

APPLICATION

- In circuits of measurement of flow of steam for securing continuous filling of the impulse piping with condensate at the same height and, thereby, for maintaining water columns in the impulse piping at the same height. The tanks are manufactured in two designs, either as a classic single-chamber or a double-chamber. The double tank replaces two condensation tanks in case of measurement of throttle body. It achieves significant decreasing of the construction dimensions of the whole measuring unit. Another advantage of its design consists in simpler ensuring of the same height of the level in both chambers.
- As special design with cleanness of internal surfaces of grade I pursuant to TPE 10-40/1926/85 (code PC1)
- For the environment, where mechanical resistance is required pursuant to EN 60068-2-6 (class AH2) and seismic capability of the electrical equipment of the safety system of the nuclear power stations pursuant to IEC 980 (MVZ level SL-2).
- For industrial environment with high concentration of SO₂ and the environment with sea climate

DESCRIPTION

The condensation tank consists of a tube jacket closed from both sides with welded bottoms. A cone with a cap nut for the connection to the measuring diaphragm is welded to the input hole of the tank. In the input hole, a threaded terminal for the connection of the stop valve is welded; it is provided with a cone with a cap nut.

The double-chamber condensation tank consists of two chambers that are separated with a partition. The design of the input and output holes of both chambers is the same as in case of the single tank. The pitch of input and output holes is 54 mm.

The tanks can be delivered in design without or with a stop valve.

TECHNICAL DATA

Classification of the tank as a part of the piping systems pursuant to EN 13480-1, table 5.1-1:

piping category I
group of liquids 2 (refer to ČSN 13 0020, part 7).

Operation position:

The condensation tanks shall be placed horizontally and at the same height, input screw-joints of both chambers of a double-chamber tank shall be at the same height

Type of operation: continuous

Weight without condensate:

Single-chamber condensation tank with valve approx.

2.8 kg

Double-chamber condensation tank with valves approx.

5.0 kg

Used materials:

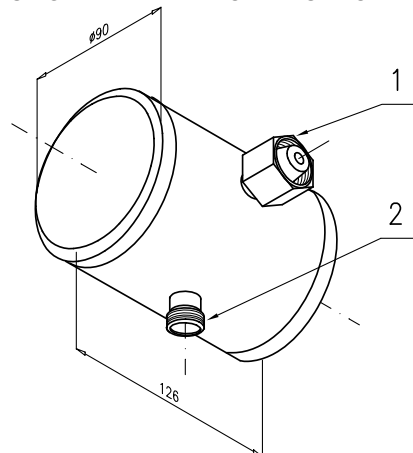
Jacket of tank	stainless steel AISI 321
Cover and separation diaphragm	stainless steel 1.4541
Input connecting cone	stainless steel 1.4541
Output terminal	stainless steel 1.4541
Cap nut	stainless steel 1.4541

OPERATION CONDITIONS

The armatures are designed for the environment defined by the group of parameters and their severity grades IE36 pursuant to standard EN 60 721-3-3 and the following operation conditions.

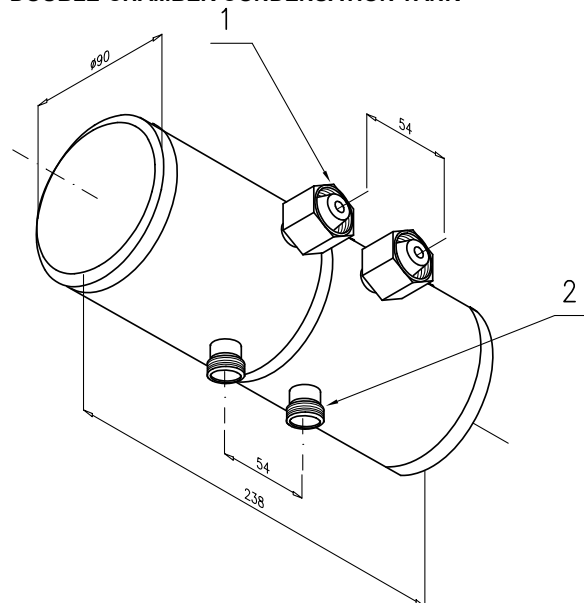
Condensation tanks can be exposed to sea climate from time to time pursuant to EN 60068-2-52, severity grade 2

