SINTEF Technical Approval

TG 2464

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Amended:
Valid until 01.05.2029
Provided listed on
www.sintefcertification.no

SINTEF confirms that

JRG Sanipex pipe in tube system

has been found to be fit for use in Norway and to meet the provisions regarding product documentation given in the regulation relating to the marketing of products for construction works (DOK) and regulations on technical requirements for building works (TEK), with the properties, fields of application and conditions for use as stated in this document

1. Holder of the approval

Georg Fischer JRG AG
Hauptstrasse 130,
4450 Sissach,
Switzerland
www.gfps.com/jrg

2. Product description

JRG Sanipex pipe in tube system is a system for distribution of cold and hot water inside buildings, see Fig. 1-3. Table 1 shows the main components in JRG Sanipex pipe in tube system. The complete list of components is found in the Control Description for SINTEF Technical Approval no. 2464. The Control Description is a formal part of the Approval, and the valid version is held by SINTEF.

3. Fields of application

The approval concerns cold and hot water distribution inside buildings.

4. Properties

PEX-pipes

The use of PEX-pipes has the following limitations:

- Maximum allowed pressure is 1.0 MPa (10 bar)
- Maximum allowed temperature for a short period is 95 °C
- Maximum continuous operating temperature is 70 °C

If the water temperature from the water heater is higher than 70 °C, or if there is uncertainty about the water temperature, SINTEF recommends installing a copper pipe of at least 0.5 m between the water heater outlet and the PEX pipe.

Watertightness

The pipe in tube system has passed type testing for watertightness in accordance with SINTEF Test Method no. 2 *Pipe in tube systems* for PEX-pipes with dimensions 12x1.7 mm and 16x2.2 mm. PEX-pipes and fittings are certified in accordance with current product standards.

Exchangeability

PEX-pipe dimensions 12x1.7 mm (18 mm protection tube) and 16x2.2 mm (25 mm protection tube) are documented to be exchangeable for up to 10 meters length, included three bends plus wall box. See Chapter 6 regarding dimensioning.

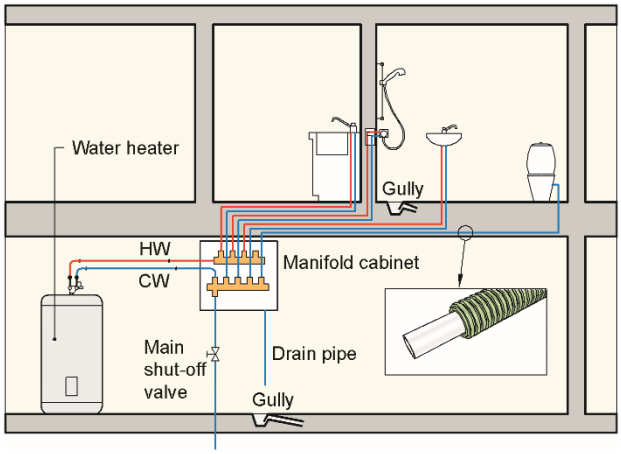

Fig. 1
Principle sketch of a pipe in tube system

Acoustic characteristics

The pipe in tube systems acoustic characteristics depends on how it is installed, noise levels of taps, water hammer levels etc. The noise levels from technical installations shall be in accordance with limit values given in TEK and NS 8175, Class C.

5. Environmental aspects

Chemicals hazardous to health and environment

The product contains no hazardous substances with priority in quantities that pose any increased risk for human health and environment. Chemicals with priority include CMR, PBT or vPvB substances.

Effect on indoor environment

The product is evaluated according to SINTEF Technical Approval – Health and Environmental Requirements version 09.09.2024. The product is not regarded as emitting any particles, gases or radiation that have a perceptible impact on the indoor climate, or to have any significant impact on health. The product meets the requirements in BREEAM-NOR v6.1, Emissions from building products according to Hea 02 Indoor air quality.

Effect on soil, surface water and ground water

The product is evaluated to emit no substances to drinking water in amounts that can cause taste, smell or is dangerous to the health.

Waste treatment/recycling

The product shall be sorted as metal and residual waste. The product shall be delivered to an authorized waste treatment plant for material and energy recovery.

