Installation and Commissioning

(IU-0065-EN-202201-B)

U-tube Heat Exchangers
WATER / WATER

Range
RTB(X)(TX)

FOREWORD

Dear Customer,

Thank you for choosing a tubular heater LACAZE ENERGIES RTB Range (X) (TX).

In your interest, we invite you to follow and observe the instructions in this operating instructions manual and perform scheduled maintenance by qualified personnel in order to maintain the unit to a maximum level of efficiency.

We remind you that failure to observe the instructions in this manual results in the invalidity of the guarantee.

In the case of damage to persons, animals or objects, deriving from failure to follow instructions contained in the instructions supplied with the equipment, the manufacturer shall in no event be liable.

SUMMARY

GENERAL INFORMATION

Symbols used in this manual

When reading these instructions, special attention should be given to paragraphs preceded by the following symbols:

DANGER !
Dangerous situation
for the user

GENERAL DANGER
Potentially dangerous situation
for the product and environment

Note / Warning
For the user

Notice regarding the preparation and publication of this manual

NOTE !

This leaflet was prepared and published under the direction of LACAZE ENERGIES. It uses the descriptions and the latest known features to date of the product.

The contents of this manual and specifications are subject to change without notice.

The LACAZE ENERGIES reserves the right to make changes without notice in specifications and materials contained herein. The company LACAZE ENERGIES cannot be held liable for any damages (including consequential) caused by reliance on the materials presented, including but without being limited to, typographical and other errors relating to the publication.

Information to be provided to the user

NOTE !

Avertissement

This instruction booklet and other documents relating to the unit are part of the product and must imperatively be delivered to the user. It must retain documentation in an accessible place for future reference if needed.
The unit has been designed for the storage and hot water. Any other unauthorized use shall be considered improper and dangerous.
The appliance must not be installed in humid environments (HR □ 80%). Protect the device from water splashes or other liquids to avoid damage to components.
Installation must be in accordance with the standards andregulations on the installation site, according to the manufacturer's instructions, by a qualified professional.
This booklet should accompany the material if it would come to be sold or transferred to another user, so that it and the installer to view.
In case the unit remains unused during freezing, we ask to be drained completely. The manufacturer is not liable in case of frost damage.

Safety Precautions

ATTENTION !

The installation, adjustment and maintenance of the unit must be carried out by professionally qualified persons in accordance with standards and regulations.

DANGER !

Maintenance work or repairs of the appliance must be performed by a qualified technician authorized by the manufacturer. It is strongly recommended to forward the unit as part of an annual maintenance contract and that, in its first year of use. Insufficient or irregular servicing could compromise the safe operation of the unit and cause damage to persons, animals or objects for which the manufacturer shall in no event be liable (eg tartar thermostat and / or valve).

It is strongly advised to use only replacement parts supplied by the manufacturer to get the best service and recognition of the warranty on the device.

ATTENTION !

To tighten or loosen the connections of the device, including the plate of the manhole, only use appropriate key (eg torque wrench). Improper use (gasket, bolts, torque etc.) and / or inadequate tools can cause serious damage (eg water leak).

NOTE !

By "professionally qualified person", it means someone with technical knowledge in the field of components and heating / hot water (DHW).

TECHNICAL DATA

The removable tubular exchanger is directly attached to a manhole of TH400 or TH500 after setting up a joint fiber without asbestos, of adequate type. The tube bundle is made of stainless steel AISI 316L. Maximum pressure inside and outside the tubes 7 bar;

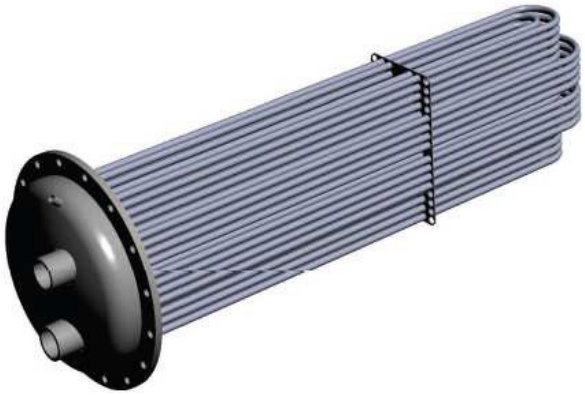
Maximum temperature inside tubes: 105°C ;

Maximum temperature on the outer tubes:

- 85 °C if the support plate is RC coated;
- 105 °C if the support plate is in stainless ste el.

