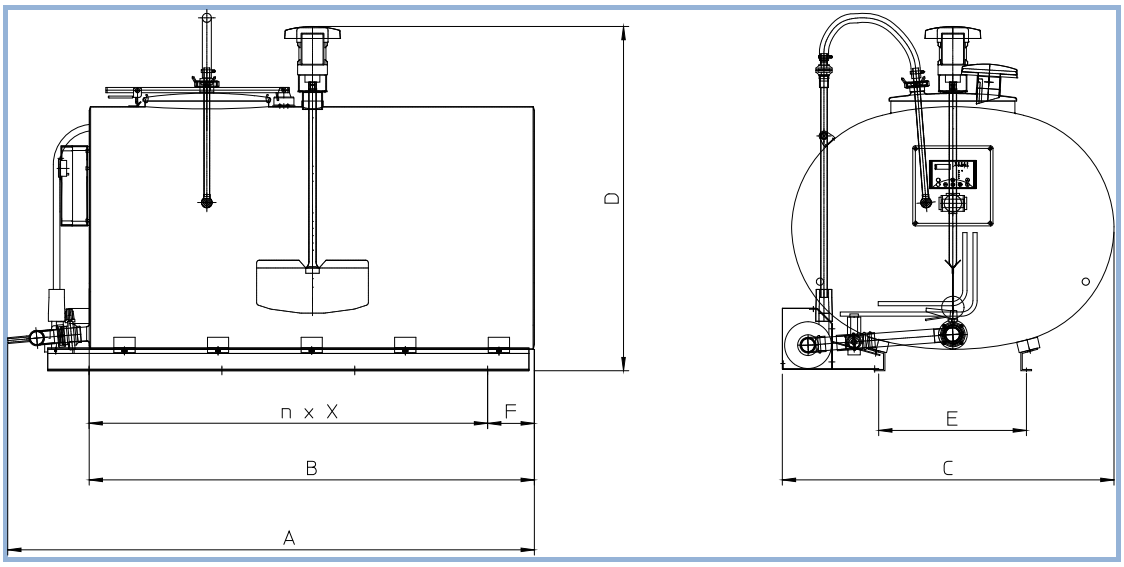
Cooling and agitation

- Special laser welded heat exchanger for ice water results in an efficient cooling
- A **separate ice builder** provides the ice water
- **Very fast cooling** with **no risk of freezing** even the smallest quantities of milk
- A high cooling capacity is guaranteed
- Equipped with 1 agitator motor, vertically mounted with stainless steel hood
- Ice water connection with quick coupling

Cleaning

- 2 automatic dosing pumps for alkaline & acid are standard
  ☞ *Option: third dosing pump*
- Time controlled water quantity
- **High pressure spray ball**
- Powerful stainless steel cleaning pump

Dimensions milk cooling tank TRT



Type TRT	V nom	V max	A	B	C	D	E	F	n x X
	L	L	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
1050	1050	1071	1982	1675	1250	1300	562	176	3 x 500
1300	1300	1326	1923	1611	1345	1440	562	129,5	3 x 500
1700	1700	1734	2381	2069	1345	1440	562	207	3 x 600
2100	2100	2142	2864	2552	1345	1440	562	350	4 x 500
2500	2500	2550	3414	3090	1345	1440	562	320	(2x500)+(1x612)+(2x500)

Corresponding ice builders PIB

	Traditional milking – PIB has energy storage for the cooling of 1 milking		
	2 milkings	**4 milkings**	**6 milkings**
TRT	*No-pre-cooling with well water to 23°C*		
1050	PIB 25	PIB 13	PIB 8
1300	PIB 25	PIB 13	PIB 8
1700	PIB 40	PIB 25	PIB 13
2100	PIB 40	PIB 25	PIB 13
2500	PIB 60	PIB 25	PIB 25

IMPORTANT:

- On request: Corresponding ice builder in case of building energy for the cooling of 2 milkings.

3.3 Options for closed model milk cooling tanks

3.3.1 GENERAL options closed model milk cooling tanks

3.3.1.1 Individual calibration of the tank

In many countries the payment for the milk is based on the measurement of the milk quantity in the tank.

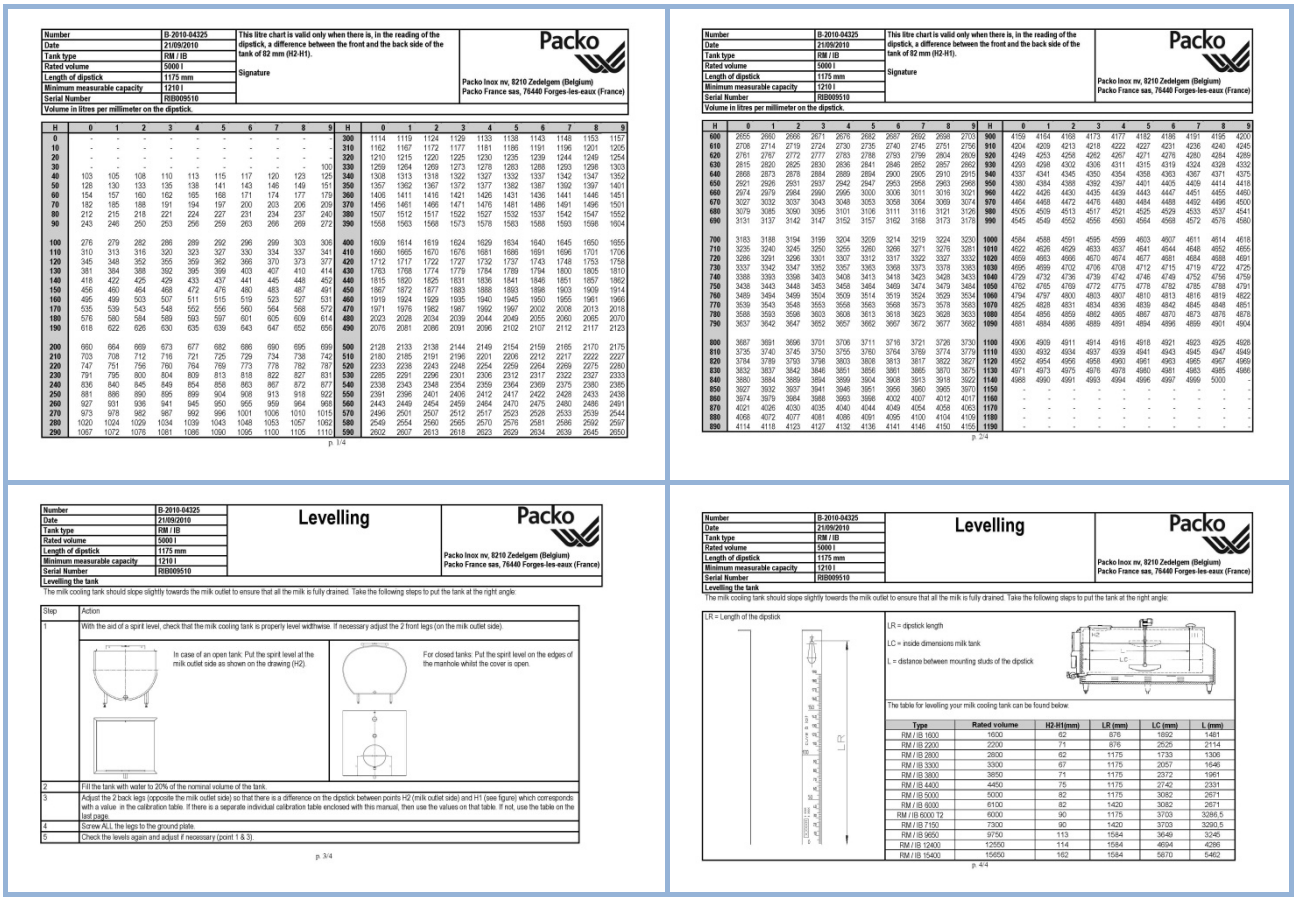
This is done based on the reading of the dipstick and the calibration chart.

A calibration (or volume) chart used for payment purpose can only be made when the tank has been individually calibrated. In other cases an indication table is provided which cannot be used for payments.

Description

- Individually placing the tank in its reference position
- Tank batch filling with calibrated quantities of cold water (<10°C)
- Calculation of a volume table (mm – litres)
- Volume table printed on waterproof chart

Example of calibration chart of a 5000 RM/IB:



Number	B 2010-04325
Date	21/09/2010
Tank type	RM / IB
Rated volume	5000 l
Length of dipstick	1175 mm
Minimum measurable capacity	1210 l
Serial Number	RIB009510

This litre chart is valid only when there is, in the reading of the dipstick, a difference between the front and the back side of the tank of 82 mm (H2-H1).

Signature

Packo

Packo Inox nv, 8210 Zedelgem (Belgium)
Packo France sas, 76440 Forges-les-eaux (France)

Volume in litres per millimeter on the dipstick.

H	0	1	2	3	4	5	6	7	8	9
0	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	100
40	103	105	108	110	113	115	117	120	123	125
50	128	130	133	135	138	141	143	146	149	151
60	154	157	160	162	165	168	171	174	177	179
70	182	185	188	191	194	197	200	203	206	209
80	212	215	218	221	224	227	231	234	237	240
90	243	246	250	253	256	259	263	266	269	272
100	276	279	282	286	289	292	296	299	303	306
110	310	313	316	320	323	327	330	334	337	341
120	345	348	352	355	359	362	366	370	373	377
130	381	384	388	392	395	399	403	407	410	414
140	418	422	425	429	433	437	441	445	448	452
150	456	460	464	468	472	476	480	483	487	491
160	495	499	503	507	511	515	519	523	527	531
170	535	539	543	548	552	556	560	564	568	572
180	576	580	584	589	593	597	601	605	609	614
190	618	622	626	630	635	639	643	647	652	656
200	660	664	669	673	677	682	686	690	695	699
210	703	708	712	716	721	725	729	734	738	742
220	747	751	756	760	764	769	773	778	782	787
230	791	795	800	804	809	813	818	822	827	831
240	836	840	845	849	854	858	863	867	872	877
250	881	886	890	895	899	904	908	913	918	922
260	927	931	936	941	945	950	955	959	964	968
270	973	978	982	987	992	996	1001	1006	1010	1015
280	1020	1024	1029	1034	1039	1043	1048	1053	1057	1062
290	1067	1072	1078	1081	1086	1090	1095	1100	1105	1110
300	1114	1119	1124	1129	1133	1138	1143	1148	1153	1157
310	1162	1167	1172	1177	1181	1186	1191	1196	1201	1205
320	1210	1215	1220	1225	1230	1235	1239	1244	1249	1254
330	1259	1264	1269	1273	1278	1283	1288	1293	1298	1303
340	1308	1313	1318	1322	1327	1332	1337	1342	1347	1352
350	1357	1362	1367	1372	1377	1382	1387	1392	1397	1401
360	1406	1411	1416	1421	1426	1431	1436	1441	1446	1451
370	1456	1461	1466	1471	1476	1481	1486	1491	1496	1501
380	1507	1512	1517	1522	1527	1532	1537	1542	1547	1552
390	1558	1563	1568	1573	1578	1583	1588	1593	1598	1604
400	1609	1614	1619	1624	1629	1634	1640	1645	1650	1655
410	1660	1665	1670	1676	1681	1686	1691	1696	1701	1706
420	1712	1717	1722	1727	1732	1737	1743	1748	1753	1758
430	1763	1768	1774	1779	1784	1789	1794	1800	1805	1810
440	1815	1820	1825	1831	1836	1841	1846	1851	1857	1862
450	1867	1872	1877	1883	1888	1893	1898	1903	1909	1914
460	1919	1924	1929	1935	1940	1945	1950	1955	1961	1966
470	1971	1976	1982	1987	1992	1997	2002	2008	2013	2018
480	2023	2028	2034	2039	2044	2049	2055	2060	2065	2070
490	2076	2081	2086	2091	2096	2102	2107	2112	2117	2123
500	2128	2133	2138	2144	2149	2154	2159	2165	2170	2175
510	2180	2185	2191	2196	2201	2206	2212	2217	2222	2227
520	2233	2238	2243	2248	2254	2259	2264	2269	2275	2280
530	2285	2291	2296	2301	2306	2312	2317	2322	2327	2333
540	2338	2343	2348	2354	2359	2364	2369	2375	2380	2385
550	2391	2396	2401	2406	2412	2417	2422	2428	2433	2438
560	2443	2449	2454	2459	2464	2470	2475	2480	2486	2491
570	2496	2501	2507	2512	2517	2523	2528	2533	2539	2544
580	2549	2554	2560	2565	2570	2576	2581	2586	2592	2597
590	2602	2607	2613	2618	2623	2629	2634	2639	2645	2650

p. 1/4

Number	B 2010-04325
Date	21/09/2010
Tank type	RM / IB
Rated volume	5000 l
Length of dipstick	1175 mm
Minimum measurable capacity	1210 l
Serial Number	RIB009510

This litre chart is valid only when there is, in the reading of the dipstick, a difference between the front and the back side of the tank of 82 mm (H2-H1).

Signature

Packo

Packo Inox nv, 8210 Zedelgem (Belgium)
Packo France sas, 76440 Forges-les-eaux (France)

Volume in litres per millimeter on the dipstick.

H	0	1	2	3	4	5	6	7	8	9
600	2655	2660	2666	2671	2676	2682	2687	2692	2698	2703
610	2708	2714	2719	2724	2730	2735	2740	2745	2751	2756
620	2761	2767	2772	2777	2783	2788	2793	2799	2804	2809
630	2815	2820	2825	2830	2836	2841	2846	2852	2857	2862
640	2868	2873	2878	2884	2889	2894	2900	2905	2910	2915
650	2921	2926	2931	2937	2942	2947	2953	2958	2963	2968
660	2974	2979	2984	2990	2995	3000	3006	3011	3016	3021
670	3027	3032	3037	3043	3048	3053	3058	3064	3069	3074
680	3079	3085	3090	3095	3101	3106	3111	3116	3121	3126
690	3131	3137	3142	3147	3152	3157	3162	3168	3173	3178
700	3183	3188	3194	3199	3204	3209	3214	3219	3224	3230
710	3235	3240	3245	3250	3255	3260	3266	3271	3276	3281
720	3286	3291	3296	3301	3307	3312	3317	3322	3327	3332
730	3337	3342	3347	3352	3357	3363	3368	3373	3378	3383
740	3388	3393	3398	3403	3408	3413	3418	3423	3428	3433
750	3438	3443	3448	3453	3458	3464	3469	3474	3479	3484
760	3489	3494	3499	3504	3509	3514	3519	3524	3529	3534
770	3539	3543	3548	3553	3558	3563	3568	3573	3578	3583
780	3588	3593	3598	3603	3608	3613	3618	3623	3628	3633
790	3637	3642	3647	3652	3657	3662	3667	3672	3677	3682
800	3687	3691	3696	3701	3706	3711	3716	3721	3726	3730
810	3735	3740	3745	3750	3755	3760	3764	3769	3774	3779
820	3784	3789	3793	3798	3803	3808	3813	3817	3822	3827
830	3832	3837	3842	3846	3851	3856	3861	3865	3870	3875
840	3880	3884	3889	3894	3899	3904	3908	3913	3918	3922
850	3927	3932	3937	3941	3946	3951	3956	3960	3965	3970
860	3974	3979	3984	3988	3993	3998	4002	4007	4012	4017
870	4021	4026	4030	4035	4040	4044	4049	4054	4058	4063
880	4068	4072	4077	4081	4086	4091	4095	4100	4104	4109
890	4114	4118	4123	4127	4132	4136	4141	4146	4150	4155
900	4159	4164	4168	4173	4177	4182	4186	4191	4195	4200
910	4204	4209	4213	4218	4222	4227	4231	4236	4240	4245
920	4249	4253	4258	4262	4267	4271	4276	4280	4284	4289
930	4293	4298	4302	4306	4311	4315	4319	4324	4328	4332
940	4337	4341	4345	4350	4354	4358	4363	4367	4371	4375
950	4380	4384	4388	4392	4397	4401	4405	4409	4414	4418
960	4422	4426	4430	4435	4439	4443	4447	4451	4455	4460
970	4464	4468	4472	4476	4480	4484	4488	4492	4496	4500
980	4505	4509	4513	4517	4521	4525	4529	4533	4537	4541
990	4545	4549	4552	4556	4560	4564	4568	4572	4576	4580
1000	4584	4588	4591	4595	4599	4603	4607	4611	4614	4618
1010	4622	4626	4629	4633	4637	4641	4644	4648	4652	4655
1020	4659	4663	4666	4670	4674	4677	4681	4684	4688	4691
1030	4695	4699	4702	4706	4708	4712	4715	4719	4722	4725
1040	4729	4732	4736	4739	4742	4746	4749	4752	4756	4759
1050	4762	4765	4769	4772	4775	4778	4782	4785	4788	4791
1060	4794	4797	4800	4803	4807	4810	4813	4816	4819	4822
1070	4825	4828	4831	4834	4838	4839	4842	4845	4848	4851
1080	4854	4856	4859	4862	4865	4867	4870	4873	4876	4878
1090	4881	4884	4886	4889	4891	4894	4896	4899	4901	4904
1100	4906	4909	4911	4914	4916	4918	4921	4923	4925	4928
1110	4930	4932	4934	4937	4939	4941	4943	4945	4947	4949
1120	4952	4954	4956	4958	4960	4961	4963	4965	4967	4969
1130	4971	4973	4975	4978	4978	4980	4981	4983	4985	4986
1140	4988	4990	4991	4993	4994	4996	4997	4999	5000	-
1150	-	-	-	-	-	-	-	-	-	-
1160	-	-	-	-	-	-	-	-	-	-
1170	-	-	-	-	-	-	-	-	-	-
1180	-	-	-	-	-	-	-	-	-	-
1190	-	-	-	-	-	-	-	-	-	-

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Number	B 2010-04325
Date	21/09/2010
Tank type	RM / IB
Rated volume	5000 l
Length of dipstick	1175 mm
Minimum measurable capacity	1210 l
Serial Number	RIB009510

Levelling

Packo

Packo Inox nv, 8210 Zedelgem (Belgium)
Packo France sas, 76440 Forges-les-eaux (France)

Levelling the tank

The milk cooling tank should slope slightly towards the milk outlet to ensure that all the milk is fully drained. Take the following steps to put the tank at the right angle:

Step	Action
1	With the aid of a spirit level, check that the milk cooling tank is properly level widthwise. If necessary adjust the 2 front legs (on the milk outlet side). In case of an open tank: Put the spirit level at the milk outlet side as shown on the drawing (H2). For closed tanks: Put the spirit level on the edges of the manhole whilst the cover is open.
2	Fill the tank with water to 20% of the nominal volume of the tank.
3	Adjust the 2 back legs (opposite the milk outlet side) so that there is a difference on the dipstick between points H2 (milk outlet side) and H1 (see figure) which corresponds with a value in the calibration table. If there is a separate individual calibration table enclosed with this manual, then use the values on that table. If not, use the table on the last page.
4	Screw ALL the legs to the ground plate.
5	Check the levels again and adjust if necessary (point 1 & 3).