SINGLE-CHAMBER CONDENSATION TANK



1. Connecting input terminal (cone $\varnothing 14$, cap nut M22x1.5)
2. Connecting output terminal (screw-joint M20x1.5 for a cone $\varnothing 14$)

DOUBLE-CHAMBER CONDENSATION TANK



1. Connecting input terminal (cone $\varnothing 14$, cap nut M22x1.5)
2. Connecting output terminal (screw-joint M20x1.5 for a cone $\varnothing 14$)

Relative ambient humidity:

10 to 100 % with condensation, with upper limit of water content 29 g H₂O/kg of dry air

Atmospheric pressure: 70 to 106 kPa

Operation liquid: steam and condensate

Parameters of liquid	
Max. operation overpressure [MPa]	Operation temperature min./max. [° C]
10	0/200
6.5	0/400

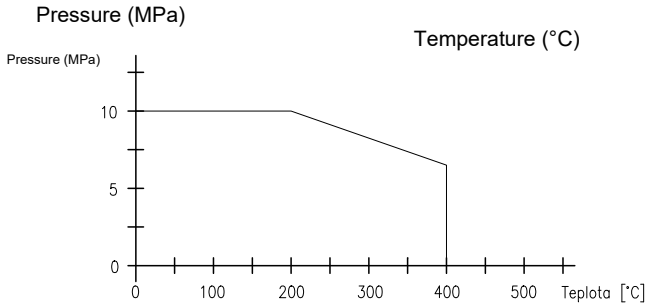
Volume of one chamber: 470 cm³

Amount of condensate in one chamber: approx. 0.2 litre

PRESSURE AND TEMPERATURE CHARACTERISTICS

Values of pressure and temperature of operation medium, for which the tank may be used, are identified in the following chart.

Chart 1



DESIGNATION

Data on cover of tank

- Trade mark of the manufacturer
- Product ordering number
- Maximum operation pressures and temperatures
- Material of cover
- Heat number of material of cover
- Mark of realized pressure test
- Serial number

Data on jacket of tank

- Material of jacket
- Heat number of material of jacket

DELIVERY

Unless agreed otherwise with the customer, each delivery includes

- Delivery note
- Products pursuant to the purchase order
- Valves of type 967 1122xx W4S2 pursuant to purchase order (for tanks with valves)
- Screw-joint 025946815 ordered independently as optional accessories
- Accompanying technical documentation in Czech:
 - o Product quality and completeness certificate, which also serves as the warranty certificate
 - o Test report and overview of applied materials
 - o Product manual
 - o Product manual for valve of type 967 (for tank with valve)
 - o Inspection report about purity of internal surfaces (only in case of armature with code PC1)

If it is established in the purchase contract or agreed otherwise, the following documentation can be also delivered with the product:

- Copy of inspection certificate 3.1 pursuant to EN 10204 for body and bottom material with heat number
- Declaration of Conformity with purchase order 2.1 pursuant to EN 10204
- Test report about the seismic and the vibration qualification
- Copy of the resistance test report of the environment
- Supplier's declaration of conformity in accordance with ISO/IEC 17050-1

PACKING

Both products and accessories are delivered in a packing ensuring resistance to the impact of thermal effects and mechanical effects pursuant to controlled packing regulations.

TRANSPORT

The products may be transported on conditions corresponding to the set of combinations of classes IE 21 pursuant to EN 60721-3-2 (i.e. by airplanes and trucks, in premises that are ventilated and protected against atmospheric conditions).

STORAGE

The products may be stored on conditions corresponding to the set of combinations of classes IE 11/1K3 pursuant to EN 60721-3-1 (i.e. in places with temperature from -5 to 45 °C and humidity from 5 to 95%, without a special threat of an attack with biological agents, with vibrations of small significance and not situated close to sources of dust and sand).