➡ ***Presentation:***

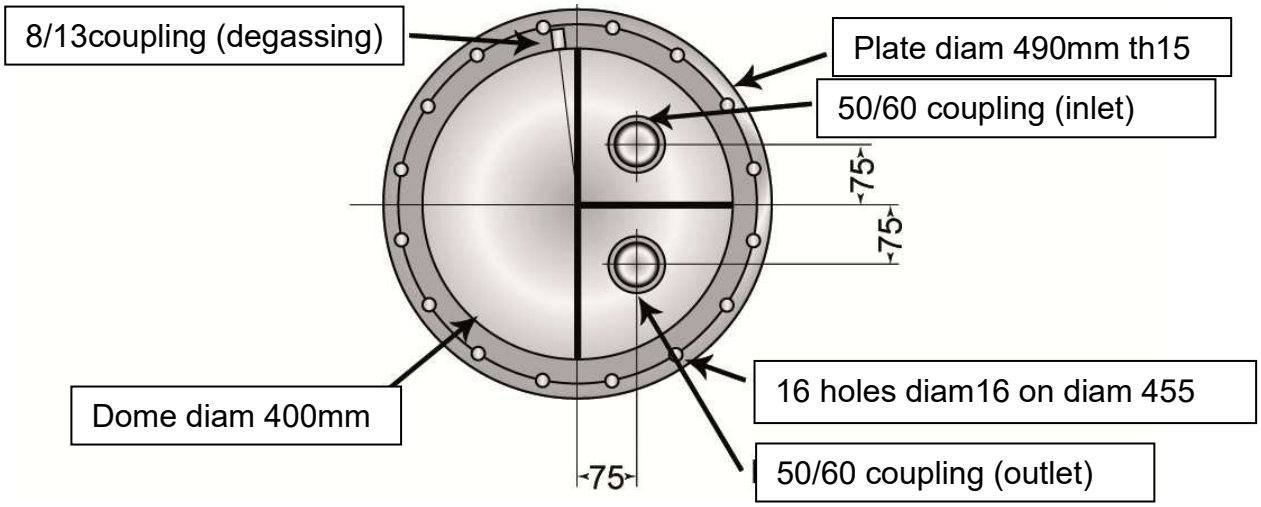
View of the exchanger



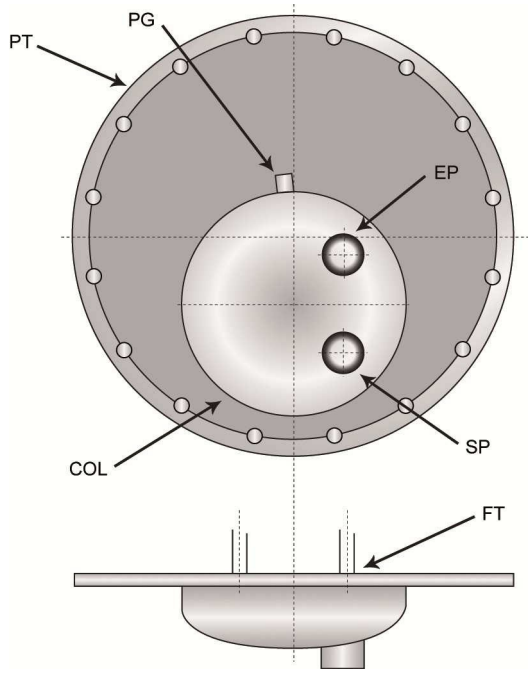
(non-binding example of exchanger)

View of heater mounted on the tank

➥ ***Fixation of Φ400 dome on TH400 manhole :***



➥ ***Fixation of Φ250 dome on TH400 manhole:***



Nomenclature :

PT- tubes plate S235 Φ490
PG- air bleed aperture
EP- input primary circuit
SP- output primary circuit
COL- collector
FT- SS tube bundle

The power of the heater varies depending on the operating of the primary and secondary circuits (notably temperature and flow). Reported power is always the average power for the indicated regimes.