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Number	B 2010-04325
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Levelling

Packo

Packo Inox nv, 8210 Zedelgem (Belgium)
Packo France sas, 76440 Forges-les-eaux (France)

Levelling the tank

The milk cooling tank should slope slightly towards the milk outlet to ensure that all the milk is fully drained. Take the following steps to put the tank at the right angle:

LR = Length of the dipstick

LR = dipstick length
LC = inside dimensions milk tank
L = distance between mounting studs of the dipstick

The table for levelling your milk cooling tank can be found below.

Type	Rated volume	H2-H1(mm)	LR (mm)	LC (mm)	L (mm)
RM / IB 1600	1600	62	876	1692	1481
RM / IB 2200	2200	71	876	2525	2114
RM / IB 2800	2800	62	1175	1733	1306
RM / IB 3300	3300	67	1175	2057	1646
RM / IB 3900	3850	71	1175	2372	1961
RM / IB 4400	4450	75	1175	2742	2331
RM / IB 5000	5000	82	1175	3082	2671
RM / IB 6000	6100	82	1420	3082	2671
RM / IB 6000 T2	6000	90	1175	3703	3286,5
RM / IB 7150	7300	90	1420	3703	3290,5
RM / IB 9650	9750	113	1584	3648	3245
RM / IB 12400	12550	114	1584	4694	4296
RM / IB 15400	15650	162	1584	5870	5462

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Range of application: **ALL tanks exclusive the TRT and vertical tanks (VM-type)**

3.3.1.2 ECO-TRONIC electronic expansion valve

Ultra modern

Besides the Packo Eco-Cool cooling units, the Packo milk cooling tank performs a prominent and very important role in an energy efficient and reliable cooling of milk.

Packo milk cooling tanks can be equipped with an *electronically controlled refrigeration* system. Via the **Packo Eco-Tronic** system the optimal amount of refrigerant is injected in the laser welded cooling jacket in each stage of the cooling process.

Since ultimately the refrigerant cools down the milk, it's obvious this system has an important influence on the energy consumption and the cooling speed of the milk.

Packo Eco-Tronic

The **Packo Eco-Tronic** ensures:

- the refrigerant is evaporated **completely** => no risk of sending liquid refrigerant back to the compressor
- the refrigerant is evaporated over the **total surface of the evaporator** => every square centimetre of the laser welded evaporator is used optimally
- the correct amount of refrigerant is injected according to the size of the milk cooling tank in each stage of the cooling process
- an optimal cooling in all circumstances, such as different ambient and milk temperatures
- a faster regulation
- a reliable operation thanks to the back-up battery in case of power cut-off
- a more efficient assembling and start-up

Thanks to the typical Packo cooling system you can have an additional **energy saving of +/- 10 %.**

Eco-Tronic mounted on the tank and protected by a stainless steel hood

☞ *Standard installed on LS-LEM/DX from 17.650 L onwards and on all VM/DX tanks*
☞ *Optional for LS/DX < 17.650 L and for all REM-RS/DX tanks*

Remark:
When you will receive for the first time a milk cooling tank with Eco-Tronic, please order the programming set "Programming module & communication cable" : Packo reference: 168450.

Range of application:	**Possible on all closed DX-tanks**

3.3.1.3 Cooling pipes bent to the side of the tank

- In case of lack of space, the tank can be ordered executed with cooling pipes bent to the left (L) or right (R) hand side from point of view outlet tank.

- Including protective stainless steel hood.
- The pipes are bent to the side of the tank
- The expansion valves can easily be reached from the side of the tank
- Tank can be placed almost against the wall
  - ⇨ Space saving of +/- 60 cm

Example of bended cooling pipes on the right hand side

Range of application:	**All closed horizontal DX-tanks**

3.3.1.4 Control unit and stairs switch places

- In some cases it can be useful or required to switch the control unit and the stairs from places.
  - ⇨ Control unit is mounted on the right side, the stairs on the left side from point of view outlet tank.

Range of application:	All closed horizontal tanks

3.3.1.5 Shorter legs

- In case of height problems, in some cases the tank can be executed with shorter legs to win some height.

☞ ***Kindly contact Packo to know the possibilities before confirming to the customer.***

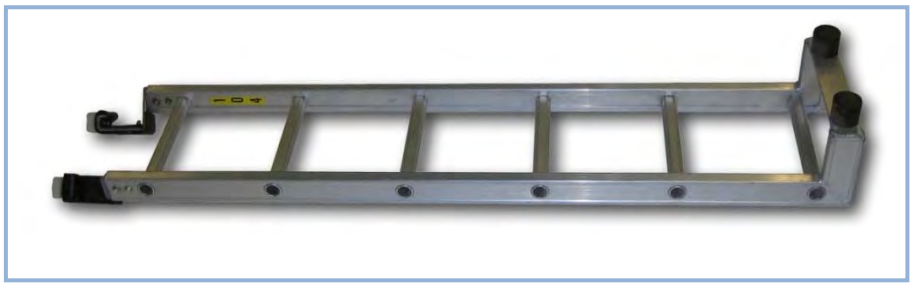
☞ *Kindly check the local directives in relation to the height between the tanker connection and the floor*

Range of application:	All closed horizontal REM-RS & LEM-LS/DX – DIB tanks

3.3.1.6 Ladder for inside tank inspection

☞ ***According to the EU-directives, a safe possibility must be foreseen to climb inside the tank for inspection and / or manual cleaning.***

- Stable aluminium ladder
- Rounded steps to avoid injuries
- Hooks with rubber to protect manhole side from damage
- Lower part foreseen with rubber blocks to protect the inside of the tank from damage



Range of application:	**ALL closed horizontal tanks**

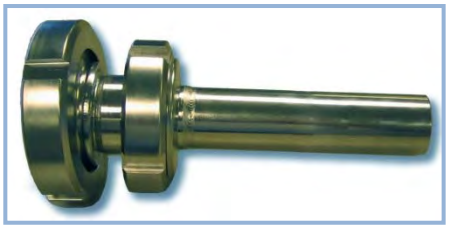
3.3.1.7 Bottom filling

The “normal” way of filling the milk in the horizontal tank is through the manhole cover or from the top side of the tank. Milk filled from the top can easily be damaged (creating Free Fatty Acids).

To avoid milk damage and fat separation we developed the bottom inlets below. The tank is filled through its outlet.

Characteristics

- Variant 1: Bottom inlet with non-return valve



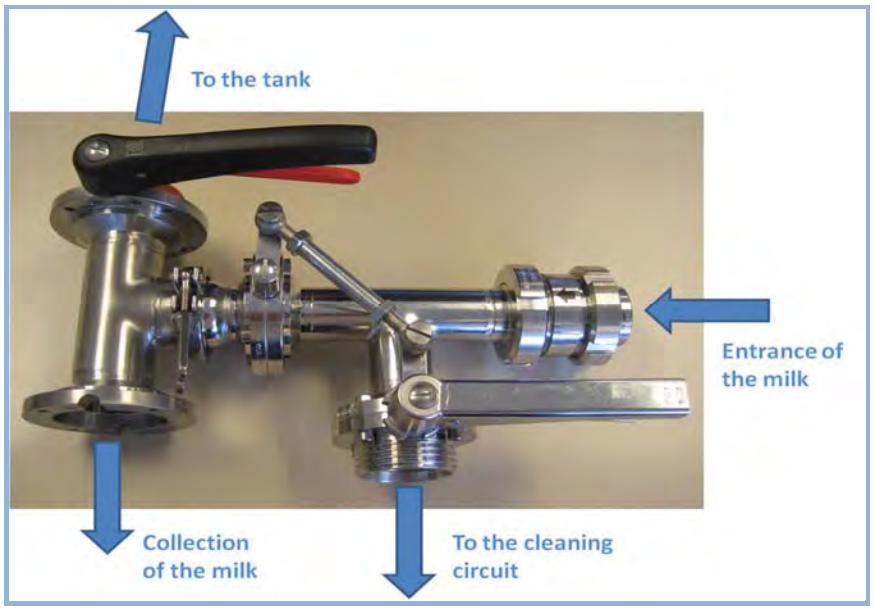
- Connection to milk outlet
- Including a non-return valve with stainless steel reinforcement

Part numbers:

Tanker connection	Diameter milk supply line		
	Ø 32	**Ø 40**	**Ø 52**
NW50	214609	204013	149474
NW65	220318	220319	220320
DS 2"	49751	210039	
DS 2 1/2"	210038		
SMS 2"		229710	
RJT 2"	217696	217695	217869

☞ This variant has to be disconnected each time the tank is emptied and cleaned together with the milking system

- Variant 2: Bottom filling with 2 interlocking valves for milk outlet



- Connection between tank outlet and butterfly valve
- Stainless Steel 3-way valve DN40 to open milk delivery line to tank or milk return pipe
  1. Milk in tank → return pipe is closed
  2. Wash water in return pipe → tank is closed
- Non-return valve DN40

☞ Automatically cleaned together with the cleaning of the milk supply line.

- Variant 3: Tri-clamp coupling with butterfly valve

- Tri-clamp coupling with butterfly valve DN50/65/80 to connect milk supply line for 22 mm, 32 mm or 40 mm
- Customer has to foresee the other parts to complete the bottom filling

☞ Black handle is supplied separately and can be used for service purposes.

Range of application:	**ALL closed tanks**

3.3.1.8 Sample tap with goose neck

- To connect to the tank outlet allowing to take small quantities of milk from the tank, e.g. for personal use
- To be disconnected and cleaned after each use
- Completely made in stainless steel
- Possible to pour directly into a bucket or other recipient
- Possible connections: NW50 – NW65 - 2” - 3”

Connection	Part no.
NW50	201849
NW65	220304
SMS2”	164391
SMS3”	228417

☞ Manual cleaning required !!

Goose neck

Range of application:	**ALL milk cooling tanks**

3.3.1.9 Two cooling units instead of standard one

Sometimes it is advisable to install two cooling units on the milk cooling tank instead of the standard one cooling unit.

In this case, there are the following advantages:

- Limitation of the compressor starting current
- Operational safety with 2 cooling units instead of 1

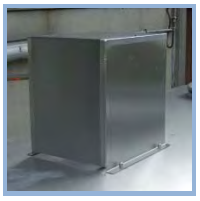
Range of application:	**ALL horizontal closed tanks**

3.3.1.10 Options related to installation of the horizontal milk cooling tank outside

In case the dairy is too small and extension of the existing or building of a new dairy is not possible, then it could be a solution to install the horizontal tank outside.

Example of an outdoors REM/DX milk cooling tank – control unit inside the dairy

Therefore some extra parts are required:

- Stainless steel hood for the agitator motor(s) 
- Lock for the manhole cover 
- Vent brought inside the dairy 
  ☞ *if not required, a lockable stainless steel hood will be provided.*
- Extended milk outlet brought inside the dairy, well insulated 

☞ **Please consult the local regulations if it is allowed to have this kind of Installation/set up !**

Range of application:	**All horizontal closed DX or DIB-tanks**

Options only related to RM/IB milk cooling tanks:

3.3.1.11 Time clock for use of night rate electricity

☞ *included in the iControl control unit*

☞ *Only supplementary required for RM/IB (and REM/DIB, LEM/DIB, LS/DIB) tanks with PCV3-control unit*

- In areas with important difference between day and night rate, it can be interesting to build up the ice during the night

⇨ cheaper production of the cold energy

⇨ cooling unit is operating less during the day at a higher rate

- Therefore a time clock can be installed in the control unit of the milk cooling tank
- This option is standard included in the iControl unit itself; no need to order this option supplementary

Range of application:	**All RMIB-tanks with PCV3-control unit**

3.3.1.12 Set instant cooling

In case of pre-cooling or instant cooling with ice water, an extra ice water pump is required to send the ice water from the milk cooling tank to the pre-cooler.

The set is including:

- An extra ice water pump
- Ice water return pipe
- Extra controls

Range of application:	**All RMIB-tanks with iControl**

Options related to VERTICAL milk cooling tanks:

3.3.1.13 Alcove with air vent

In case it is preferable to foresee a vent on site, a liner and nut have to be purchased to provide the connection with the threaded part mounted on the tank.

3.3.1.14 Alcove with air vent

An alcove facilitates the installation of the vertical tank. The tank is placed face to a large opening in the wall of the dairy. The tank control, the bottom filling and the self-washing milk outlet with 80 mm butterfly valve and milk tanker connection are mounted on the tank. Easy access from the dairy to the tank control unit, the tank outlet and the manhole cover.
The air vent is brought inside the alcove.

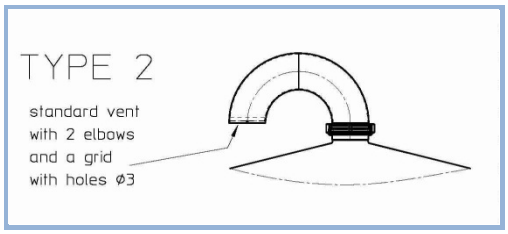
☞ *Only one size alcove is available ! The wall opening has to be min. 1640 mm wide and min. 2040 mm high.*

☞*The height of the concrete surface should be minimal equal to the height of the floor of the dairy.*

Alcove

3.3.1.15 Air vent of 180°

- Air vent with stainless steel bend of 180° and protective grid instead of the standard threaded part in case there is no alcove



3.3.1.16 Manhole cover on top

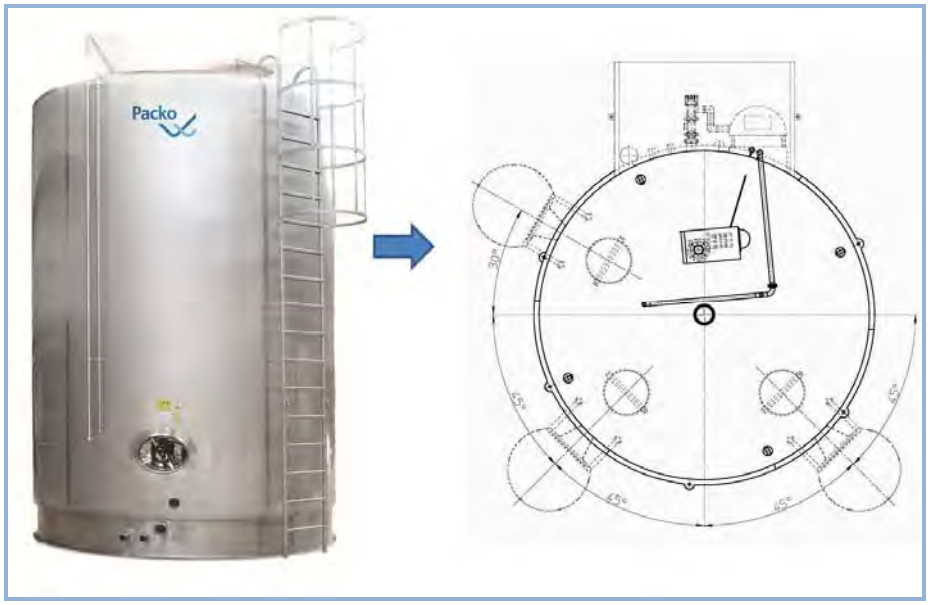
- Optional an additional manhole cover can be installed on the top of the tank
- Including lock
- The manhole cover on top can be mounted on 3 different positions seen from the tank outlet: 60° - 135° - 225° *(see the drawing below)*

Remark:
In some countries, this option is not advised for safety reasons.