PLACING AN ORDER

The purchase order shall specify:

- Name
- Product ordering number
- If is required for the tank as an optional accessory a fitting, plug or socket
- Requirement for other documentation pursuant to Article DELIVERY
- Other (special) requirements
- Number of pieces

PURCHASE ORDER EXAMPLE

Standard design:

1. Single-chamber condensation tank
966 1 45 15
20 pcs
2. Double-chamber condensation tank
966 2 45 15
20 pcs

Special request:

- Single-chamber condensation tank
966 1 45 15 PC1
5 pcs

ORDERING ACCESSORIES

The purchase order shall specify:

- Name
- Product ordering number
- Number of pieces

PURCHASE ORDER EXAMPLE

Standard design:

1. Screw-union
025946815
20 pcs
2. Weld-on sleeve with cap nut and sealing
981 NA1
20 pcs
3. Sealing3
382041
20 pcs

TABLE 1- DESIGN OF CONDENSATION TANKS, TYPE 966

SPECIFICATION OF CONDENSATION TANK				ORDERING NUMBER				
				966	x	xx	xx	xxx
DESIGN OF CONDENSATION TANK	Single-chamber				1			
	Double-chamber				2			
MATERIAL OF TANK	Stainless steel 1.4541					45		
CONNECTING TERMINALS	Tank without valve	input	cone + nut M22x1.5				01	
		output	screw-joint M20x1.5 for a cone					
	Tank with valve 967 1122xx W4S2	input	cone + nut M22x1.5					xx
		valve output	optional terminals pursuant to table 3					
SPECIAL TREATMENT	Cleanness of inner surfaces of equipment of grade I *)							PC1

*) Only as a special request on the basis of an agreement with the manufacturer

TABLE 2 – OVERVIEW OF CONNECTING TERMINALS

(According to the type of accessory 981, except the terminal with the codes 16, 17, 18, 19, 52 and 53). Along with the weld-on terminal, the relevant number of cap nuts, sealing, plugs, threaded rings, which are illustrated in the dimensional drawing.

CODE	DRAWING	INSTALLATION PROCESS OF CONNECTING TERMINALS WITH THREADED RINGS
11		<p>By means of a cap nut and two rings, a drawn, seamless tube made of plain carbon steel, alloy steel or stainless steel with Ø 6, 8, 10, 12 and 14 mm with tolerance of outside diameter and ovality ± 0.3 mm can be connected in a way that enables further uninstallation.</p> <p>FIRST INSTALLATION:</p> <ol style="list-style-type: none"> Slide the cap nut, rear (cylindrical) ring and front (conical) ring on the straight-cut end of the tube that is free of burrs – pay attention to its orientation! To ensure correct function, it is necessary to maintain the layer of grease applied by the manufacturer on the conical sealing surface, rear ring and threads! Insert the end of the tube with rings into connecting sleeve up to the bottom and tighten the cap nut by hand. Tighten the cap nut with a torque-limiting wrench with the following torque 30 - 35 Nm (diameters 6 and 8 mm), 60 - 65 Nm (diameters 10, 12 and 14 mm), <p>UNINSTALLATION + REPEATED INSTALLATION:</p> <ol style="list-style-type: none"> The uninstallation shall be realized by complete unscrewing of the cap nut <u>after pressure has been completely discharged from the system.</u> Before repeated installation, check cleanness of the tube, threads and all sealing surfaces and pay attention to any possible damage. Rotation of the front threaded ring on the tube is not a defect! To ensure correct function, it is suitable to maintain the layer of grease applied by the manufacturer on the conical sealing surface, rear ring and threads; if required, they should be greased again. If required, this original grease can be ordered at the manufacturer of the tank. The installation is realized by inserting the end of the tube with rings and cap nut up to the bottom of the connecting sleeve. Tighten the cap nut by hand. By means of a torque wrench, tighten the nut with the aforesaid torque. <p>WARNING: <u>THE CAP NUT MAY NEVER BE TIGHTENED (RELEASED) UNDER PRESSURE – it could cause lethal injury!!!</u></p> <p>Failure to comply with the aforesaid torque (i.e. insufficient or excessive tightening of the cap nut) during the installation and with the minimum straight part of the tube from its end results in decreasing resistance of the connection to pressures and vibrations, which could cause leakage of the connection. If vibrations of the piping system occur, the armature to be connected shall be fixed by means of a suitable holder and the connecting piping shall be attached in certain distances by tube fittings.</p>
12		
13		
14		
15		
21		<p align="center">SCREW-JOINT FOR A CONE</p> <p>By means of the cap nut, screw the cone with weld-on piping to the screw joint and tighten with torque of 120 Nm.</p>
22		<p align="center">WELDED CONE WITH A CAP NUT M20x1.5</p> <p>By means of the nut, screw the armature to the screw joint for a cone, which forms a part of e.g. condensation tank, another valve, etc., and tighten with torque of 120 Nm.</p>
23		<p align="center">WELD-ON CONE WITH CAP-NUT M22x1.5</p> <p>By means of a nut, screw the armature to the screw-joint for a cone with the relevant thread, which forms a part of e.g. the piping, and tighten with torque of max. 150 Nm.</p>
31		<p align="center">MANOMETRIC SCREW-JOINT M20x1.5</p> <ol style="list-style-type: none"> Put a metal sealing on the screw joint. Screw the sleeve with weld-on piping to the manometer screw joint with the use of a cap nut and tighten by torque of approx. 120 Nm.