Warning!

Whatever the type of regulation, the place where the temperature is taken on the tank MUST be located above the heating element.

STANDARD U-tube heaters

Type reference : RTB(X)(TX)- AAA-BB/CC-DD/EE

_ (X) : SS plate
_ (TX) : all SS (plate+dome)
_ AAA : tank diameter in cm
_ BB : number of tubes in the bundle
_ CC : dome diameter
_ DD : manhole type
_ EE : inlet / outlet diameter of the heater

Solar Heater

Primary (glycol 30% water) 80/65°C **Secondary 10/6 0°C**

Tank	Power kW	Reference	Flow m^3/h *	Head loss mCE	Surface m^2	Volume L
500L	16	RTB-065-14/25-40/32	1,1	0,1	1	5,5
750L	30	RTB-080-22/25-40/32	1,9	0,15	1,8	8,0
1000LH	30	RTB-080-22/25-40/32	1,9	0,15	1,8	8,0
1500LB	40	RTB-110-22/25-40/32	2,6	0,3	2,4	10
2000LB	60	RTB-130-40/40-40/65	3	0,15	5,1	24,6
2500L	70	RTB-130-40/40-40/65	3,5	0,15	5,1	24,6
3000L	80	RTB-130-44/40-40/65	4	0,15	5,1	24,6

primary Heater

Primairy 90/70°C **Secondary 10/60°C**

Tank	Power kW	Reference	Flow m^3/h *	Head loss mCE	Surface m^2	Volume L
300L	6	RTB-055-4/25-25/32	0,3	0,1	0,2	3,2
500L	11	RTB-065-6/25-40/32	0,5	0,1	0,4	3,9
750L	25	RTB-080-12/25-40/32	1,1	0,1	1,0	5,5
1000LH	25	RTB-080-12/25-40/32	1,1	0,1	1,0	5,5
1500LB	34	RTB-110-12/25-40/32	1,5	0,2	1,3	6,6
2000LB	58	RTB-130-16/25-40/32	2,5	0,3	2,0	8,7
2500L	58	RTB-130-16/25-40/32	2,5	0,3	2,0	8,7
3000L	58	RTB-130-16/25-40/32	2,5	0,3	2,0	8,7
4000L	124	RTB-150-26/25-40/32	5,4	0,5	3,9	14,4
5000L	124	RTB-150-26/25-40/32	5,4	0,5	3,9	14,4
6000L	124	RTB-150-26/25-40/32	*5,4*	0,5	3,9	14,4

Instant DHW heater (storage of hot water for heating)

Primary 90°C (tank) **Secondary10/55°C**

Tank	Power kW	Reference	Flow m^3/h *	Head loss mCE	Surface m^2	Volume L
750L	100	RTBX-080-48/40-40/65	*1,9*	0,1	4,0	21,3
1000LH	100	RTBX-080-48/40-40/65	*1,9*	0,1	4,0	21,3
1500LB	150	RTBX-110-48/40-40/65	*2,9*	0,1	5,4	25,6
2000LH	150	RTBX-110-48/40-40/65	*2,9*	0,1	5,4	25,6
2000LB	250	RTBX-130-62/40-40/65	*4,8*	0,2	8,2	34,0
2500L	250	RTBX-130-62/40-40/65	*4,8*	0,2	8,2	34,0
3000L	250	RTBX-130-62/40-40/65	*4,8*	0,2	8,2	34,0