Supplementary manhole cover

3.3.1.17 Stainless steel ladder

- Optional a stainless steel ladder can be mounted on the tank including a safety cage
- Mostly in combination with the option *"manhole cover on top"*
- The ladder can be mounted on 3 different positions seen from the tank outlet and anti-clockwise: 60° - 135° - 225°; on the same position of the manhole cover *(see the below drawing)*



Possible positions of the supplementary manhole cover & ladder

3.3.1.18 Stainless steel ladder bracket

- Optional a stainless steel ladder bracket can be supplied with the tank
- In this case the customer can easily slide his own ladder into this bracket

Ladder bracket

3.3.1.19 Self-cleaning sampling valve

- In some countries (e.g. Belgium and the Netherlands) the tank should be equipped with a sampling valve
- Mounted on the manhole cover in the jacket of the tank
- Possibility for taking samples by the dairy to collect a sample for testing purposes
- Hygienic, professional execution
- EHEDG & 3A certificate
  - ⇨ Perfect cleanable
- Self-cleaning: cleaning during the cleaning cycle of the tank *(connection of the black hose on the below picture)*
- Ideal in combination with the alcove

Self-cleaning sampling valve

3.3.1.20 Full tank detection

- Maximum level detection of the milk stored in the tank
- Including an electrical panel with warning light: is on when the max. volume is reached

3.3.1.21 Volume indication

- With this option it is possible to have a volume indication in % or kg/10 or L/10 of the quantity of milk stored in the tank, e.g. indication of 35 = 35%; indication of 100 = 100 x 10 = 1000 kg
- Accuracy +/- 60 Litres
- Maximum level indication is included
- Sensor mounted in the outlet of the tank
- Possible to set the amount of milk on which the warning light will be on
- Including:
    - Pressure transmitter mounted in the tank outlet (via a tri-clamp coupling)
    - Display with visual indication mounted on the tank at delivery
    - Warning light separately delivered

☞ **This volume indicator cannot be used for commercial use (for payments by the dairy).**

3.3.2 Options related to the CLEANING of closed model milk cooling tanks

3.3.2.1 Supplementary detergent dosing pump

- Standard the closed tanks are equipped with two pumps for dosing of detergent: alkaline and acid.
- In some cases a third dosing pump is required for the dosing of disinfection product.

Example of 3 dosing pumps built on the control box

Range of application:	All closed tanks

3.3.2.2 ECO-WASH cleaning

The **Packo ECO-WASH cleaning** results in a lower cold water and energy consumption and also in time profit compared to the standard cleaning system. The basis of the system is the iControl tank control with a supplementary reservoir of 20-25 Litres volume for cold water. This reservoir is automatically filled through a float valve. The filling of warm water is controlled through a level sensor, the tank will only be cleaned when there is enough warm water. This also prevents the dry run of the cleaning pump.

iControl unit with supplementary reservoir (top view)

In combination with robotic milking without buffer tank it is possible for the milk robot to re-start milking much sooner, which benefits the daily milk production.

Remark:

For installation of Eco-Wash following instructions have to be taken into account:

- Diameter of the conduct of cold and warm water should be minimal 3/4" up to the connection on the tank control unit
- Flow controllers in the water valves should be removed
- The warm water should have minimum 75°C at the tank control unit

  ☞ *to be checked by setting the end temperature of the cleaning water on 50-55°C instead of 40°C in the iControl parameters*

Program ECO-WASH:

1. *Cold pre-rinsing*: flush of 20-25 Litres with cold water to remove milk residues
2. *Cold pre-rinsing*: flush of 20-25 Litres with cold water to remove milk residues
3. *Warm rinsing*: 1% of the tank volume with hot water to remove last milk residues and to heat up the tank
4. *Main cleaning*: 1% of the tank volume with hot water and detergent
5. *Cold after rinsing*: flush of 20-25 Litres with cold water to remove the residues of cleaning media
6. *Cold after rinsing*: flush of 20-25 Litres with cold water to remove the residues of cleaning media

Range of application:	**All tanks with iControl**

3.3.2.3 Second drain valve - Eco-drain

- In case the first pre-rinsing water, including the milk residues, and the rest of the cleaning water should be separated, a second drain valve should be installed.
- In some cases the cleaning water, exclusive the first rinsing water, can be recuperated and used for cleaning of surfaces, such as floors, milking parlour, etc.

Range of application:	**All tanks with automatic cleaning**

3.3.2.4 Detection “nearly” empty containers detergent

- It is advisable to have an announcement when the detergent containers are empty.
- Set is designed for 2 detergents
- After this announcement it is still possible to empty the tank once or twice before the recipient should be filled.

Set of two probes

Range of application:	**All closed tanks with iControl unit**

3.3.2.5 In-line heating

- **Additional** heating of the cleaning water during the main washing step
- Installation of an electrical heating element of 7.5 kWatt including supply of a set pressure line
- The cleaning water temperature is measured and checked during circulation. If the temperature is too low according to the set parameters there will be an automatic in-line heating. Once the required temperature is reached, the cleaning program continues.

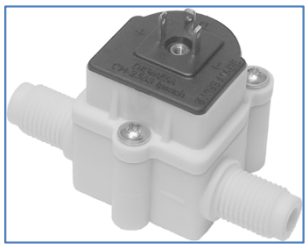
☞ **This option does not replace a hot water boiler!**

Heating element mounted in line

Range of application:	All tanks with iControl

3.3.2.6 Volume counter alkaline detergent

- When the customer wants to know the total use/consumption of **alkaline** detergent, it is possible to install a volume counter totalizing the amount of detergent used.
- Volume counter is installed in line and display is mounted next to the control unit.



Sensor and display

Range of application:	All tanks with dosing pumps

3.3.3 OCULUS – Tank guard

Independent milk tank guard

Monitoring of milk temperature, cooling, agitation, cleaning, … The Oculus works with a **highly accurate temperature sensor** (on the wall of the tank) **and a level sensor** (in the milk through the vent). On top of that there is the agitation measurement for each agitator.
Therefore you know exactly what happens in the milk, you don't have to guess…

IMPORTANT:

In combination with the iControl unit, the software for the tank guard is integrated. In case the tank guard is required, kindly confirm at order (to be marked on the order form). In this case the sensor will be supplied.

Standard equipment

- ☐ **Software**
  - Integrated in the iControl control unit

  - Visual alarm
    - ⇨ Green color changes into purple/blue
    - ⇨ Is "not loading" alarm
    - ⇨ In case of:
      - Exceeding temperature-time between 2 collections
      - Maximum power failure (voltage interruption)
      - System failure, e.g. failure sensor
      - Tank not cleaned on time
      - Milk too warm during 2nd and next milkings

- ❑ **Sensor**
  - Probe for the measurement of the milk- and cleaning water temperature
  - Level sensor depends on the tank volume

- ❑ **Agitation measurement**
  - Agitation measurement: on the paddle there is a sensor mounted which detects the agitation movement
  - There is a measurement on each agitator paddle

Options

- Extern acoustic alarm (sirene)
- Extern visual alarm (flashing light)

Range of application:	**All new closed tanks with iControl control unit**

3.3.4 Digital milk volume indicator

Digital volume content indicator

Don't lose time to measure the milk quantity in the tank.
The volume indicator provides you with a simple readout of the milk volume in the tank

☞ **This volume indicator cannot be used for commercial use (for payments by the dairy).**
☞ **The volume indicator should still be calibrated on site during start-up of the milk cooling tank.**

Standard equipment

- Electronics with digital display
- Indication in litres or mm
- Control box provides power supply to the sensor
- Watertight housing IP 65
- Level sensor with magnetic floater, precise and reliable
- Stainless steel sensor cover
- For calibration / service:
  User friendly interface with RS 232, PC serial cable and software
  ☞ *Cable and software can be ordered at Packo*
- Easy set-up with computer utility, loading of volume chart
- Accuracy of the measurements: +/- 1 mm

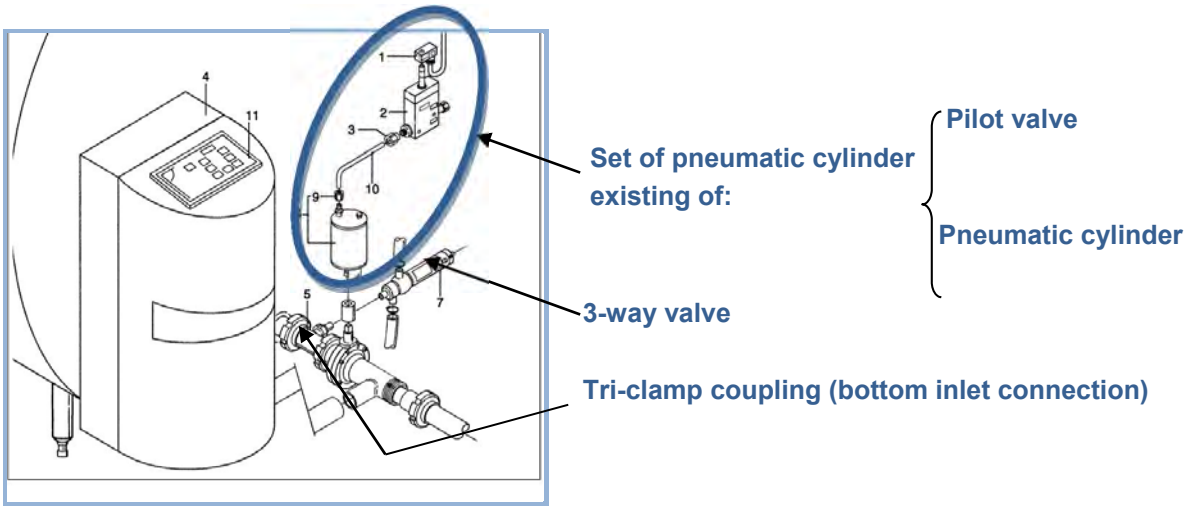
Sensor

Volume indicator

Range of application:	**All closed calibrated tanks (not possible on VM-range)**

3.3.5 Options in combination with robotic milking systems

3.3.5.1 Connections on the milk cooling tank in case of robotic milking



Schematic drawing of the set up of the items on the milk cooling tank in combination with robotic milking

Range of application:	All tanks with iControl control unit

3.3.5.1.1 Bottom inlet connection

- Tri-clamp coupling with butterfly valve DN50, 65 or 80 for supply line diam. 22 mm
- Possible up to 4 supply lines.

Example of a bottom inlet connection for 1 supply line

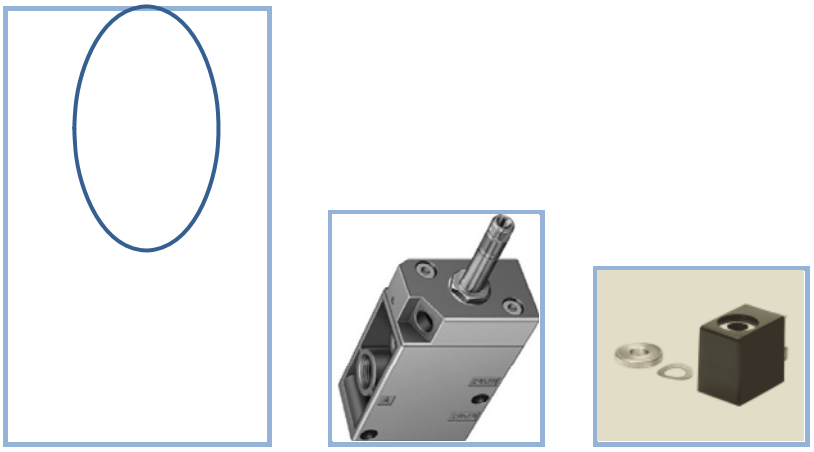
3.3.5.1.2 Set of pneumatic cylinder for tank outlet

For butterfly valves DN50 or 65 or 80

Including:

- Pneumatic cylinder to open/close the butterfly valve tank outlet
- Pilot valve
- Coil for pilot valve
- Couplings for air hose

☞ *Air hose is not included in the supply !*



Pneumatic cylinder – pilot valve and coil

3.3.5.1.3 Three-way valve for robot connection

- To install in the milk supply line from the milking robot
- Foreseen with welded flange 2” for tri-clamp coupling
- 2 x DN20 connections

☞ *In most of the cases this 3-way valve is supplied by the supplier of the automatic milking system ! Please consult!*

Three-way valve mounted on the tank outlet

3.3.5.2 Soft Start Cooling (SSC)

An *Ice Bank* tank can cool the smallest quantity of milk without the risk of freezing. For robotic milking clearly the best cooling system is the Ice Bank system.

For tanks with ***direct expansion*** (DX), the situation is slightly different:
When the robot starts milking in an empty tank with direct expansion, there is always the risk of freezing the milk.

Each direct cooled Packo milk cooling tank can be equipped with the **Soft Start Cooling (SSC)** system. After collection and cleaning, the milk is cooled 'gently' with the first filling. The cooling is started immediately with the reception of the first milk.
The initial quantity of milk going into the tank, after it has been emptied and washed, is very small. Normal cooling cannot be done at this stage.
SSC provides a safe regulation of the milk cooling. SSC functions independently of the robot and works according to the quantity of the milk present in the tank. **SSC guarantees a 'gentle' cooling of the milk**, so that freezing of the milk can be avoided perfectly. Once the evaporator is sufficiently covered, the cooling will be automatically switched over to continuous full output.

Characteristics

- Level switch with sensor to measure the milk level in the tank
- Low pressure switch
- Controlling of the compressor(s) via iControl
- Electronic fan speed control of the cooling unit(s) integrated in the Eco-Cool cooling unit(s)

Remarks:

- If the milk cooling tank is ordered without Eco-Cool cooling unit, the customer has to foresee electronic fan speed control *(see options refurbishment)*
- In case of 2 cooling units, order SSC for 2 cooling units.
- In case of 4 cooling units, SSC will only be connected on the 2 cooling units from the lower heat exchangers => SSC for 2 cooling units to be offered to the customer.

3.3.5.3 Buffer tank

To optimize the daily number of milkings per cow, the standstill of the milk robot (tank empting and washing) is restricted to the minimum. Therefore the installation of **a Packo buffer tank** is essential in the total project of robotic milking.

After the collection of the milk from the milk cooling tank, the milk is sent automatically to the buffer tank. Therefore it is possible to continue milking through the robot while the milk cooling tank is being cleaned thoroughly.

So the **milking rhythm of the animals will not be disturbed** by shutting down the milking robot unnecessarily.

As soon as the milk cooling tank is cleaned it can receive milk again from the robot. The robot milks into the tank and the milk in the buffer tank is also pumped to the milk cooling tank by a powerful Packo centrifugal pump (produced of high-quality stainless steel).