TABLE 2 – OVERVIEW OF CONNECTING TERMINALS, continuation from the previous page

CODE	DRAWING	DESCRIPTION AND INSTALLATION PROCEDURE
32		WELDED SLEEVE WITH A CAP NUT M20x1.5 By means of the nut, screw the armature to the manometric screw joint with the relevant thread and tighten with torque of 120 Nm.
33		MANOMETRIC SCREW-JOINT M20x1.5 LH The screw joint is used to connect a manometer or valve with manometric screw joint M20x1.5 1. Put a metal sealing on the screw joint of the manometer. 2. Screw the manometer and the armature together with the use of a sleeve coupling (it is delivered with the armature), which is tightened by torque of approx. 120 Nm.
34		TEST SCREW-JOINT M20x1.5 The screw joint is used to connect control manometer. It is delivered including the plug with sealing. Recommended torque 120 Nm.
35		MANOMETRIC SCREW-JOINT G1/2 1. Put a metal sealing on the screw joint. 2. Screw the sleeve with the weld-on piping to the manometric screw joint by means of a cap nut and tighten with torque of 120 Nm.
36		WELDED SLEEVE WITH A CAP NUT G1/2 By means of the nut, screw the armature to the manometric screw joint with the relevant thread and tighten with torque of 120 Nm.
37		WELD-ON SLEEVE WITH CAP-NUT M20x1.5 WITH SEALING ACCORDING TO THE STANDARD SHELL By means of a nut, screw the armature to the manometric screw-joint and tighten with torque of max. 120 Nm. The sealing is secured with stainless sealing ring from material 1.4404. The sealing can be ordered also separately under the ordering number 120208.
38		MANOMETRIC SCREW-JOINT G1/4 1. Put a cap nut on the sleeve 2. Weld the sleeve on the end of tube 3. Put a metal sealing on the screw joint (not a part of the delivery) 4. Screw the piping to the screw-joint with the use of a nut and tighten with torque of max. 120 Nm The sleeve with cap-nut can be ordered as special request after an agreement with the manufacturer, aluminium sealing from material EN AW-1050A can be ordered under the ordering number 382041/ZP2699.
39		SCREW-JOINT WITH MANOMETRIC CONNECTION M20x1.5 LH / G1/2 The screw-joint is used for the connection of the manometer or valve with the manometric screw-joint G1/2 1. On the screw-joint of the manometer, put on a metal sealing (not a part of the delivery, it can be ordered according to Table at Figure 3 – Sealing rings for weld-on sleeve) 2. Screw the manometer and the armature together with the manometric coupling (delivered with the armature); tighten it with torque of max. 120 Nm
40		SCREW-JOINT WITH MANOMETRIC CONNECTION G1/2 LH / G1/2 The screw-joint is used for the connection of the manometer or valve with the manometric screw-joint G1/2 1. On the screw-joint of the manometer, put on a metal sealing (not a part of the delivery, it can be ordered according to Table at Figure 3 – Sealing rings for weld-on sleeve) 2. Screw the manometer and the armature together with the manometric coupling (delivered with the armature); tighten it with torque of max. 120 Nm
41		EXTERNAL THREAD 1/4 - 18NPT 1. Wind up sealing tape of PTFE on the thread. 2. Screw the armature into the hole with corresponding internal thread and tighten with torque of 28 Nm.
42		EXTERNAL THREAD 1/2 - 14 NPT 1. Wind up sealing tape of PTFE on the thread. 2. Screw the armature into the hole with corresponding internal thread and tighten with torque of 60 Nm.