Réchauffeur PAC

Primary (Chilled Water 30%) 55/47,5°C **Secondary 10/45°C**

Tank	Power kW	Référence	Flow m^3/h *	Head loss mCE	Surface m^2	Volume L
500	18	RTB-065-26/25-40/32	3,5	0,6	1,72	7,8
750	35	RTB-080-48/40-40/65	4,5	0,2	4,1	21,3
1.000H	35	RTB-080-48/40-40/65	4,5	0,2	4,1	21,3
1.000B	35	RTB-080-48/40-40/65	4,5	0,2	4,1	21,3
1.500H	35	RTB-080-48/40-40/65	4,5	0,2	4,1	21,3
1.500B	40	RTB-110-40/40-40/65	5,1	0,3	4	22,7
2.000H	45	RTB-110-40/40-40/65	5,8	0,4	4,5	22,7
2.000B	45	RTB-130-40/40-40/65	5,8	0,4	4,56	24,6
2.500	50	RTB-130-40/40-40/65	6,3	0,4	5,1	24,6
3.000	50	RTB-130-40/40-40/65	6,3	0,4	5,1	24,6
4.000	60	RTB-150-40/40-40/65	7,7	0,7	5,9	27,1
5.000	60	RTB-150-40/40-40/65	7,7	0,7	5,9	27,1
6.000	60	RTB-150-40/40-40/65	7,7	0,7	5,9	27,1

For temperature regimes and powers other than those in these tables, refer to the information contained in the estimate of the heater.

* *Flow indicated for primary circuit.*

INSTALLATION

General Warning

Warning !

- *Our equipment must be installed in compliance with the rules of the art, in accordance with standards / regulations in force at the place of installation*
- *Recommendations of D.T.U. (especially DTU 60.1)*
- *Requirements of this leaflet*
- *Other requirements of in force at the place of installation*

DANGER !

This device must be used only for the purpose for which it was designed. Any other use is considered improper and potentially dangerous.

Attention !

The appliance must be installed by a qualified technician who, under his own responsibility to ensure compliance with standards / regulations.

Attention !

It is necessary to install:
- at least one safety valve to a maximum pressure of 7 bar. *
- a capacity expansion system adapted to absorb changes in the volume of water in the circuits.

Attention !

Always provide, in correspondence with the safety valve set at 7 bars, a sewer connection to ensure drainage (clearly visible and directed by means of a funnel with siphon).

Attention !

Do not mix different metals promoting electrochemical couples - galvanic cell (eg Copper / Steel). Avoid including cuprous elements (pipes, couplings, etc.) upstream of the heater.

DANGER !

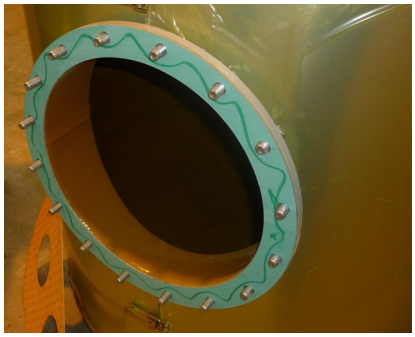
In the absence of the connection of the drainage to the sewer, the possible intervention of the safety valve can cause damage to persons, animals or objects for which the manufacturer can not be held responsible.

Attention !

The ground connection is required by the regulations.

**** In order not to permanently activate the safety valve, it is strongly recommended to set the maximum operating pressure to the calibrated value of the valve minus 5 to 10%, or between 6.30 and 6.65 bar.***

The mounting of the tube heat exchanger



Preparation of the flange of the manhole;

- Fit the bolts, either on the manhole flange, or on heater flange (the attachment system can vary in function of tank construction).

- Grease both sides of the gasket

- Fit the gasket to the flange

Mounting the heat exchanger: this operation is done without tools with the help of two operators:
- Insert the exchanger in the manhole until it makes contact with the flange.

- Attach the top of the flange;
- Hand tighten the upper two bolts on two or three threads;
- Attach the bottom of the flange and tighten the two lower bolts by hand;
- Ensure a minimum tightening of the 4 lower bolts above using a torque wrench;
- Mount the rest of the bolts.