Description of the buffer tank:

- Tank made in **stainless steel AISI304**
- **Electrolytically polished**
- **Possible sizes: 250 - 350 - 500 Litres**
  ☞ *choice of the size is depending on the number of robots and on the time of milking in the buffer tank*
  ☞ *250 - 350 L is provided with wall mounting brackets; the 500 L has 3 legs and is freestanding on the floor*
- Powerful **Packo stainless steel centrifugal pump** for pumping the milk to the main milk cooling tank
- **Autonomous and automatic cleaning system** using the same Packo centrifugal pump and a fixed spray ball. The buffer tank is cleaned as soon as it is empty to avoid any possible contamination. The milk has no time to dry on the inner wall of the buffer tank. Thanks to this own system, the cleaning is entirely independent of the milking robot and the distance between the robot and the buffer tank. The cleaning pump takes care of the ideal water pressure and capacity at the level of the spray ball.
- Filling of the tank through level measurement
- **Control unit** in a stainless steel housing to be mounted on the wall (including fixation bolts), pre-mounted and tested, is including:
  - PLC-program
    ☞ *An additional PLC-program is required in case there is more than 1 supply line*
  - Automatic cleaning program (the same as on the cooling tank)
  - 2 dosing pumps alkaline and acid
  - Manual cleaning button
  - Controls for the centrifugal pump
- Including **minimum two 3-way valves**: one mounted in the milk supply line from the robot, one for pumping the milk to the main milk cooling tank or for cleaning purposes
  ☞ *Per additional supply line, an additional 3-way valve has to be installed*
  ☞ *It is possible to connect 4 supply lines to one buffer tank*

Advice

The adviced size of the buffer tank is depending on:

- The number of robots
- The cleaning time of the milk cooling tank
- The time required to empty the milk cooling tank

Summary

Number of supply lines:	1	2	3	4
Extra PLC-module	-	+1	+1	+1
Extra 3-way valve on buffer tank (standard 2 valves on buffer tank)	-	+1	+2	+3

The advantages of the Packo buffer tank are clear:

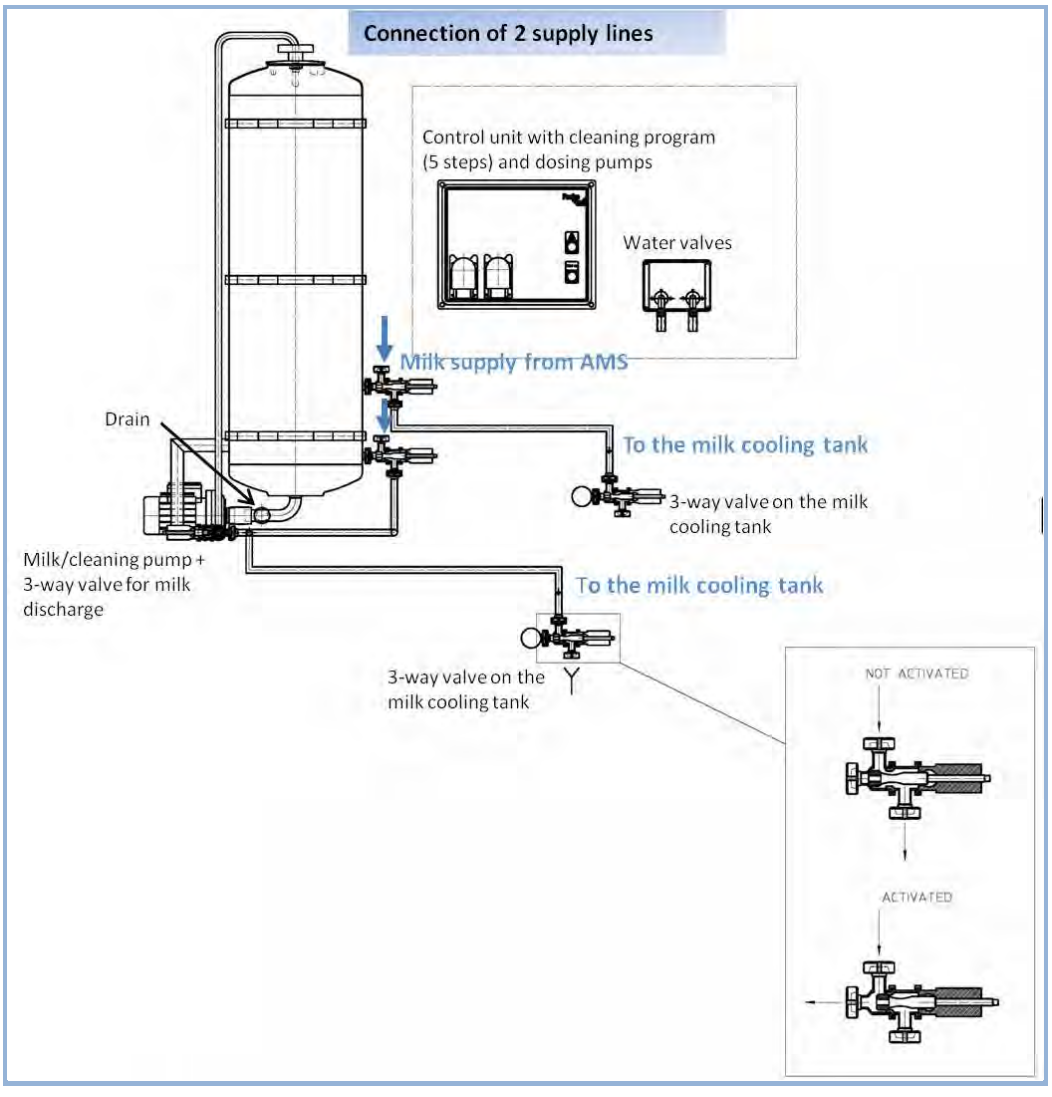
- Continuous milking is possible so that the milking rhythm is not disturbed; ensures a smooth operation of the milking-cooling-cleaning cycle
- Connection of more robots is possible
- Milking is independent of the cleaning of the milk cooling tank.
- No time losses during the cleaning and so a shorter return on investment.
- Automatic cleaning with detergents. No risk of quality loss as result of bad cleaning.
- Microprocessor controlled system including all magnetic valves, automatic cycle.
- Automatic dosing pumps for detergents (acid – alkaline).
- The dairy can collect the milk at any time.

Packo buffer tank & control unit

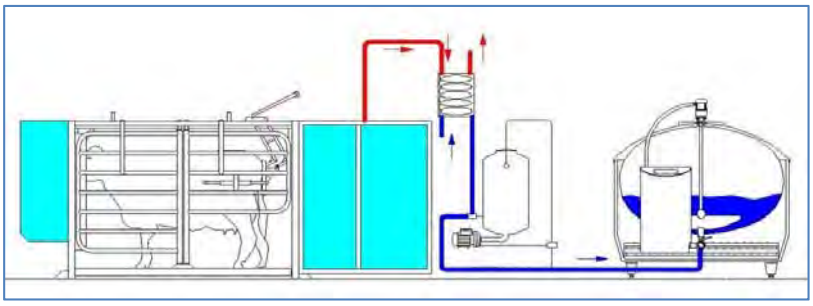
Remark:

It is important that the distance between the buffer tank and the main milk cooling tank is as small as possible, because the moment the robot stops milking in the main milk cooling tank, the amount of milk in the supply line between buffer tank and milk cooling tank will be sent to the drain.

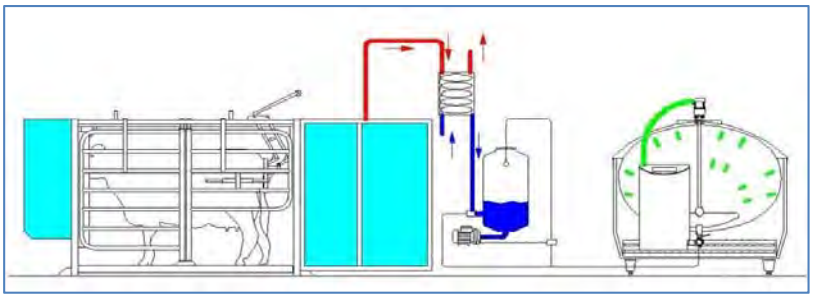
Working principle for 2 milk supply lines



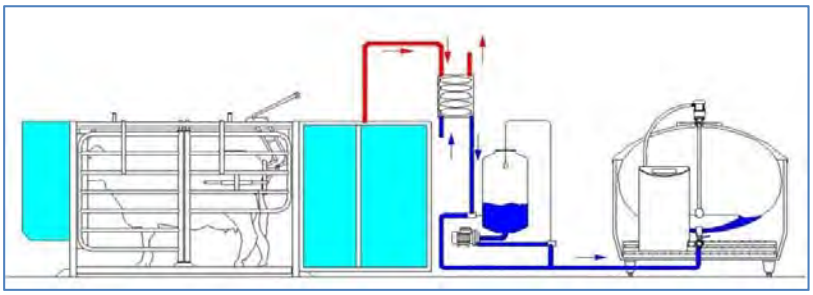
Schematic view of the different positions



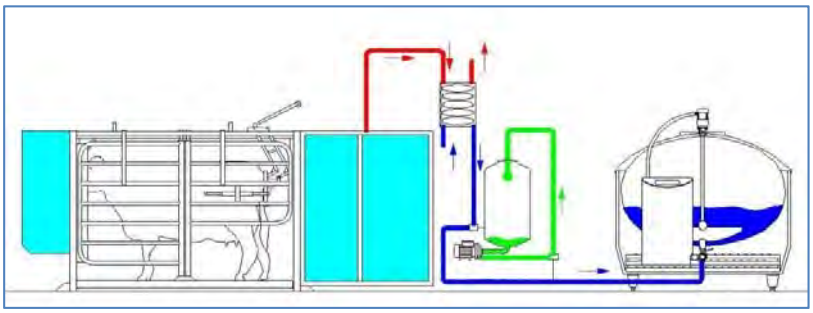
1.Transfer of the milk from the milking robot to the milk cooling tank



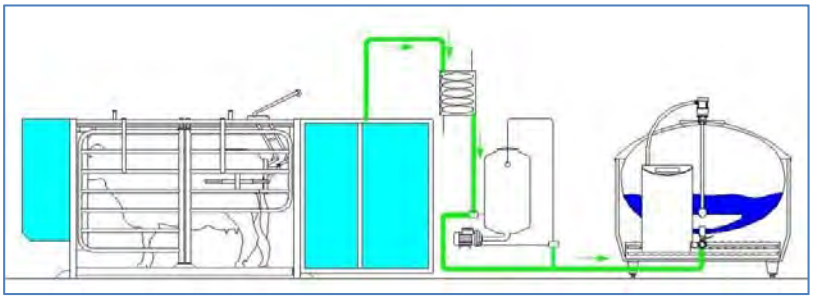
2.Milk is transferred to the buffer tank during cleaning of the milk cooling tank



3. After cleaning of the milk cooling tank, the milk is transferred from the buffer tank to the milk cooling tank

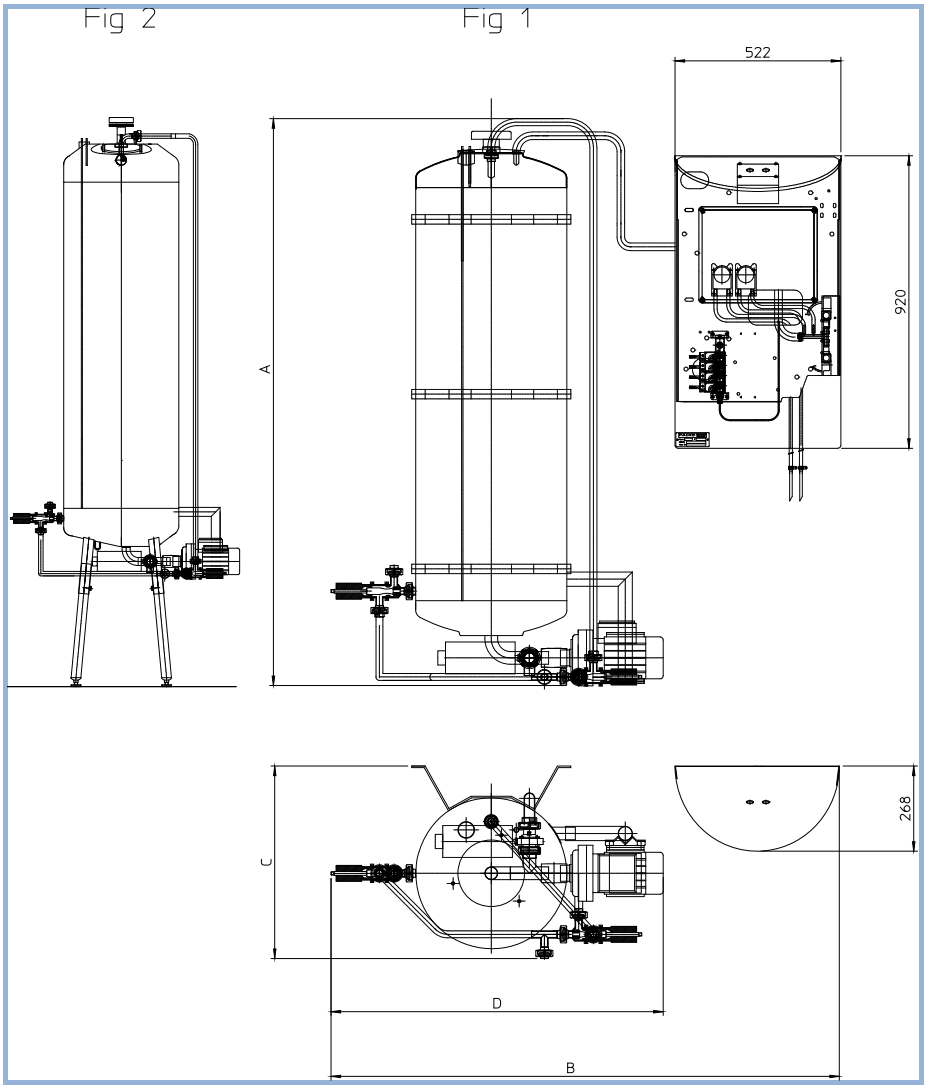


4.During the cleaning of the buffer tank, the milk is sent directly to the milk cooling tank



5.Cleaning of the milking robot and the milk supply line up to the milk cooling tank

Dimensions of the buffer tank and control unit



Model	A	B	C	D	Fig.
250	1785	1600	600	1045	1
350	1700	1660	665	1145	1
500	2810	1677	636	1122	2

(in mm)

☞ standard supply: 4 meter cable between control unit and buffer tank (longer on request)

4. ICE BUILDERS (PIB)

Contents

Application

- Ice water has been used for many years in dairy farms and collection centres because it can cool large amounts of milk in a very short time.
- A lot of energy can be stored on a small area, which results in a compact space saving unit. Thanks to this large ice reserve, a huge amount of ice water at 0,5 - 1 °C can be produced.
- With automatic milking systems there is no risk of freezing of even the smallest quantities of milk.

Remark:

For the requirements regarding the water quality: see installation manual

4.1 PACKO ICE BUILDER (PIB) 8-13 COMPACT

Characteristics

- Fully constructed of stainless steel 18/10 - AISI 304 => high resistance against eventual corrosion.
- **CFC-free** polyurethane foam for an **excellent insulation** and **extra strength** to the tank
- Built in evaporator:
  - existing of seamless copper tubes => less risk on leaks of the evaporator
  - fast and efficient ice accumulation thanks to an excellent cold transfer
- Mechanical water level control (float valve) => always the correct amount of water
- Ice water pump built on
- Cooling unit integrated (compact version): hermetic type, R404A refrigerant included, high/low pressure switch, including stainless steel protective hood
- Electrical control box incorporated
- **Efficient , reliable, no loss of space**
- Ready for use: no cooling technician required on site for start-up

Illustration PIB 8-13 Compact

PIB 8-13

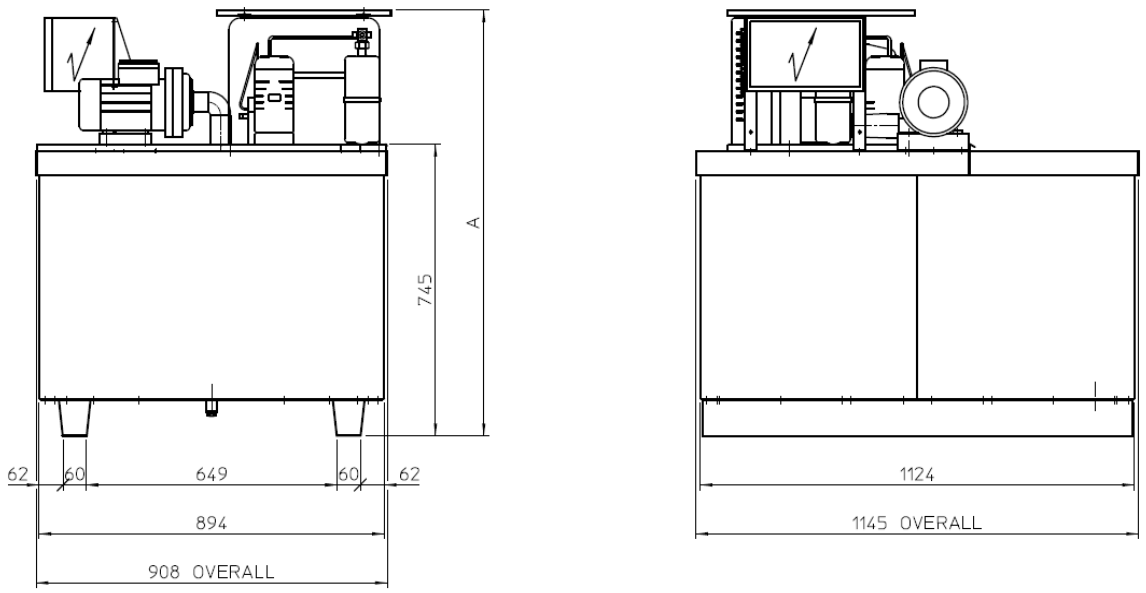
PIB compact - with cooling unit incorporated type R404A

Model	kcal	kWh	Cooling unit	Eco-Cool
			3 x 400 V - 50 Hz - R404A	
PIB 8	7570	8,8	TAJ T 9513 ZMHR	1.1
PIB 13	11488	13,4	TAJ T 4519 ZMHR	1.5

Remarks:

- Other voltages / frequencies and refrigerants on request.
- In case of execution for R22 refrigerant: PIB is not supplied with refrigerant.