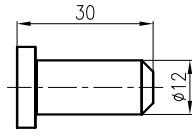
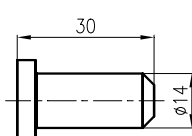
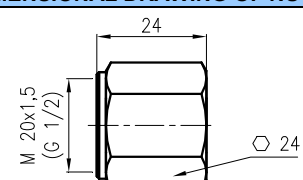
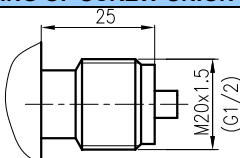
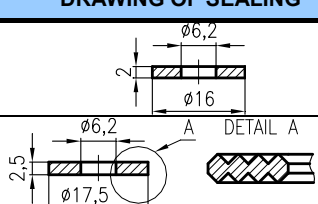
TABLE 2 – OVERVIEW OF CONNECTING TERMINALS, continuation from the previous page

CODE	DRAWING	DESCRIPTION AND INSTALLATION PROCEDURE
43		<p>EXTERNAL THREAD 3/8 - 18 NPT</p> <ol style="list-style-type: none"> 1. Wind up a sealing tape from PTFE on the thread 2. Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 45 Nm
51		<p>INTERNAL THREAD 1/4 - 18NPT</p> <ol style="list-style-type: none"> 1. Wind up sealing tape of PTFE on the corresponding external thread. 2. Tighten the screw joint with torque of 28 Nm.
54		<p>INTERNAL THREAD 1/2 - 14 NPT</p> <p>The thread is cut out in the weld-on terminal.</p> <ol style="list-style-type: none"> 1. Wind up sealing tape from PTFE on a corresponding external thread 2. Screw the screw-joint or, as the case may be, tube into the hole in the armature and tighten with torque of max. 60 Nm
61		<p>EXTERNAL THREAD G1/4</p> <ol style="list-style-type: none"> 1. Wind up a sealing tape from PTFE on the thread 2. Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 35 Nm
62		<p>EXTERNAL THREAD G1/2</p> <ol style="list-style-type: none"> 1. Wind up a sealing tape from PTFE on the thread 2. Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 120 Nm
63		<p>EXTERNAL THREAD G3/8</p> <ol style="list-style-type: none"> 1. Wind up a sealing tape from PTFE on the thread 2. Screw the armature into the hole with a corresponding internal thread and tighten with torque of max. 80 Nm
72		<p>INTERNAL THREAD G1/2</p> <p>The thread is cut out in the weld-on terminal.</p> <ol style="list-style-type: none"> 1. Wind up sealing tape from PTFE on a corresponding external thread 2. Screw the screw-joint or, as the case may be, tube into the hole in the weld-on terminal 3. With the side wrench 32, hold the flange of the cock and tighten the nut with torque of max. 120 Nm