➥ Tightening procedure for the connecting bolts

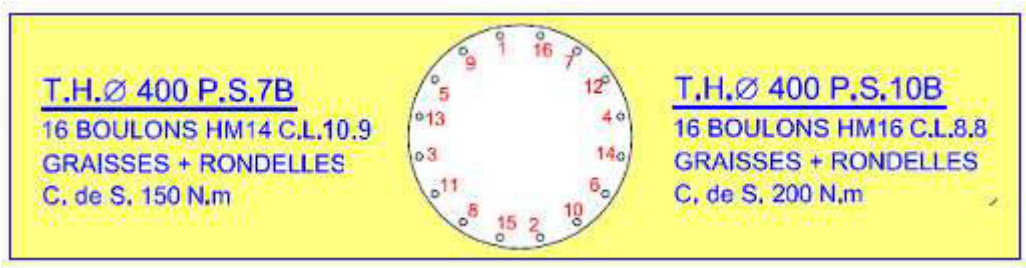
Tightening the bolts is done according to the figure below: the order of tightening and bolt torque.

- Screw in a first stage, using a wrench: torque about 1/3 of tightening torque, respecting the tightening sequence.
- Carry out another tightening cycle at 80% of the tightening torque, using a torque wrench.
- Finalize tightening the bolts with a torque wrench, tightening sequence by turning and starting with No. 1 bolt.

Note:

Unnumbered bolts are screwed, after each cycle and turning.

Use HM14-45 bolts greased treatment GLEITMO



_ Recommended tightening torque and order _

The heat exchangers may be delivered in kit, with the gasket, grease and necessary bolts. In this case the client is responsible for the correct installation.

If the heat exchangers are mounted in factory, the bolts may loosen from vibration effects and various stresses (temperature, pressure, ...) during transport and / or during handling. We recommend that you follow the safety procedures below:

- ☐ make sure the bolts are tightened at the expected torque after the installation of equipment on site because they may have loosened during the phases of storage and / or transportation
- ☐ to the first filling with water of the tank, ensure that there is no leakage,
- ☐ after a month of use, recheck the torque and absence of leaks.

Caution!

It is highly recommended to use a new gasket (replace the old gasket) after each opening of the manhole of the tank.

Recommendations and requirements

- Install the unit away from freezing.
- ***It is imperative to provide sufficient clearance for easy removal of accessories such as tubular heater,***

  (minimum clearance equal to the tank diameter).

- All necessary care should be taken against all risks that could cause damage to the inner lining (for RC tanks) (eg shock) during transportation, handling and maintenance operations (eg water jet at high pressure, abrasive ...).
- The evacuation of the valve must be connected to a discharge circuit by a connection of the "funnel" type for viewing the operation of the valve.
- Before installation, we strongly recommend that you clean the unit to remove any waste or residue.
- Ensure that the pressure is constant and there are no sharp variation (□P <1 bar).
- Do not put an isolation valve between the tank and the valve.
- Do not use adjustable safety valves.
- Use only dimensions of valve adapted to the installed power and / or flow.

WATER QUALITY

➥ DHW side (secondary)

To better protect the tubular heater and benefit of the manufacturer's warranty, it is imperative to use a quality of the domestic water, in line with the recommendations of DTU No. 60.1 - Supplement No. 3 (see Appendix). Otherwise, further treatment of the water is required if the quality of water is in one or more of the following limits (measured at 20 °C):

Resistance < 2 200 Ω.cm	Resistance > 4 500 Ω.cm	CO_2 free > 15 mg/l (ppm)
TH < 8 °F	TAC < 8 °F	Sulfates (SO_4^{2-}) > 96 mg/l
chlorides (Cl-) > 71 mg/l	SO_4^{2-} + Cl- < 15 °f	index RYZNAR > 8

For information, a French degree (°f) = 0.2 meq pe r liter.

Nota : Contact us for the limits of continuous use of a chlorinated or similar product (eg preventive treatment against Legionellosis) and cure (shock) for all tanks and / or equipment in stainless steel.