Dimensions PIB 8-13 Compact



Model	Water [1]	Quantity of Ice	A	Legs	Net weight
	litres	*kg*	*mm*	*Number*	*kg*
8	396	95	1090	2 [2]	176 [3]
13	396	144	1200	2 [2]	186 [3]

[1] Filling quantity of water
[2] Longitudinal profiles, width 60 mm
[3] Cooling unit included, empty

4.2 PACKO ICE BUILDER (PIB) 25 – 370

Characteristics

- Fully constructed of stainless steel 18/10 - AISI 304 => high resistance against eventual corrosion.
- **CFC-free** polyurethane foam for an **excellent insulation** and **extra strength** to the tank
- The well dimensioned evaporator enables the storage of a large ice reserve; this guaranties a maximum cold transfer.
- Built in evaporator, mounted in a stainless steel frame for a long lifetime:
  - existing of copper tubes => less risk on leaks of the evaporator
  - fast and efficient ice accumulation thanks to an excellent cold transfer
- Ice water pump(s) built on
- Electrical control box incorporated
- **Efficient , reliable, no loss of space**

Ice accumulator controls

- Electrical control box incorporated (without cooling unit controls)
- An accurate ice thickness sensor activates the cooling system until an equal layer of ice is formed on all evaporator tubes.
- For PIB ≤ 160: executed with 2 ice thickness sensors: 50% and 100% use of its cooling capacity
  ☞ *50% ice thickness sensor; can be used in low milk yield periods or when the size is foreseen for future expansion*
- For PIB 230 & 370: executed with 3 ice thickness sensors: 50% and 100% use of its cooling capacity + minimum thickness sensor for automatic start of cooling unit(s) (instead of timer)
  ☞ *50% ice thickness sensor; can be used in low milk yield periods or when the size is foreseen for future expansion*
- The thermostatic expansion valves are pre-mounted.

Remark:

For PIB 230 & 370 on each cooling unit a selector switch AUTO/OFF is foreseen.

⇨ "intelligent" ice building: to determine how much energy should be built

Ice water agitation

- One (PIB25-160) or two (PIB230-370) high pressure single phase air blowers push compressed air through PVC collector on bottom of ice-builder for an even meltdown of the ice.
- Foreseen with non-return valve which prevents taking water into the air pipe

Advantages:

1. A big contact surface between ice and large amount of water thanks to the very long ice coil, e.g. more than 1 km and 8000 L water in a PIB370
2. Homogeneous distribution of the warm return water over the full water surface
3. Thanks to the air blower there is an efficient mixture of the warm return water and the ice water

Resulting in:

- Constant ice water temperature of 0,5°C
  - ⇨ Never freezing of the milk
  - ⇨ Faster cooling thanks to the constant low temperature
- Equal melting down of the ice

Cooling

- The ice water coming from the ice builder is transported with one efficient single phase *(for PIB25-160)* or one (PIB230) or two (PIB370) 3-phase ice water pumps through the heat exchanger of a DIB tank.
  ☞ *Optional: 3-phase ice water pump for PIB25-160*

Instant cooling

- The milk flows through a tubular or plate heat exchanger before entering the milk cooling tank.
  Ice water flows through this heat exchanger in the opposite direction. The milk is cooled to storage temperature before it enters the tank. Instant cooling requires an extra ice water pump.
  ☞ *Optional: extra ice water pump or more powerful pump – up to a maximum of 6 (PIB25-230) or 8 (PIB370) pumps can be installed*

  ☞Extra pump is only possible in combination with Packo milk cooling tank with iControl control unit.

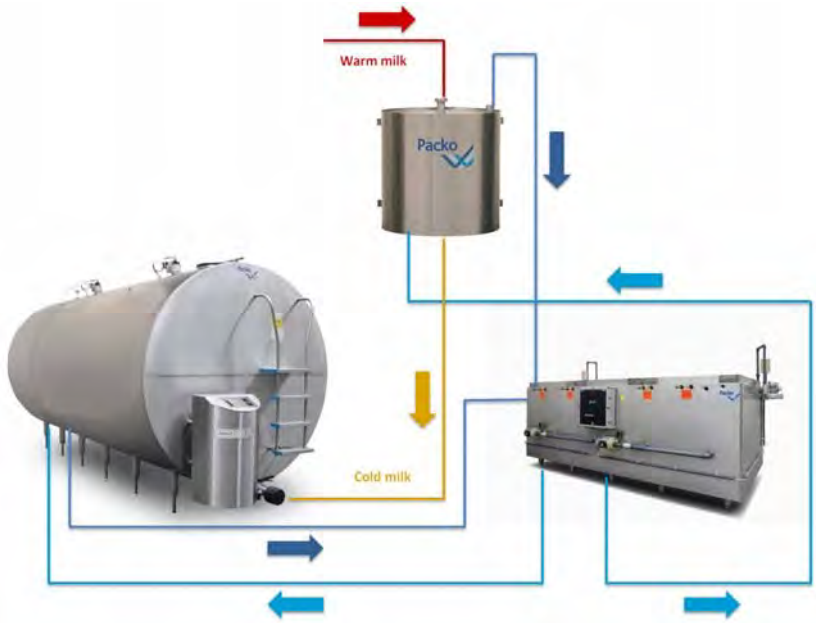
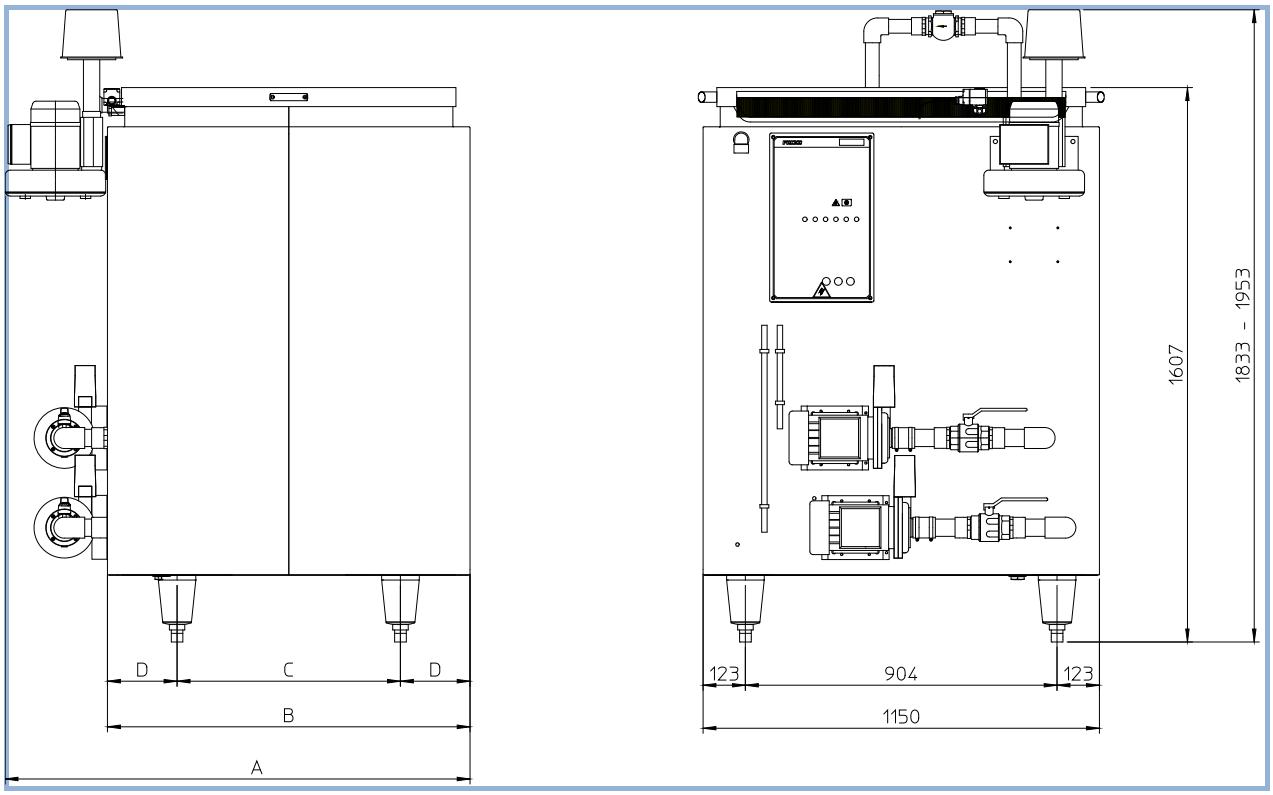


Illustration PIB 25-370

Dimensions PIB 25-160



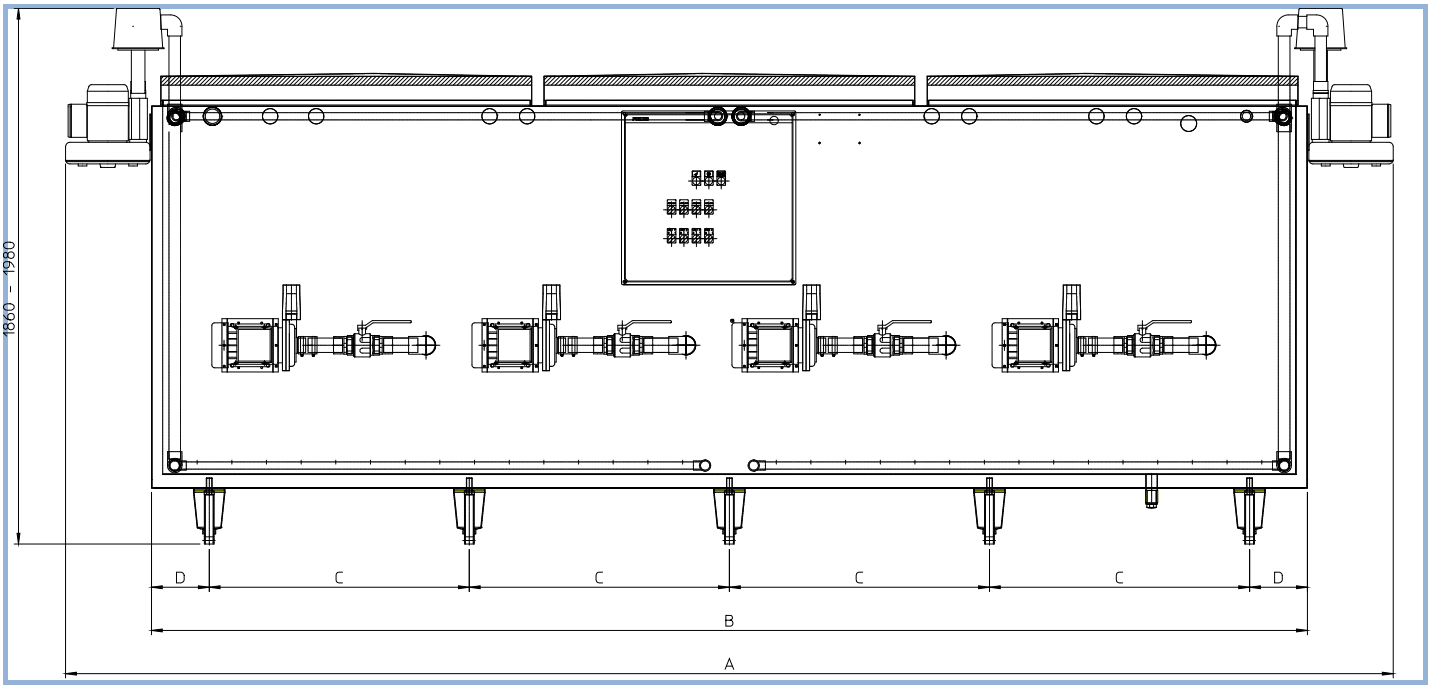
Model	Storage capacity	Storage capacity	A	B	C	D	Legs	Empty weight(1)	Full weight(1)
	kWh	*Kcal*	*mm*	*mm*	*mm*	*mm*	*number*	*kg*	*kg*
25	25,8	22160	1350	1052	648	202	4	320	1474
40	41,2	35456	1350	1052	648	202	4	370	1524
60	61,8	53184	1790	1492	1088	202	4	437	2129
80	82,5	70912	2230	1932	1528	202	4	532	2761
120	123,7	106368	3110	2812	2408	202	6	690	3994
160	164,9	141824	3990	3692	3288	202	6	840	5219

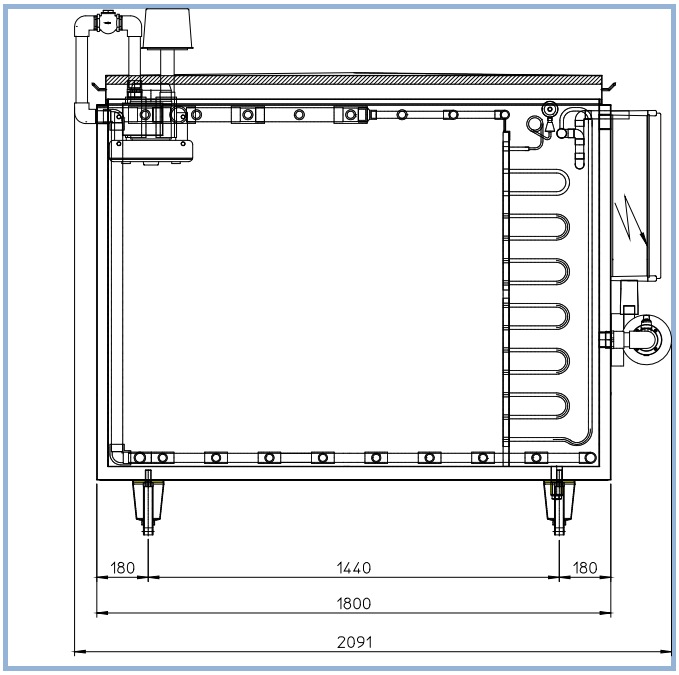
(1) Weight exclusive the cooling unit(s)

Remark:

If dimensions are crucial, please ask for an approval drawing to confirm the exact dimensions, especially when the cooling unit(s) should be built on.

Dimensions PIB 230-370





Model	Storage capacity	Storage capacity	A	B	C	D	Legs	Empty weight(1)	Full weight(1)
	kWh	*Kcal*	*mm*	*mm*	*mm*	*mm*	*number*	*Kg*	*kg*
230	238,4	205005	3260	2665	755	200	6	1050	6247
370	374,6	322150	4594	4000	900	200	10	1415	9292

(1) Weight exclusive the cooling unit(s)

Remark:

If dimensions are crucial, please ask for an approval drawing to confirm the exact dimensions, especially when the cooling unit(s) should be built on.

4.3 OPTIONS FOR PACKO ICE BUILDER (PIB)

4.3.1 Timer night rate

- In areas with important difference between day and night rate, it can be interesting to build up the ice during the night

⇨ cheaper production of the cold energy

⇨ cooling unit is operating less during the day at a higher rate

- Therefore a time clock can be installed in the control unit of the milk cooling tank

☞ Only required in case the PIB is

- NOT accompanied by a Packo milk cooling tank
- accompanied with a milk cooling tank with PCV3-control unit
- accompanied with a milk cooling tank with Dolphin control unit version < 2.0 (existing milk cooling tank)

☞ *Not required in combination with milk cooling tank with Dolphin 3.0 (existing milk cooling tank) or iControl control units.*

Range of application:	**All PIB**

4.3.2 Set extra ice water pump

In case of

- DIB-tanks > 14500 L (2 cooling circuits): extra pump is REQUIRED
- pre-cooling with ice water, an extra ice water pump is required to send the ice water from the ice builder to the pre-cooler.