TABLE 3 – OVERVIEW OF OPTIONAL ACCESSORIES- ordered separately

ORDERING NUMBER	SCREW-UNION		
	Screw-union is used as fitting on the tube between the diaphragm and the inlet of the condensation tank		
	MATERIAL		ROZMĚROVÝ NÁKRES
025946815	stainless steel	1.4541	
CODE	WELD-ON CONE WITH CAP NUT		
	The cone is delivered by 1 piece, welded in a PE bag together with the relevant cap nut. After putting the cap nut on the cone and welding the cone on the piping, it is possible to connect an armature to the cone, which is provided with a corresponding screw-union for the cone according to the dimensional drawing of the screw-union		
	MATERIAL	INNER DIAMETER	DRAWING
KU1	Carbon steel	1.0569	
KU2	Stainless steel	1.4541	
KU3	Creep-resisting steel	15 128	
KKU4	Carbon steel	1.0569	
KKU5	Stainless steel	1.4541	
KKU6	Creep-resisting steel	15 128	
	CAP NUT FOR WELD-ON CONE		
	MATERIAL OF NUT	DRAWING OF NUT	DRAWING OF SCREW-UNION
	Stainless steel 1.4541 (only for KU2, KU3, KCU5 and KCU6)		
Carbon steel 11 109.0 (only for KU1 and KCU4)			

TABLE 3 – OVERVIEW OF OPTIONAL ACCESSORIES- ordered separately, continuation from the previous page

CODE	WELD-ON SLEEVE WITH CAP NUT AND SEALING				
	The sleeve is delivered by 1 piece, welded in a PE bag together with the relevant cap nut and aluminium sealing. After putting the cap nut on the sleeve and welding the sleeve on the piping, it is possible to connect an armature, which is provided with a corresponding screw-union for the sleeve according to the dimensional drawing of the screw-union, to the piping.				
	MATERIAL OF SLEEVE		THREAD OF NUT	SLEEVE	
			INNER DIAMETER	DRAWING	
NA1	Carbon steel	1.0569	M20 x 1.5	6.5	
NA2	Stainless steel	1.4541			
NA3	Heat-resistant steel	15 128			
NAG1	Carbon steel	1.0569	G 1/2		
NAG2	Stainless steel	1.4541			
NAG3	Heat-resistant steel	15 128			
NA4	Carbon steel	1.0569	M20 x 1.5		
NA5	Stainless steel	1.4541			
NA6	Heat-resistant steel	15 128			
NAG4	Carbon steel	1.0569	G 1/2		
NAG5	Stainless steel	1.4541			
NAG6	Heat-resistant steel	15 128			
	CAP NUT FOR WELD-ON SLEEVE				
	MATERIAL OF NUT	DIMENSIONAL DRAWING OF NUT	DRAWING OF SCREW-UNION		
	Stainless steel 1.4541 (only for NA2, NAG2, NA3, NAG3, NA5, NAG5, NA6 and NAG6)				
Carbon steel 11 109.0 (only for NA1, NAG1 NA4 and NAG4)					
ORDERING NUMBER	SEALING RINGS FOR WELD-ON SLEEVE				
	Sealing rings made of other materials can also be ordered independently according to the following ordering numbers				
	MATERIAL OF SEALING		DRAWING OF SEALING		
382 041	Al	EN AW-1050A			
276 067	Cu	42 3005			
382 063	Stainless steel	1.4541			
382 096	Stainless steel	1.4404			

INSTALLATION AND CONNECTION

Installation of the condensation tank may only be realized by a worker of the operation or service organization.

INSTALLATION OF CONDENSATION TANKS

The condensation tank shall be installed directly on the measurement place of the measuring diaphragm by means of the cone \rightarrow 14 mm and cap nut M 22x1.5. Install the stop valve with weld-on cone \rightarrow 14 mm on the output screw-joint by means of a cap nut M 20x1.5.

The operation position identified in the Article TECHNICAL DATA shall be complied with.

Correct position of the condensation tank can be adjusted and checked by means of a hose water level. To ensure the same height of the level of condensate in both chambers, both input holes of the double-chamber tank shall be at the same height. The best way to check it is with a knife ruler enclosed on the output cones of the tank. The height difference of points of the ruler with distance 30 cm from each other should not exceed 2 mm (for the range of pressure difference 30 kPa). The input piping shall be either horizontal or it may be inclined slightly downwards from the tank to the diaphragm.