➥ LTHW side (primary)

water

The installation of a water treatment device on the filling water for the heating circuit against the phenomena of corrosion and scaling is expected, in order to monitor the water quality of the circuit. Essential for the good operation, it must be defined in terms of physico-chemical characteristics of the water used and the operating conditions of the installation.

It is appropriate to emphasize the need, before commissioning, of a proper cleaning of the networks to descaling the tubes (at hot, with a dispersant product, followed by rinsing) to remove all construction waste (filings , bast, welding waste etc.).

Following two sets of parameters are presented:

1) Inter Agreement boiler manufacturers (1969)

- This document sets out the minimum requirements that the drinking water of a ECBT circuit must comply with regarding the risks of damage by corrosion and / or scaling in boilers. Failure to comply with these minimum conditions leads in case of damage to the non-application of the guarantee:
- pH > 7,2
- TH < 25ºF
- ρ > 2000 Ω.cm
- Si TH > 25ºF : softening treatment:,
- Si pH < 7,2 ou ρ < 2000 Ω.cm : film forming treatment.

Comments:

pH> 7.2: This condition is insufficient against the risk of acid corrosion of the black steel tube (protection for pH> 9.6) in the case of the network in steel . Also with a TH

25ºF (250 ppm CaCO3) it is likely to have a significant scaling of the source of production if the top-ups are frequent.

2) SNEC / CSNHP (1980)

This document deals not only with the LTHW networks but also those carrying HTHW, steam, or the service circuits of the air conditioning equipment (ice water, humidification water).

- If the network is in black steel: pH> 9.6.

- Presence of a corrosion inhibitor with oxygen (oxygen scavenger) in the following proportions:

• Sodium sulfite: 2-10 ppm

• Hydrazine: 0.2 to 1 ppm (N2H4),

• tannins or lignosulfonates 0.4 20 ppm.

• Maintenance of alkalinity (TA): 5 to 30ºF.

• If the circuit includes bronze elements: TA 5 to 10ºF.

• If the circuit includes aluminum elements TA: the lowest possible.

• If treatment is made based on a film: maintaining the active agent in excess.

Comments :

Presence of sulphites creates the risk, at low temperature, of a development of sulfate-reducing bacteria. In the presence of bronze it could deteriorate and cause the formation of sulphides.

Hydrazine (N2H4): This is a toxic product that cannot be used due to the risks, except in industrial environments.

Note: Oxygen reducers, excepting hydrazine and sulfites, are available on the market,

In any case, it is highly recommended to use water treatment processes with technical CSTBat advice. Here is the link to view the latest published ATEC: http://www.cstb.fr/evaluations/atec-et-dta/derniers-atec-publies.html.

WARRANTY

Our STANDARD tubular heaters made by LACAZE are guaranteed from the date of delivery, against punctures, in continental climatic conditions and for the following duration:

_ ***Standard heater:*** ***1 year***
_ ***Equipements + accessoires :*** ***1 year***

This warranty is limited to the exchange, repair or replacement (supply) in our factory in Leyme (Lot 46) of the equipment recognized as defective by our technical services in accordance with our terms and conditions. Other damage, travel, labor costs that might result, are excluded.
Replacement, repair or modification of parts during the warranty period does not have the effect of extending the length of warranty and does not give rise to any compensation for any damage or miscellaneous expenses.

Excluded from these warranties the units whose deterioration is due to:

- Water supply pressure superior to the nominal pressure or / and the excessive variation of pressure (**ΔP > 1 bar**).
- Mishandling during assembly and installation (including setting without filling operation of the balloon, mechanical shock etc.).
- Overpressure resulting from the use of safety devices which are calibrated at pressure exceeding the operating pressure.
- Overpressure due to lack, inssuficient, malfunction or incorrect installation of the security devices, including valve (s).
- Depression resulting from the lack of sufficient air intake during emptying.
- Operating depression> 0.1 bar or 100 mbar.
- Fault of maintenance of the heating elements or of the security organs / regulation.
- Incorrect or inappropriate piping connections or attached accessories.
- Corrosion of water inlets of outlets, resulting from a defective or improper connection (leaks / steel-copper contact).
- Insufficient quality top-up water (see above)
- Corrosion due to inadequate or absent degassing.
- Corrosion due to organic and / or metallic deposits from the hot water system (looping) or cold water (filling up).
- Poor contact or lack of connection between the body of the balloon and the anode.