The set is including:

- An extra ice water pump
- Extra ice water return pipe
- Extra controls

☞ *Possible to install a single phase or a three phase ice water pump*

Range of application:	**PIB 25-370 in combination with Packo MCT with iControl**

4.3.3 Anti-frost protection

In case the accompanied milk cooling tank (DIB) is mounted outside (which is not advised!), the evaporator and pipes can be protected by intermittent circulation of ice water.

If the outside temperature is reaching freezing point, the ice water pump (s) is (are) running intermittently

The PIB must be installed inside in a frost-free area.

The option is including:

- Extra thermostat to measure the ambient temperature
- Timers

Temperatures and timers have to be adjusted on site

Range of application:	**All PIB**

4.3.4 Three phase ice water pump

- Optional the customer can buy a 3-phase ice water pump instead of the standard single phase pump.

Range of application:	**PIB 25 - 160**

4.3.5 Other type of ice water pump

- In case of higher flow rates or pressure drops

☞ Please contact Packo.

Range of application:	All PIB

Remark:
Always foresee a second ice water pump for DIB- tanks ≥ 14000 litres. These tanks have two ice water circuits which are to be fed separately.

4.3.6 Two cooling units instead of standard one

Sometimes it is advisable to install two cooling units on the ice builder instead of the standard one cooling unit.

In this case, there are the following advantages:

- Limitation of the compressor starting current
- Operational safety with 2 cooling units instead of 1

Range of application:	PIB 25-120

5 FALLING FILM CHILLER (FFC)

In order to meet the increasing demand for continuous instant cooling of liquid food products, Packo presents the *PACKO FALLING FILM CHILLER* .

The question came initially from the dairy farming : MEGA FARMS, where huge amounts of milk should be cooled quickly and efficient. The milk is instantly cooled by means of ice water produced by the Falling Film Chiller.

Construction

- The Falling Film Chiller is completely made of stainless steel AISI304. Only the four side panels are made out of double wall reinforced plastic. These panels are easy removable to have access to the cooling plates e.g. for inspection or cleaning purposes.
- The Falling Film Chiller consists of a series of stainless steel plates arranged vertically. The required cooling capacity determines the number of plates. For each 3 plates there is a corresponding cooling unit. The basic model of the Falling Film Chiller has 12 plates, so 4 cooling units to be connected.
- The plates are cooled by a refrigerant such as R404a, glycol solution, ammonia,…
- Below the plates, there is a reservoir split up in 2 parts: left for the return water (from the consumer) and right for the prepared ice water.
- The Falling Film Chiller is equipped with minimum 2 ice water pumps: one for the internal circuit and one to pump the ice water to the consumer.
- Control box built according to EN60204-1 and supplied separately.

Operation

A thin layer of water is circulated over the plates and is cooled down to 0.5-1°C. The ice water "falls down" into the right hand side of an insulated reservoir. From this reservoir, the ice water is sent with the second pump to the consumer which can be a plate heat exchanger, a cooling jacket of a cooling or processing vessel,….

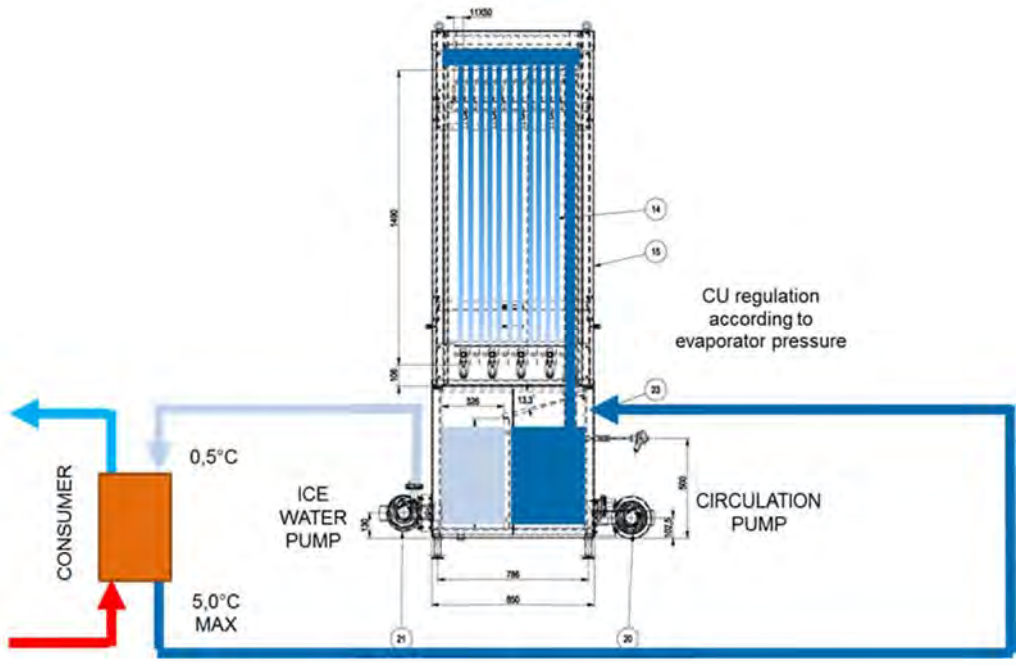
The total number of ice water pumps is depending on the quantity and type of consumers.

The warmed water returns from the consumer into the left hand side of the reservoir of the Falling Film Chiller. This water is again pumped up to be circulated over the plates.

The flow rate over the plates is always the same and ensures a highly efficient heat transfer. The cooling units will function according to the temperature difference to overcome between the return water and the ice water. This way, the chiller operates most economic.

The Falling Film Chiller is standard equipped with the **Packo Eco-Tronic** technology. Via this system the amount of refrigerant is easy to adjust and the optimal amount is injected in the plates.

Packo eco-tronic

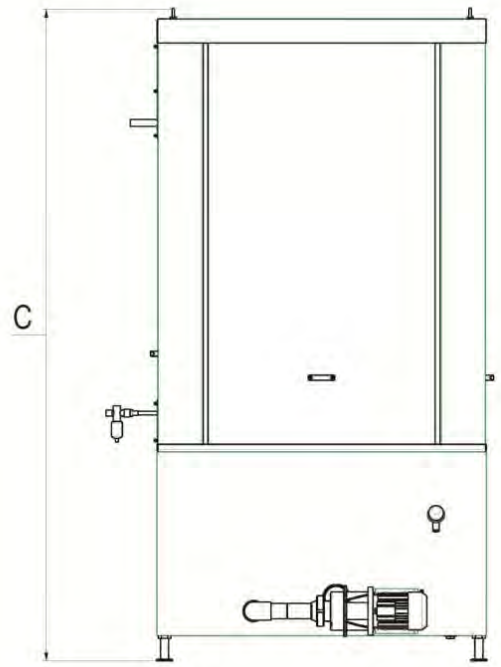


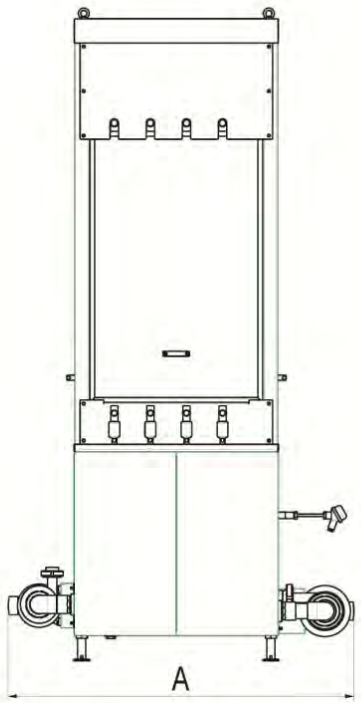
Features

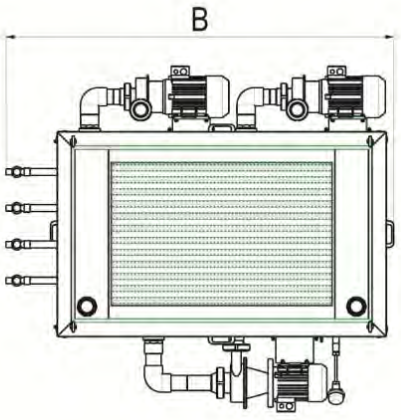
- Compact design
- Easy to assemble on site
- Limited floor space required
- Light weight removable side panels for inspection and cleaning
- Production of ice water of 0.5-1°C without risk of freezing
- No risk on condensation
- Efficient heat transfer
- Optimal refrigerant injection thanks to the Packo Eco-Tronic technology
- Reliable system
- Electrical control box according to EN60204-1
- CE-label

Type	Cooling capacity		Cooling plates	Cooling unit TAGD T 4614 ZHR	Connections pump
	kcal/hr	kW	Qty	Qty	Qty
PFF 80	69.050	80	12	4	2
PFF 120	103.576	120	18	6	4
PFF 160	138.102	160	24	8	4
PFF 200	172.628	200	30	10	4
PFF 240	207.153	240	36	12	4

Dimensions







		PFF 80	PFF 120	PFF 160	PFF 200	PFF 240
A	mm	1450	2285	2285	3135	3135
B	mm	1611	1611	1611	1611	1611
C	mm	2704	2704	2704	2704	2704

6. ENERGY SAVING PRODUCTS

Contents

Year after year energy becomes more scarce and expensive. But energy (in the form of electricity, hot water,…) is indispensable on a dairy farm.

On top of that, a growing and future-oriented dairy farm has more and more increasing energy needs. However, to run a profitable business, the operating costs needs to be kept as low as possible, hence the energy costs.

Therefore Packo, as leader and a global active player, has developed an extended range of **energy-efficient** products such as the **Packo Eco-cool** cooling unit and the **Packo Eco-Tronic** refrigerant injection and energy saving products such as **Packo Eco-Wash**, the **Packo Tubular Cooler** and the **Packo Eco-Heater.**

Packo tests extensively all products on efficiency, usability, reliability, safety and durability in the certified laboratory at the parent company in Zedelgem (Belgium).

6.1 ECO-COOL II cooling unit

Fast, safe, economic and environmental aware cooling with the Packo **ECO-COOL II cooling unit.**

The Packo Eco-Cool stands for *efficiency*, which ensures the optimal use of the capacity of the cooling unit.

⇨ This allows the electrical power of the cooling unit being limited which results in *a lower initial investment cost* and *a lower running cost.*

The Packo Eco-Cool is equipped with:

- an extra large air condenser (radiator / heat exchanger)
- a double fan with fine regulation of the air flow.
- electronic fan control

As a result an optimal operation is guaranteed, even with extreme weather conditions such as hot and windless summer days. Also in extreme cold environment, the Eco-Cool cooling unit is functioning efficiently.

Eco-Cool II cooling unit

Low starting power, also with multiple compressors and cooling units

When 2 compressors per cooling unit or multiple cooling units are connected on the tank, a second compressor and/or second cooling unit will be started automatically a bit later by the use of timers. This delayed start guarantees a low starting power demand.
Obviously not only the total electrical consumption is of main interest, but also the peak consumption is important.

Reliable cooling system

Thanks to the installation of a liquid receiver, efficient and reliable cooling is guaranteed which will secure your income.

With other systems working with a small refrigerant charge and no liquid receiver, a leak will result immediately in “not-cooling” and in this case an intervention of a service team will be necessary.

Furthermore it incorporates the “pump down system” thanks to the presence of this receiver. This means that during cleaning of the milk cooling tank all the refrigerant is evacuated from the evaporator so the warm water doesn’t lose any energy during the cleaning cycle.

Modular construction

A Packo heat recovery ECO-HEATER can easily be installed and connected afterwards on an existing installation thanks to the modular construction of the Packo Eco-Cool.

With the Packo Eco-cool cooling unit you have:

- Maximum use of low ambient temperatures = lower energy consumption
- Smaller power requirement because of high efficiency
- Fast cooling of the warm milk
- Stable, safe and gentle cooling of all milk at various ambient temperatures
- Lower starting current

Save up to 20% energy using the Packo Eco-Cool cooling units.

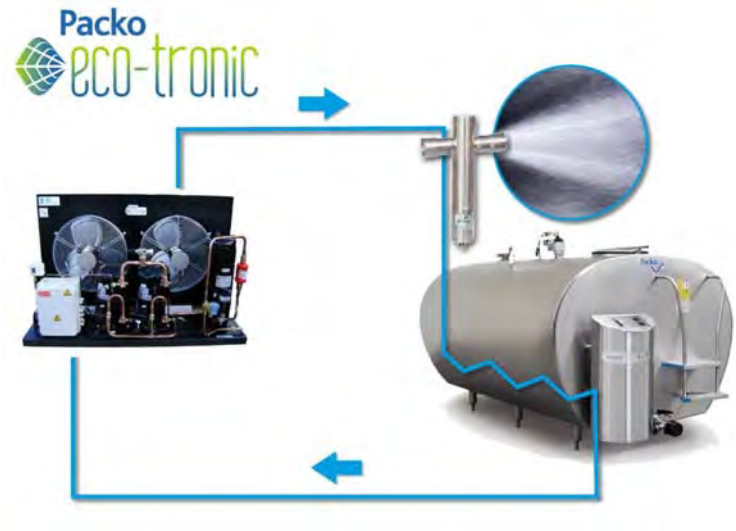
6.2 ECO-TRONIC electronic expansion valve

Ultra modern

Besides the Packo Eco-Cool cooling units, the Packo milk cooling tank performs a prominent and very important role in an energy efficient and reliable cooling of milk.

Packo milk cooling tanks can be equipped with an *electronically controlled refrigeration* system. Via the **Packo Eco-Tronic** system the optimal amount of refrigerant is injected in the laser welded cooling jacket in each stage of the cooling process.

Since ultimately the refrigerant cools down the milk, it's obvious this system has an important influence on the energy consumption and the cooling speed of the milk.



Packo Eco-Tronic

The **Packo Eco-Tronic** ensures:

- the refrigerant is evaporated **completely** => no risk of sending liquid refrigerant back to the compressor
- the refrigerant is evaporated over the **total surface of the evaporator** => every square centimetre of the laser welded evaporator is used optimally
- the correct amount of refrigerant is injected according to the size of the milk cooling tank in each stage of the cooling process
- an optimal cooling in all circumstances, such as different ambient and milk temperatures

Thanks to the typical Packo cooling system you can have an additional **energy saving of +/- 10 %.**

☞ *Standard installed on LS-LEM/DX from 17.650 L onwards and on all VM/DX tanks*
☞*Optional for LS/DX < 17.650 L and for all REM- & RS/DX-tanks*

Range of application:	**All closed DX-tanks**

6.3 ECO-WASH cleaning on the milk cooling tank

There is a profit to be made on the cleaning of the milk cooling tank also.
The **Packo ECO-WASH cleaning** results in **a lower water and energy consumption** and also **in time profit** compared to the standard cleaning system.

In combination with the Automatic Milking System without buffer tank it is possible for the milk robot to re-start milking much sooner, which benefits the daily milk production.

The basis of the system is the iControl tank control with a supplementary reservoir for water. The filling of the cold water is controlled by the float valve in the reservoir. The filling of warm water is controlled through a level sensor, the tank will only be cleaned when there is enough warm water. This also prevents the dry run of the cleaning pump.

iControl unit with supplementary reservoir (top view)

Example of time and cold water savings on a 10.000 L milk cooling tank:

	Packo Traditional cleaning system	Packo Eco-Wash cleaning system
Water consumption (in Litres):		
pre-rinsing cold water	100	50 (= 2 x flushes of 25 L)
pre-rinsing warm water	100	100
main cleaning warm water	100	100
final rinsing cold water	200 (= 2 x 100 L)	75 (= 3 flushes of 25 L)
Total water consumption:		
Cold:	300	125
Warm:	200	200
Total (in Litres):	**500**	**325**
Required time:		
Filling rate @ 20 l/minute:	61 minutes	40 minutes
Filling rate @ 10 l/minute:	86 minutes	48 minutes

6.4 ECO-DRAIN

In some cases the cleaning water, exclusive the first rinsing water with the milk residues, can be recuperated and used for cleaning of surfaces, such as floors, milking parlour, etc.

In this case a second drain valve can be installed on the milk cooling tank. The customer has to provide a water storage tank for the recovery of the cleaning water.

This can result in a considerable decrease of water consumption.