CONNECTION OF THE IMPULSE PIPING

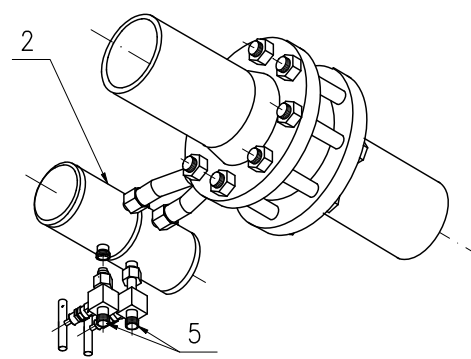
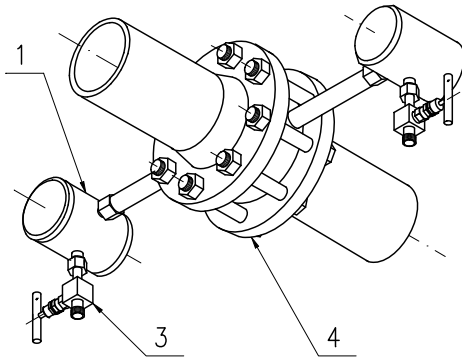
Before the connection, the impulse piping shall be cleaned perfectly.

The condensation tank shall be connected to the impulse piping through a valve with the use of welded terminals. All types of connections with their dimensional drawings and described type of installation are identified in table 3.

INSTALLATION OF STOP VALVE

By means of a sealing cone and a cap nut on the output part, the valve shall be connected to the output screw-joint of the condensation tank. To ensure better quality of venting, the valve shall be installed with the arrow marked on its body facing upwards in the direction of the tank.

TYPES OF INSTALLATION OF CONDENSATION TANKS



1. Single-chamber condensation tank
2. Double-chamber condensation tank
3. Stainless valve (type 967)
4. Measuring diaphragm
5. Connecting terminals pursuant to table 3

COMMISSIONING

After the installation, check of the correct position and connection of the impulse piping, the condensation tank is prepared for putting into operation.

OPERATION AND MAINTENANCE

The condensation tank does not require any operation and maintenance.

PROCEDURE WHEN FINDING LEAKAGE OF CONNECTION WITH THREADED RINGS

Possible leakage of the connection can be caused by unprofessional installation, e.g. by failure to comply with specified torque (i.e. insufficient or excessive tightening of the cap nut), with minimum straight part of the tube from its end or by using this connection in the environment with increased level of vibrations without any fixation of armature and connecting tubes, in particular those of longer lengths.



WARNING:

Never tighten (release) the cap nut under pressure – danger of lethal injury!!!

Uninstallation and repeated installation of the connection shall be realized according to manual for accessories, type 981 – Connecting terminals.

RELIABILITY

Reliability indicators in operation conditions and ambient conditions specified herein

- Mean time of operation between failures 96 000 hours (inf. value)
- Expected service life 10 years

SPARE PARTS

The design of the condensation tank does not require any delivery of spare parts.

WARRANTY

The warranty period is 36 months from the receiving of the product by the customer, unless established otherwise in the contract.

Rejection of defects shall be enforced in writing at the manufacturer within the warranty period. The rejecting side shall identify the product name, ordering and manufacturing numbers, date of issue and number of the delivery note, clear description of the occurring defect and the subject of the claim. If the rejecting side is invited to send the device for repair, it shall do so in the original package of the manufacturer and/or in another package ensuring safe transport.

The warranty shall not apply to defects caused by unauthorized intervention into the device, its forced mechanical damage or failure to comply with operation conditions of the product and the product manual.

REPAIRS

The tanks are not repaired. The stop valves shall be repaired by the manufacturer. They shall be sent for repair in the original or equal package without accessories.

DISABLING AND LIQUIDATION

The product and its package do not include any parts that could impact the environment.

Products that are withdrawn from operation, including their packages, may be disposed of to sorted or unsorted waste pursuant to the type of waste.

The package of the product can be recycled completely. Metal parts of the product are recycled, non-recyclable plastic materials shall be disposed of in accordance with applicable legislation.

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