Table 2
Product specification for JRG Sanipex pipe in tube system

Component	Description Article numbers according to the approval control description
PEX- pipe and protection tube	Dimension 12 x 1.7 mm (18 mm protection tube) and 16 x 2.2 mm (25 mm protection tube). External diameter of the belonging corrugated PE protection tubes is given in parenthesis. SINTEF Product Certificate no. 0017, 0049 and 1814.
Fittings for PEX- pipe	Fitting system for PEX- pipe. SINTEF Product Certificate no. 0049 and 1814.
Wall box	Wall box for 12 x 1.7 mm and 16 x 2.2 mm PEX-pipe with 18 mm and 25 mm protection tube respectively. The wall box is delivered in two versions; with and without threads on the extension part.
Wall box collar	Membrane collar used to ensure watertight connection between wall box and waterproof membrane in wet zones.
Locking clip for wall box	The locking clip secures grip and tightening between wall box and protection tube.
Bracket for wall box	Bracket to fix the wall box to the building construction.
Manifold	Manifold made of bronze for distribution of water.
Manifold cabinet - aluminium	Powder coated salt water resistant aluminium manifold cabinet for installation in ceiling or wall in dry zones. The cabinet is delivered with splash protection, front door with frame, manifold bracket, bushings, drainage clip and drainage components. Drainage capacity ≥0.25 l/s.
Manifold cabinet - plastic	Cabinet for installation in ceiling or in wall in dry zones. The cabinet is delivered with splash protection, front door with frame, manifold bracket, bushings, drainage clip and drainage components. Drainage capacity ≥ 0.25 l/s.
Mini manifold cabinet	Aluminium manifold cabinet. The cabinet is delivered with JRG Sanipex box 3-way 90°. Drainage capacity 0.25 l/s.
Drainage elbow	Drainage component for safely draining leakage water from the manifold cabinet to a watertight floor with gully. Fits 25 mm protection tubes.
Ball valves	Ball valves in brass for taps/mixers and manifolds. SINTEF Product Certificate no. 1454 and 1455.
Fixing clamps	For use inside the manifold cabinet when replacing PEX-pipes through protection tubes.
Clamps for protection tube, single and double	Clamps for fixing/support of protection tubes with external diameters 18 mm and 25 mm.
Pipe protection unit for nails and screws	Pipe protection unit is used for protection of 18 mm, 25 mm and 29 mm protection tubes from penetration of nails and screws.
End sleeve	End sleeves are used to make a watertight connection between PEX-pipes and protection tubes with dimension 12 x 1.7 mm (18 mm protection tube) or 16 x 2.2 mm (25 mm protection tube).
Fitting connector	Fitting connector is used for fixing/support of protection tube, for instance in kitchen units. The fitting must be secured against possible leakages with leakage detector.
Pipe support	Pipe support made of plastic ensuring correct pipe bending radius between transition floor/wall and ceiling/wall.
Installation suitcase with special tools	Installation suitcase with special tools for installation of the pipe in tube system.

Fig. 2
JRG Sanipex - Wall box with locking clip
Figure: Georg Fischer JRG AG

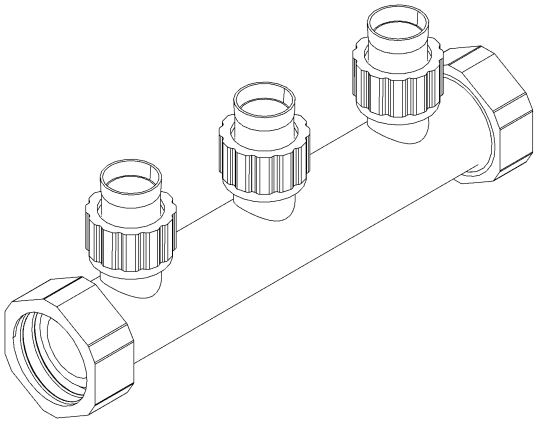

Fig. 3
JRG Sanipex - Manifold
Figure: Georg Fischer JRG AG

6. Special conditions for use and installation

Design considerations

The PEX-pipes shall be easily accessible for replacement after installation. The protection tubes shall be installed so that damaged PEX-pipes can be replaced without dismantling or damaging any building constructions. Leakages shall be easily discovered and shall not damage other installations or building parts. The main purpose of the protection tube is to drain potential leakages to a floor gully in a wet room. The protection tubes shall lead leakages water to a manifold cabinet. From the manifold cabinet, the leakage water shall be drained through the cabinets' drainage tube to a wet room with watertight floor and gully. The leakage water shall be drained to a visible spot, not into the floor gully directly.