- Faulty maintenance of consumable (s) anode (s) [non replacement before complete wear: remaining weight (s) <20% (s) weight (s) anode (s) initial (at) after descaling].
- In general, non-compliance with this user manual.

Attention !

Contact us for the limitations of using a chlorinated product continuously (eg preventive treatment against Legionellosis) and cure treatment (shock) for all tanks and / or equipment in stainless steel.

The provisions of this warranty certificate are not exclusive of the profit for the the buyer of the legal guarantee on defects and hidden defects under the conditions of Article 1641 of the Civil Code and those related to liability for defective products.

PACKAGING / TRANSPORT / STORAGE / HANDLING

Packaging

Caution !

After unpacking the unit, make sure its perfect integrity. The packaging elements must be sorted and collected according to their nature to environmental protection.

Transport / Storage

The unit must be transported and stored in its original packaging until installation location.

Storage conditions:
- Ambient temperature: between -8 and 50 °C (standa rd package)
- Relative Humidity (RH): 30 to 80% (no condensation)

Handling

Caution !

The device will be handled using suitable lifting equipment and qualified personnel:
- Using a pallet (note the stability!)
- Ears (rings) Lifting using a bridge or crane compatible with the load to be lifted. Handling slings will be adapted to the load and in good condition.
The unit must be handled "EMPTY" and without any additional equipment not supplied and fitted by the manufacturer.
During handling, avoid maneuvering likely to produce side impact to the tank.
The tank must put on the ground smoothly.

The handling on the site will be made by the customer.

ANNEX : Recommendations DTU 60.1 - Supplement No. 3

Analysis Elements	UNIT	Case of compulsory treatment	Type of treatment	Desired value	Observations
Tempera-ture	°C	- - -	- - -	- - -	
pH	U	< 7,2	A	> 7,2	
TH	°f	TH < 6 ou TH > 25	B C	8 à 15	
TAC	°f	TAC < 6 ou TAC > 30	B C	10 à 20	
Mg++	°f	> 4	C	< TH / 5	
Ca++	°f	* * *	C	* * *	Note (1)
CO_2 free	mg/l	> 30	D	< 10	
O_2 dissolved	mg/l	> 9	D	6 à 9	
Cl-	°f	> 7	E	< 3	
SO_4^{--}	°f	> 9	E	< 5	
NO_3^-	°f	> 1	E	< 0,5	
Resistivity at 20 °C (ρ)	Ω x cm	< 2 000	E	2 500 à 3 000	Note (2)
Na+	°f				Note (3)
Fe++	mg/l				Note (4)
Type of treatment:					
A :	- Degassing + Possibly neutrality and / or Film-forming				Note (5)
B :	- Neutrality or similar and / or Film-forming				Note (5)
C :	- Partial softening or demineralization				
D :	- Degassing				
E :	- Total or partial demineralization and / or Film-forming				Note (5)
Notes:					
(1)	- value Ca ++ not stated, which can be obtained from the difference between TH and Mg ++.				
(2)	- Approximate calculation: ρ = 750 000 / Rs (Rs: dry residue at 105 °C mg/l)				
(3)	- Na + dose is necessary in the case C				
(4)	- Standard of potability: Total iron □ 0.2 mg / l)				
(5)	- Filmforming: treatment with silico-phosphate salts against corrosion				

Note: 1 °f = 0.2 milli equivalent (meq) per liter.

Nota : Contact us for the limits of use of a chlorinated or similar product continuously (eg preventive treatment against Legionellosis) and cure (shock) for all tanks and / or equipment in stainless steel.

NOTE ON SITE

U-tube Heat Exchanger Water/Water
Range RTB(X)(TX)

INSTALLATION COMMISSIONNING AND USE
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