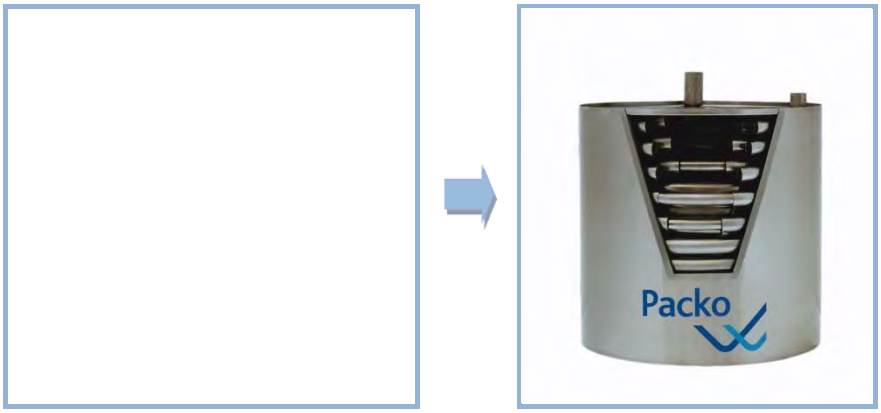
Range of application:	**All closed tanks with automatic cleaning**

6.5 PRE-COOLERS

Pre-cooling of the milk before it enters the milk cooling tank:

- results in a faster cooling of the milk ➔conservation of the milk quality
- reduces the running time of the cooling unit ➔ less electricity costs

6.5.1 Packo tubular cooler



Packo tubular cooler

Construction

- Tube-in-tube construction ➔high water turbulence for excellent heat transfer
- Low turbulence on the milk side ➔ "soft" treatment of the milk
- Large tube diameter compared to free section in a plate cooler ➔minimal pressure drop
- Diameter and length of the tubes are calculated to have a maximum heat exchange surface
- Reliable ➔ no seals, *maintenance free*
- Tube construction ➔easy to clean after the milking
- The tubular pre-cooler has a large milk volume of 7.6 Litres ➔ maximum cooling efficiency when batches of 7- 8 Litres are pumped through the tubular cooler

Advised conditions

- Milk-water ratio minimal 1 : 1 – ideal: 1 : 1.5
- Well water temperature: max. 14°C => pre-cooling from 35°C to 23°C
- Using a timer set on 30 seconds running time of the water after the milk pump has stopped ➔ to be sure all the milk will be pre-cooled

Remark: An optimal efficient pre-cooling with a tubular cooler can be obtained by pumping the milk in batches of 7- 8 Litres through the tubular cooler

Advised quantities to be installed

1. Based on <u>average</u> milk flow:

Average milkflow (L/hr)	Type of pre-cooler
≤ 1100	1 tubular cooler
1200-2200	2 tubular coolers in parallel
> 2200	plate cooler

1. Based on size of parlour:

Number of clusters	Type of pre-cooler
≤ 12	1 tubular cooler
14-24	2 tubular coolers in parallel
> 24	plate cooler

<u>Remark</u>: In case you have doubts, do not hesitate to contact Packo.

Advantages

Advantages concerning energy:

- Free (!) heating of water from milk.
- Considerable savings when using well or mains water as pre cooling. Up to 50 % less energy consumption when cooling the milk.

Technical advantages:

- No maintenance. The Packo tubular cooler needs never to be dismantled for cleaning purposes, contrary to a plate cooler or bundle tubular cooler!
- Easy cleaning, together with the milking machine.

Quality advantages milk:

- Immediate milk cooling avoides bacterial growth.
- Low blend temperature during subsequent milkings. Less chance of bacterial growth.
- No seals, the milk is only in contact with stainless steel. This avoids pollution or contamination. Very reliable in comparison with plate cooler or bundle tubular cooler.

Financial advantages:

- The heated water can be used as drinking water for the cattle. The animals like to drink warm water. They drink more; the milk production remains stable, also during wintertime. Tests on the farm have proven this.
- Possible subventions for environment friendly solution
- Smaller cooling unit possible. This means lower investment
- Short return on investment
- Suitable for spring water
- Very long life expectancy
- No maintenance costs

Application

- with mains or well water → *pre-cooling* / less power consumption
- with ice water → *instant cooling*, the milk enters the tank already cooled .
- with mains- or well water combined with ice water (combination of 2 or more tubular pre-coolers)

Connection sets

You can order sets including connection material for water and milk:

- Milk couplings
- Electro valve to control the water flow and make best use of the batch effect (milk hold in the tube while the water continuous to flow for a predestined time)

and a frame in case of 2 tubular coolers :

Type of water	Quantity of tubular coolers	Connection tubular cooler	Diameter product supply line
Well	1	NW20	NW20
Well	1	NW32	NW32
Well	1	NW40	NW40
Well	2	NW32	NW40
Well	2	NW40	NW40
Well	2	NW40	NW50
Ice	1	NW20	NW20
Ice	1	NW32	NW32
Ice	1	NW40	NW40
Ice	2	NW32	NW40
Ice	2	NW40	NW40
Ice	2	NW40	NW50

Example of 2 tubular coolers on frame

Technical data

▪ Milk tube	Stainless Steel, diameter 20 x 1 mm Heat exchanging surface 1,9 m².
▪ Connections	Water: Stainless steel G 3/4" (20 x 27) Milk: Stainless steel, DIN NW20-25-32-40 or diam. 25-32-38 -40 mm straight tube
▪ Volume	Water volume: 6.4 litres Milk volume: 7.6 litres
▪ Housing	The spiral is fixed in a stainless steel envelope and positioned for complete drain.
▪ Envelope	Stainless steel
▪ Installation	Preferably above the tank, allowing draining off.
▪ Weight	50 kg (empty)
▪ Water pressure	Max. 7 bar

6.5.2 Plate cooler

As alternative to the tubular cooler and as second best option, we can offer a **plate cooler** to pre-cool the milk:

Standard equipment

- Stainless steel bolts and plates in AISI 316
- Frame in carbon steel, RAL7001 coating
- NBR seals, mechanically fixed

Illustrations

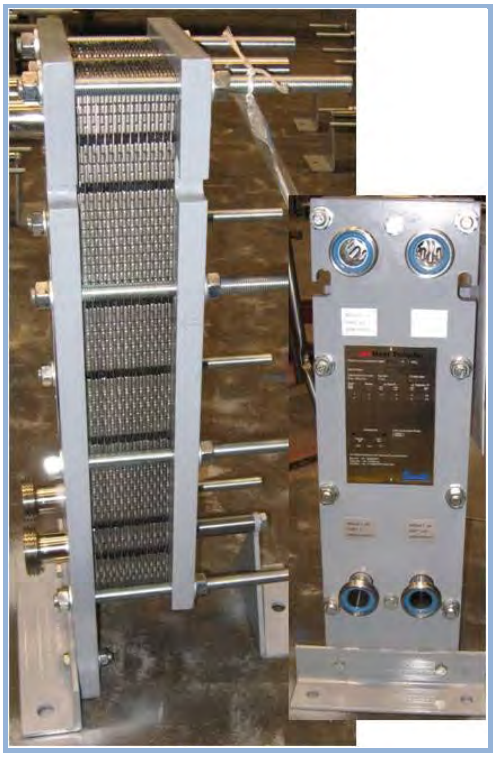


Plate cooler

Remark

In order to allow the selection of the correct plate cooler it is necessary to know the exact milk pump output in litres per hour at working conditions during milking.

The temperatures mentioned in the below table are only possible with predefined conditions (milk and water flow) and are given only as basic information. No responsibility is taken if plate coolers are used without subsequent calculations.

Technical data

	Milk flow rate (L/hr)			
	3000	**5000**	**7500**	**10000**
Connections milk & water	NW32	NW65	NW65	NW65
Ratio flow rate milk : water	1 : 2	1 : 2	1 : 2	1 : 2

Single stage pre-cooling of the milk with WELL water:

	Milk flow rate (L/hr)			
	3000	**5000**	**7500**	**10000**
Path milk	35 -> 23°C	35 -> 23°C	35 -> 23°C	35 -> 23°C
Path well water	14 -> 20°C	14 -> 20°C	14 -> 20°C	14 -> 20°C
Dimensions (in mm):				
Length	365	362	362	612
Width	300	300	300	300
Height	730	875	875	875
Net weight (in kg)	67	1118	124	135

Single stage cooling of the milk with ICE water:

	Milk flow rate (L/hr)			
	3000	**5000**	**7500**	**10000**
Path milk	23 -> 4°C	23 -> 4°C	23 -> 4°C	23 -> 4°C
Path ice water	1,5 -> 9°C	1,5 -> 9°C	1,5 -> 9°C	1,5 -> 9°C
Dimensions (in mm):				
Length	515	612	865	865
Width	300	300	380	305
Height	954	875	1261	1261
Net weight (in kg)	154	192	345	369

Double stage cooling of the milk with WELL & ICE water:

	Milk flow rate (L/hr)			
	3000	**5000**	**7500**	**10000**
Path milk	35 -> 23 -> 4°C	35 -> 23 -> 4°C	35 -> 23 -> 4°C	35 -> 23 -> 4°C
Path well water	14 -> 22°C	14 -> 22°C	14 -> 22°C	14 -> 22°C
Path ice water	1,5 -> 11°C	1,5 -> 11°C	1,5 -> 11°C	1,5 -> 11°C
Dimensions (in mm):				
Length	665	1200	1120	1120
Width	300	300	380	380
Height	954	1035	1480	1480
Net weight (in kg)	158	281	472	499

Single stage INSTANT cooling of the milk with ICE water:

	Milk flow rate (L/hr)			
	3000	**5000**	**7500**	**10000**
Path milk	35 -> 4°C	35 -> 4°C	35 -> 4°C	35 -> 4°C
Path ice water	1,5 -> 20°C	1,5 -> 17°C	1,5 -> 18°C	1,5 -> 20°C
Dimensions (in mm):				
Length	612	877	870	1120
Width	300	300	380	380
Height	875	875	1480	1480
Net weight (in kg)	181	208	383	434

6.6 ECO-HEATER Heat recovery

In a dairy farm a lot of hot water is used for the cleaning of the milking machine, the milk cooling tank and the dairy. Also for the preparation of milk for the calves, warm water is required. This is a constant cost factor, year after year.

Heat energy taken out of the milk during cooling disappears into the air if you don't have a recovery system. And that's a pity because you can use this energy in a useful way, save money and contribute to a better environment!

Warm milk is an excellent source of energy. With heat recovery this energy is used to heat water for the cleaning in the dairy.

A considerable amount of money can be saved and can help in the battle against the global warming.

How does it function?

The refrigeration system that is used to cool down the milk has a condenser, compare this with the radiator at the backside of your refrigerator at home. This condenser is used to remove the abstracted energy from the milk and the absorbed energy of the compressor motor. Blowing cold air through the cooling fins of the condenser cools down the hot refrigeration gasses. The released heat is blown into the air.

ECO- HEATER - Heat recovery with separate plate heat exchanger

The heat exchanger (refrigerant /water) is mounted between the compressor and the condensing unit to pre-cool the hot refrigerant gas before it enters the condensing unit.

Standard equipment

Heat exchanger

- High quality “welded plate” heat exchanger
- The heat exchanger is vertically mounted on the cooling unit (on a solid stainless steel plate)
- Electronic fan speed control included

Pump

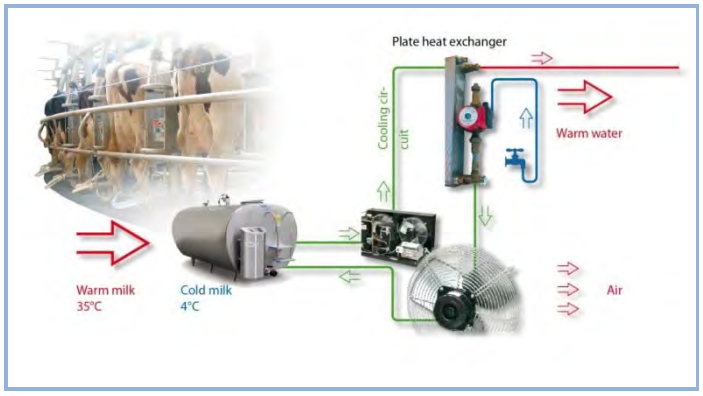
- Centrifugal pump
- In- and outlet valve, and connection parts (3/4”) included
- Flow regulation valve to guaranty a constant water flow
- It is advised to install a pressure safety valve (not included)

Eco-Heater mounted on the cooling unit

Type of set	Part no.
Set heat recovery for Eco-Cool	118936

<u>Remark</u>: A storage boiler is NOT included in our product range.

Illustration heat recovery circuit



Range of application:	For all Eco-Cool cooling units on closed tanks

7. REFURBISHMENT OF EXISTING TANKS

Contents

Repairing an “old” tank, **Packo make or other brands** can be a difficult task if the electrical control box is badly damaged or if it is old technology.

Moreover, not all components for tank controls of 10 years or older are still available, although the stainless steel parts can still be in an impeccable condition.

With the **Packo control units for refurbishing** it is possible, for a reasonable price, to give the tank a second life with up to date electronics.

Packo also can supply all parts required to **adjust** the existing milk cooling **to robotic milking** and to adjust **the road tanker connection** to the new requirements**.**

7.1 CONTROL UNIT PCV3

Basic electronic control with all necessary functions. See comparison between PCV3 and iControl on page 49. There are several executions to replace different tank controls.

7.1.1 PCV3 control box

If the relays and washing pump are still in good working order.

	Illustration	Use	Part no.
1		For DX and (D)IB tanks with **mechanical control** (oldest tanks) and **tanks from other brands.**	155457
2		For Packo DX and (D)IB tanks with **PC2000 control**. Manufactured between 1995 and 2000. Only with existing dosing system.	155458
3		For Packo DX and (D)IB tanks with **PCV4 control** (with electronics and mechanical program timer). Tanks with PCV4 are manufactured between 2000 and 2006.	155459

7.1.2 Complete PCV3 control unit

If relays and washing pump are damaged, a complete control unit is the only reliable solution.

1. For **DX tanks**, the unit is based on a complete control box, cleaning pump, level sensor, draining valve and all connections. Also included, depending on the choice, are a manual dosing cup for the detergents or automatic dosing pumps.
2. For **IB tanks** the control unit is the same as above, but completed with an extra control box. This electrical box is mounted on the backside of the tank and holds the relays for the ice thickness sensor and ice water pump.

PCV3 control unit

Selection list

Type tank		Part no.
DX- DIB	1) Standard cleaning program Automatic dosing - 2 pumps	160362

Type tank		Part no.
IB	2) Standard cleaning program Automatic dosing - 2 pumps	160370

Remark:
The self-washing outlet is not included in the supply of the refurbishment set.

7.2 CONTROL UNIT iCONTROL

7.2.1 Complete iControl control unit

If relays and washing pump are damaged, a complete control unit is a reliable solution.

1. For **DX tanks**, the unit is based on a complete control box, cleaning pump, level sensor, drain valve and all connections. Also included, are automatic dosing pumps.
2. For **IB tanks** the control unit is the same as above, but completed with an extra control box. This electrical box is mounted on the backside of the tank and holds the relays for the ice thickness sensor and ice water pump.
   A time clock for use of night rate electricity is included.

iControl control unit

Selection list

Type tank		**Part no.**
DX - DIB	3) Standard cleaning program Automatic dosing – 2 pumps	
	4) Eco-Wash cleaning program Automatic dosing - 2 pumps	

Type tank		**Part no.**
IB	5) Standard cleaning program Automatic dosing - 2 pumps	
	6) Eco-Wash cleaning program Automatic dosing – 2 pumps	

Remark:
The self-washing outlet is not included in the supply of the refurbishment set.

7.3 UPGRADES PCV4 & DOLPHIN CONTROL UNITS

7.3.1 Upgrading software for Dolphin control unit

FLASH-EEPROM to upgrade the existing Dolphin control unit to the latest version.

	Part no.
FLASH-EEPROM	**155395**

SD card to upgrade the existing Dolphin control unit to the latest version.

	Part no.
SD-card	**167976**

Remark:
The SD-card can only be used for 1 upgrade. Afterwards, you can only use this card to store general data or pictures.

7.3.2 Set of rest water detection

Type of control unit	Part no.
PCV4	127802
Dolphin < 1.17	127802
Dolphin ≥ 1.17	137424

7.3.3 Protection print Dolphin control unit

To protect the 24 V connections against 230 V power supply, you can order an input PCB.

	Part no.
Input PCB	**168084**

Remark:
In case of a Dolphin version < 3.04, you need to upgrade the software first ***(see 6.3.1)***

7.4 OCULUS tank guard

Independent milk tank guard

Monitoring of milk temperature, cooling, agitation, cleaning, … The Oculus 3 works with a **highly accurate sensor probe**. Therefore you know exactly what happens in the milk, you don't have to guess…

Standard equipment

❑ **Electronic control box**

- Microprocessor electronics with self diagnosis
- Waterproof (IP 54) housing, synthetic material (ABS)
- LED-display with temperature and error indication
- Visual alarm with LED indication for
  - Milk temperature
  - Cleaning
  - Tank empty
  - Faulty cleaning or agitation
  - Truck driver
- Logging of all data for a period of 3 months
- Acoustic alarm with buzzer
- Terminals foreseen for connection of (optional) external alarm

❑ **Sensor**

- Probe foreseen with PT1000 sensors (high sensibility) for measuring milk and cleaning water temperature
- Agitation is measured by the difference in temperature on 2 sensors, one is heated by a heating element installed on the sensor
- Probe length depending on tank volume
- Gland to mount probe in tank
- Shielded cable to connect electronics with sensor

Optional

- Software: see www.packo.com/extranet
- External acoustic alarm (siren)
- External visual alarm (flashing light)

☞ At order, confirm the serial number, type or size of the tank in order to define the correct length of probe.