Installation

JRG Sanipex pipe in tube system shall be installed as described in Building Research Design Guide 553.117 *Rør-i-rør-systemer for vannforsyning* and in accordance with the manufacturer's installation instructions. Only system components, as described in Table 1, shall be used when installing JRG Sanipex pipe in tube system. The internal control form, accompanying the manifold cabinet, shall be completed before commissioning.

Dimensioning

Chosen pipe dimensions shall give enough water to the sanitary equipment. The PEX-pipes shall be easily accessible for replacement after installation. The following factors affect the exchangeability: pipe dimension, pipe length, fixation and number of bends. The exchangeability of the PEX-pipe must be controlled before finishing the building construction if the pipe lengths are more than 10 meters.

Table 2 shows recommended pipe dimensions for different sanitary appliances, and maximum pipe length with respect to exchangeability. The recommendations assume a water pressure of at least 5 bar upstream of the manifold.

Table 2
Dimensioning of PEX pipes

Sanitary equipment	Typical water flow l/s	Recommended external diameter for PEX-pipe[1] mm	
		12x1.7	16x2.2
Water closet	0.10	X	X
Basin mixer	0.20	X[2]	X
Kitchen mixer	0.20	X[2]	X
Shower mixer	0.20	X[2]	X
Washing and dishwashing machines	0.20	X[2]	X
Bath mixers	0.30		X

[1] X is recommended pipe dimension

[2] Pipe lengths > 5 meters should be controlled regarding capacity

Manifold cabinets

JRG Sanipex pipe in tube system has manifold cabinets for installation in both dry and wet zones. All plastic cabinets and aluminium cabinets no. 5, 8 and 12 are approved for dry zones only. JRG Sanipex Mini cabinet and aluminium cabinet no.4 can be installed in both dry and wet zones. These cabinets are approved for installation with liquid membrane systems, provided the membrane system has a SINTEF Technical Approval (see www.sintefcertification.no for approved membrane systems). The installation instructions from Armaturjonsson AS for installation in wet zones must be followed.

Manifold cabinets for wall installation shall be mounted at a height that ensures the protection tubes come straight into the cabinet. A minimum height of 1 m is recommended.

Protection tubes must be fastened to the cabinet using bushings. The protection tubes must be cut above the sill height in the bottom of the cabinet. The drain tube must be cut as close as possible to the cabinet's bottom as described in Fig. 4. A pipe cutter from Armaturjonsson AS shall be used for this operation.

For draining of water leakage from JRG Sanipex aluminium cabinets, a pipe bushing mounted upside-down in the cabinet shall be used. A 25 mm protection tube (drainage tube) is installed in the upside-down bushing and connected to the drainage outlet. In dry zones, JRG Sanipex drainage elbow can be used as drainage outlet. In wet zones, an empty wall box with membrane collar must be used as outlet to ensure a watertight penetration of the wet room membrane, see section about penetrations in wet zones. The manifold cabinets have a drainage capacity ≥ 0.25 l/s. The drainage tube must not be longer than 1.5 meters.

For draining of water leakage from JRG Sanipex plastic cabinets, the belonging drainage clip and 40 mm PP drainage components shall be used. The cabinets have a drainage capacity of 0.40 l/s.

Manifold cabinets mounted in the ceiling must be placed in a wet room where water can be drained to a watertight floor with gully. The cabinets' door must be installed level with the ceiling, and the splash protection must be removed. The building's main shut-off valve must not be installed in a ceiling cabinet. Other shut-off valves should also not be located in cabinets in the ceiling. If this can't be avoided, the valves must be easily accessible.

Bushings in the cabinet shall be controlled for watertightness before completion of the building construction. The water capacity of the drainage tube shall also be controlled before finishing the wall.

The cabinets' splash protection shall always be placed in the manifold cabinet, except when the cabinet is mounted in a ceiling.

It is important that the manifolds are securely clamped inside the cabinet to avoid bothersome noise from water hammers from closing taps. Clamps and brackets delivered with the cabinets shall be used.

Manifold cabinets should preferably be installed in rooms with watertight floor and gully. If this is not an option, cabinets must be installed with a leakage detector that shuts off the water supply immediately if a leakage occurs, see Fig. 5. This solution may be relevant if the cabinets are installed in offices, toilet rooms or kitchens without floor gullies.