7.5 CONVERSION FOR USE IN COMBINATION WITH ROBOTIC MILKING

You can convert an existing milk cooling tank in case following control units are mounted:

- PCV2-2: conversion items to be offered on request
- PCV4-2
- Dolphin*
- iControl

*A Dolphin control unit version 3.xx is ADVISED to be able to make the conversion of the existing milk cooling tank.

7.5.1 Interface box

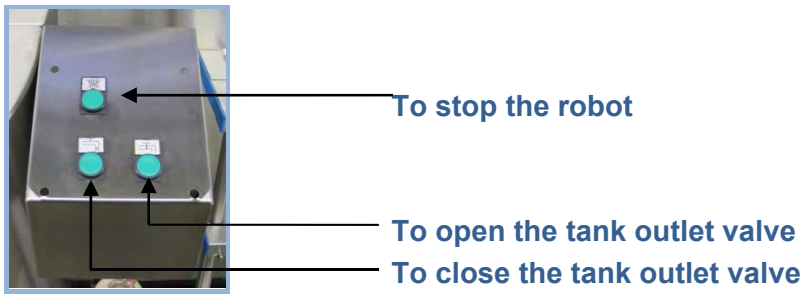
***Important:* Interface box is integrated in the iControl control unit**.

In stainless steel

- To be mounted on the milk cooling tank next to the main tank control unit

Example of interface box next to the Dolphin control unit

- User friendly for the lorry driver when collecting the milk
- Ensures the communication between
  - Milk cooling tank and robot
  - Milk cooling tank and buffer tank (if installed)



Interface box

Type of control unit	Part no.
PCV2-2	On request
PCV4-4	127720
Dolphin 3.xx	

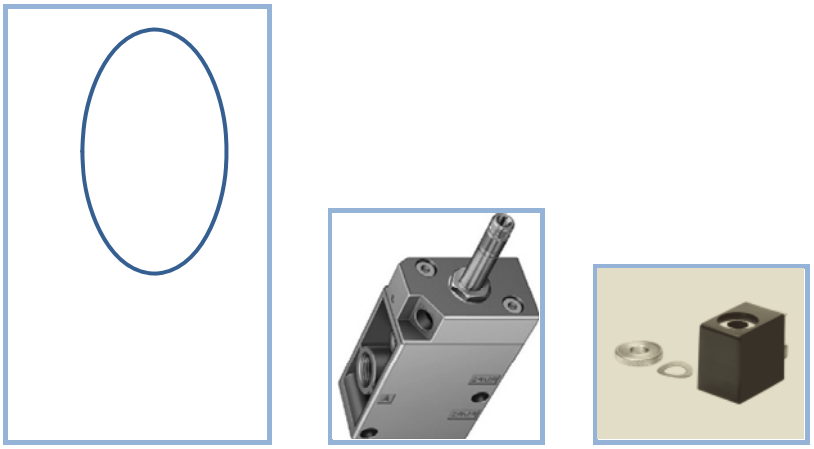
7.5.2 Set pneumatic cylinder

For butterfly valves DN50 or 65 or 80

Including:

- Pneumatic cylinder to open/close the butterfly valve tank outlet
- Pilot valve
- Coil for pilot valve
- Couplings for air hose

☞ *Air hose is not included in the supply !*



Pneumatic cylinder – pilot valve and coil

Size of butterfly valve	Part no.
DN50	
DN65	
DN80	

7.5.3 Tri-clamp for bottom filling

- Tri-clamp coupling with butterfly valve DN65/80 for supply line diam. 22 mm
- Possible up to 4 supply lines.

Part numbers:

Number of supply lines	DN65	DN80
1		
2		
3		
4		

Example of a bottom inlet connection for 1 supply line

7.5.4 Soft Start Cooling (SSC)

An *Ice Bank* tank can cool the smallest quantity of milk without the risk of freezing. For robotic milking clearly the best cooling system is the Ice Bank system.

For tanks with ***direct expansion*** (DX), the situation is slightly different:

When the robot starts milking in an empty tank with direct expansion, there is always the risk of freezing the milk.

Each direct cooled Packo milk cooling tank can be equipped with the **Soft Start Cooling (SSC)** system. After collection and cleaning, the milk is cooled 'gently' with the first filling. The cooling is started immediately with the reception of the first milk.

The initial quantity of milk going into the tank, after it has been emptied and washed, is very small. Normal cooling cannot be done at this stage.

SSC provides a safe regulation of the milk cooling. SSC functions independently of the robot and works according to the quantity of the milk present in the tank. **SSC guarantees a 'gentle' cooling of the milk**, so that freezing of the milk can be avoided perfectly. Once the evaporator is sufficiently covered, the cooling will be automatically switched over to a continuous full output.

Characteristics

- Level switch with sensor to measure the milk level in the tank
- Low pressure switch
- Controlling of the compressor(s) via iControl
- Electronic fan speed control of the cooling unit(s) integrated in the Eco-Cool cooling unit(s)

Remarks:

- In case of 2 cooling units, order SSC for 2 cooling units.
- In case of 4 cooling units, SSC will only be connected on the 2 cooling units from the lower heat exchangers => SSC for 2 cooling units to be offered to the customer.

Number of cooling units	Part no.
1	
2	

7.6 ELECTRONIC FAN CONTROL

Packo can offer a set elektronic fan control for the cooling unit(s) in case of:

- an existing cooling unit connected to a milk cooling tank on which Soft Start Cooling will be installed (e.g. modification to robotic milking) – see 7.5.4
- an existing cooling unit connected to heat recovery

7.7 DOCUMENTATION & MEASURING TABLE

Sometimes documentation such as **user' manual, electrical diagram or measuring table** can be missing for existing milk cooling tanks:

- User' manual: to be find on the Extranet
- Electrical diagram, measuring table: to be ordered against payment

8. COOLING UNITS ECO-COOL II

Contents

8.1 ECO-COOL II COOLING UNIT

Fast, safe, economic and environmental aware cooling with the Packo
ECO-COOL II cooling unit.

The Packo Eco-Cool stands for *efficiency*, which ensures the optimal use of the capacity of the cooling unit.

⇨ **This allows the electrical power of the cooling unit being limited which results in *a lower initial investment cost* and *a lower running cost.***

The **Packo Eco-Cool II is equipped** with:

- an extra large air condenser (radiator / heat exchanger)
- a double fan with fine regulation of the air flow
  - ☞ ***NOT in combination with OM-tanks***
- electronic fan speed control: controlling the speed of both fan motors
  Required when
  - ✓ the cooling unit is placed outdoors
  - ✓ in combination with heat recovery
- wrap around the crankcase heating
- bigger control box: options can easily be integrated and connections are much more survey able

As a result an **optimal and most efficient operation is guaranteed**, even with extreme weather conditions such as hot and windless summer days or ice cold winter days.

Eco-Cool II cooling unit

With the Packo Eco-cool cooling unit you have:

- Maximum use of low ambient temperatures = lower energy consumption
- Smaller power requirement because of high efficiency
- Fast cooling of the warm milk
- Stable, safe and gentle cooling of all milk at various ambient temperatures
- Lower starting current

Save up to 20% energy using the Packo Eco-Cool cooling units.

Standard Eco-Cool cooling unit models

- Cooling unit *3 x 400 V – 50 Hz – fans 1 x 230 V 50/60 Hz*
- Foreseen for *R404a* refrigerant
- Refrigerant is not included in the supply except for built on cooling units

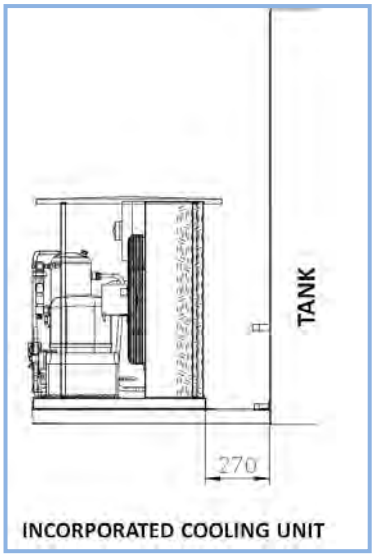
Remark

In case of the installation of 2 cooling units, it is possible to start the second cooling unit later than the first one => advantage of lower starting current

Important

- Selection list for tank/cooling unit combination: see enclosure
- Tanks on R22 refrigerant and 60 Hz: see enclosure
- It is possible to supply single phase cooling units up to Eco-Cool 3.

Dimensions Eco-Cool cooling units



Eco-cool	Type	A	B	C	Weight
		in mm	*in mm*	*in mm*	*in kg*
0.5	CAET 9460 ZMHR	430	485	340	33
0.6	TAJT 9480 ZMHR	430	485	340	35
1.0	TAJT 9510 ZMHR	512	610	395	37
1.1	TAJT 9513 ZMHR	512	610	445	40
1.2	TAJT 4517 ZHR	510	630	445	49
1.5	TAJT 4519 ZHR	573	610	540	50
2.0	TFHT 4524 ZHR	610,5	755	558	77
2.5	TFHT 4531 ZHR	992	631	465	97
3.0	TFHT 4540 ZHR	1072	611	563	120
4.5	TAGT 4553 ZHR	1072	649	563	120
6.5	TAGT 4573 ZHR	1072	647	563	128
7.5	TAGDT 4590 ZHR	1411	740	868	215
9.0	TAGDT 4610 ZHR	1411	740	868	215
10	TAGDT 4612 ZHR	1411	740	868	220
12	TAGDT4614ZHR	1411	740	868	225

8.2 OPTIONS COOLING UNIT ECO-COOL II

8.2.1 Voltage protection relay

- Protecting against over and under voltages on the electricity net
- Single phase preventer (on a 3-phase net)

8.2.2 Soft starter

- Limits the compressor starting current electronically
- Depending the local regulations

8.2.3 Cooling unit built on the tank (compact)

- Eco-Cool unit built on the tank
- Including protective hood in stainless steel
- Including refrigerant*
- On OM/REM/RS-tanks: max. 1 cooling unit possible
- On RMIB tanks and PIB: up to 2 cooling units on a special frame

☞ *not possible for RMIB, LEM and LS milk cooling tanks*

***Remark:** In case of the use of R22T refrigerant, the cooling circuit is supplied without refrigerant (EU-directives)

Built on cooling unit

Range of application:	**ALL OM-REM-RS/DX, OM/IB tanks and PIB**

8.2.4 Frame for 2 cooling units

- Galvanised frame
- For 2 cooling units

8.2.5 Separate brackets for wall mounting

- Only for cooling units ≤ Eco-Cool 6.5

stainless steel brackets

8.2.6 Stainless steel legs

- 4 stainless steel legs to be mounted under the cooling unit
- Adjustable
- Height: 200 mm

4 stainless steel legs

8.2.7 Protective hood

- In stainless steel
- In case the cooling unit is delivered separately

8.2.8 Adjustment to low ambient temperatures

- When the cooling unit is mounted in a cold environment below -5 °C, it is strongly advised to take certain measurements:
    - An extra pressostat and timer in order to build up pressure in the condenser. This should be done until the pressure in the condenser becomes higher than in the evaporator. Then the cooling units is again capable of functioning “normal”.
    - A supplementary wrap around crankcase heating on each compressor housing
- Strongly recommended in mountain area and continental climate

9. MILK PROCESSING

Contents

This section contains the following subjects:

9.1 CALVES' MILK PASTEURIZER – type PPB

In order to protect the health of your calves, Packo have developed a low cost, self contained **pasteurizer** for dairy farmers.

By feeding pasteurized milk, the transfer of possible pathogenic bacteria to your young animals is not eliminated.

More specifically is the battle against the MAP bacterium (*Mycobacterium avium subspecies Paratuberculosis)*, which can infect young calves through raw milk. This bacterium causes para- tuberculosis (Johne's disease), a contagious type of chronic and lethal gastroenteritis.

Recent studies have shown that this bacterium readily propagates under moderate climate conditions in areas with intensive dairy farming activity.

That's why investing in a Packo pasteurizer stands for **financial security** (fewer deaths, lower veterinary bills) and for the **good health** of your animals and your family.

Standard equipment

- Tank in stainless steel AISI304
- Available in 300 and 600 Litres
- Insulated with PU-foam
- Cover with handle and proximity switch: agitator motor stops when opening the cover
- Agitator motor fixed on separate cover bridge
- Double jacket for heating and cooling of the milk
- Electrical heating through a closed water circuit (1bar) with all necessary items: heating element(12 or 24 kW), water circulation pump, expansion vat, filling valve, pressure relief valve, pressure gauge
- Plate heat exchanger installed in the closed circuit to connect external cooling water
- Outlet NW50 with butterfly valve
- Electrical control box in painted steel, according to CE-standard EN 60204-1, installed on the tank, including digital temperature control
- Options: higher frame (for both models) and mobile execution (only for 300 L)

Illustrations

☞ Ask our advisers for more info and a competitive price offer.

9.2 BATCH PASTEURIZER – type PPA

The Packo Pasteurizer Advanced model (PPA) is especially designed for small scale processing of food products in a range of 150, 300, 500 and 1000 litres.

The pasteurizer forms a stand alone, complete small processing plant which can be used for the pasteurization and the production of all kinds of products such as milk, cream, yoghurt, liquid egg, fruit juice, etc.

The unique combination of double jacket and closed water circuit results in a efficient energy transfer.

In this multifunctional tank the complete process can be automated without interference of the operator.

Standard equipment

- Tank in stainless steel AISI304
- Insulated with rock wool (withstanding high temperatures)
- Double jacket for heating and cooling of the product
- Cover with handle and proximity switch: agitator motor stops when opening the cover *(not for 1000 L version)*
- Agitator motor fixed on the cover *(for 1000 L: motor on separate bridge)*
- Electrical heating through a closed water circuit (1.5 bars) with all necessary items: heating element(s), water circulation pump, expansion vat, filling valve, pressure relief valve, pressure gauge
- Plate heat exchanger installed in the closed circuit to connect external cooling water
- Outlet NW80 with butterfly valve
- Electrical control box in painted steel, according to CE-standard EN 60204-1, installed on the tank, including digital controls with process automation

Illustration

Advantages

- Rock wool insulation which endures high product temperatures up to 90°C
- Good accessibility thanks to the hinged cover
- Heating and cooling through a double jacket by means of a closed water circuit under low pressure
- Quick and complete emptying of the pasteurizer thanks to the bottom with slope towards the large outlet
- Quick and complete emptying of the pasteurizer thanks to the bottom with slop
- Automation of the complete process by means of automatic valves on the plate heat exchanger *(optional)*
- Guaranteed safety for the operator:
  - Agitator motor stops when the lid is opened
  - Hot water circuit is installed underneath the tank, so no risk of burning
  - Pneumatic springs on the cover for a safe opening of the pasteurizer

Energy transfer technology

The unique Packo system of energy transfer with the double jacket and closed water circuit has many advantages:

- Low water consumption, especially during cooling of the product (cost effective)
- Final storage temperature < 10°C is easily obtained using ice water
- Not sensitive to the quality of local water: no risk of corrosion which results in a longer life span
- No risk of burning the product thanks to the constant temperature difference between the water and the product

Control box

- Large graphic LCD screen
- User friendly
- Operating panel with easy to use controls
- Continuous, accurate display of each action
- Possible to pre-set 4 different product recipes

<u>Optional execution</u>: cheese version

In case of the production of cheese (fresh and ripened cheese), we designed a batch pasteurizer equipped with a *special agitator* and *cutting device.*

Differences in comparison with standard MILK version:

- Cover in 2 removable parts (no proximity switch)
- Agitator motor frequency controlled (speed regulation) and turning in left/right direction
- Agitator bridge can be turned away so that the complete tank is open for easy filling of the moulds
- Agitator blade with a normal blade used for the pasteurization of the milk and production of yoghurt and other fermented products and with a cutting device for the cheese production
- Whey screen for easy whey evacuation
- On the control box for the cheese vessel, a potentiometer is installed for speed regulation of the agitator motor

☞ Ask our advisers for more info and a competitive price offer.

10. ENCLOSURES

This section contains the following subjects: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