Manifolds without cabinet

Manifolds should preferably be installed inside a manifold cabinet. In wet rooms with floor gully and watertight membrane on the floor and walls, manifolds can be installed without manifold cabinet. The installation shall be in a visible spot, either on a wall, at floor level or under the ceiling. It is important to fix manifolds securely to the building construction. Manifold brackets for fixing/supporting of the manifolds shall be used.

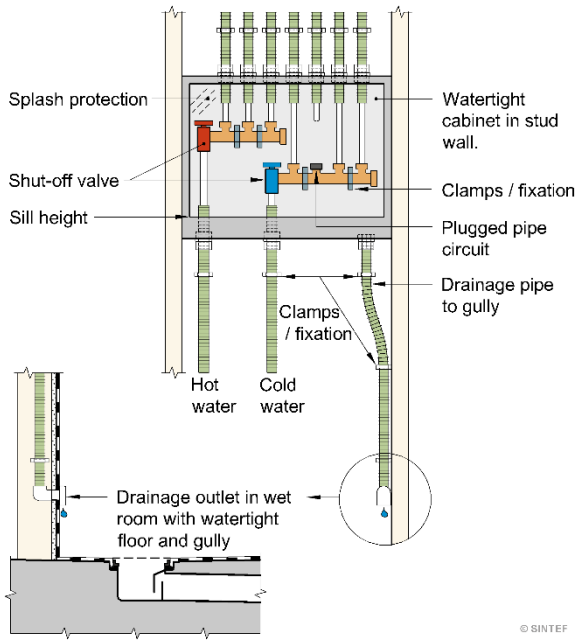

Fig. 4
Correct installation of manifold cabinet in wet rooms

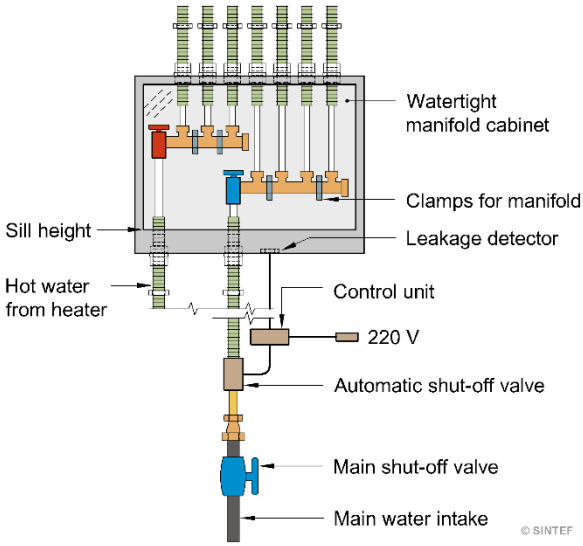

Fig. 5
Manifold cabinet without drainage must be installed with a leakage detector that shuts off the water supply immediately if leakages occur.

Clamping of protection tubes
Clamps for protection tubes described in Table 1 shall be used to fix the protection tubes securely to the building construction.

Correct fixation of protection tubes is vital for ensuring easy exchangeability of PEX pipes. Fixation of protection tubes is especially important before and after a bend, in the middle of a bend, where tubes pass through a building part and in conjunction with wall boxes and manifold cabinets.

Protection tubes should be clamped in conjunction with wall boxes and manifold cabinets at a distance of 150-300 mm. The space between clamps on straight lengths should not exceed 0.6 m.

Fixing clamps for use inside the manifold cabinet shall be used when replacing PEX-pipes.

Installation of wall boxes
Wall boxes shall be installed as described in the installation instruction from Georg Fischer JRG AG and/or Armaturjonsson AS.

Installation of wall boxes in wet zones
Wall boxes and belonging wall box collar or fixation ring shall always be used in wet zones with liquid membrane, bathroom panels or watertight boards, to ensure a watertight connection to the construction. The collar or fixation ring must be installed as described in the installation instructions from Georg Fischer JRG AG or Armaturjonsson AS. In wet zones with bathroom panels, water-tightening of wall boxes shall follow the procedure given in the technical approval of the panels.

Water leakage protection in dry zones
Rooms without gully and watertight floor, such as kitchen units and toilet rooms, are considered dry zones. It is not required to use wall boxes in dry zones, but it is highly recommended. The wall box ensures a watertight connection between wall box and protection tube, and a good fixation to avoid problems with expansion forces.

Floors in toilet rooms or inside kitchen cupboards should have a watertight covering or tray and a leakage detector to avoid damages from potential water leakages, see Fig. 6.

Tools
Special tools delivered by Armaturjonsson AS for installation of the system shall be used if specified in the installation manual.

Expansion forces
Expansion forces shall not cause damage to the pipe in tube system, taps or building constructions it is fastened to. Pipe expansion caused by changing water temperature must be considered when installing the system. PEX- pipes have a length expansion of 0.18 mm/(m°C), i.e. 90 mm per 10 m pipe at 50° C temperature difference. If the pipes are installed with small curves and clamp spacing of 0.6 m as described in Building Research Design Guide 553.185 *Trykkstøt i sanitærinstallasjoner* and 553.117 *Rør-i-rør systemer for vannforsyning*, much of the expansion will be picked up between the space of the PEX- pipe and the protection tube.

Water hammer
Water hammer can cause noise from the pipe in tube system due to movement (strokes) between PEX-pipes and protection tubes. This movement can be avoided if the pipes are installed with small curves and clamp spacing of 0.6 meter as described in Building Research Design Guide 553.117 *Rør-i-rør systemer for vannforsyning* and 553.185 *Trykkstøt i sanitærinstallasjoner*. It is also recommended to use taps that have a water hammer reducing closing mechanism.

Pipe protection
Pipe protection units shall be installed in stud partitions where there is a risk of penetrating the pipes with nails, screws etc. Protection tubes that go through steel partitions should have protection that prevents movements caused by expansion forces and water hammers from damaging the tubes.

PEX-pipes must not be exposed to sunlight (UV- radiation) for a long period of time, and tape must not be used on the outside of the pipes. The pipes have good durability against all water qualities, but should not be exposed to solvents, tar or oil-based products.

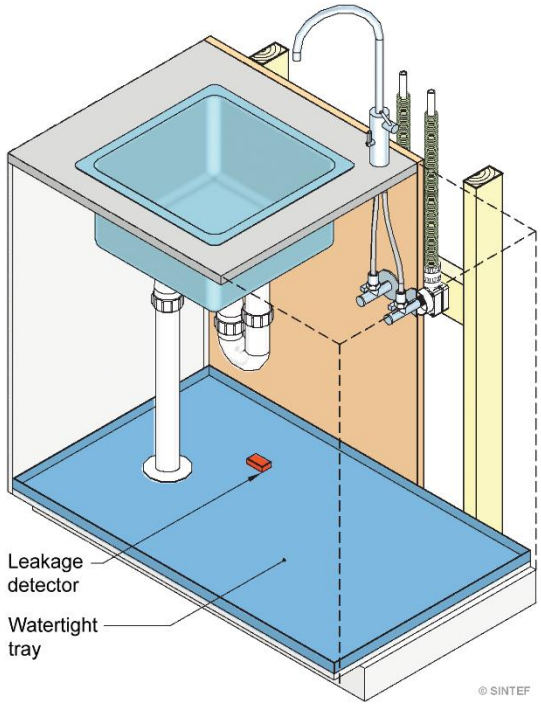

Fig. 6
Main principles for water leakage protection in dry zones

Protection against frost
To avoid risk of freezing, pipes should not be installed in an outer wall, floor or roof. If installing pipes in outer walls, floor or roof cannot be avoided, the pipes must be placed on the warmest side of the construction, well protected from cold drafts. This means on the inner side of heat insulation and vapor barrier.

Penetration of fire walls
Penetrations through building parts must not weaken the fire resistance of fire rated building constructions. Penetrations with plastic pipes with an external diameter no more than 32 mm are allowed through bricked or cast building constructions classified with fire resistance up to class EI 90 A2-s,d0, and through insulated non-loadbearing walls classified with fire resistance up to class EI 60 A2-s1,d0. The penetrations must be sealed with a sealant that is classified with the same fire resistance as the construction. Penetration of fire rated walls shall be carried out as described in Building Research Design Guide 520.342 520.342 *Branntetting av gjennomføringer*.

Pressure testing of the system
All systems must be pressure tested after installation. Pressure testing of the pipe system should preferably be done with water. The test is performed with a water pressure 1.3 times the dimensioning pressure. The dimensioning pressure is the highest pressure that occur during normal operation. It is important to consider the risk of freezing if the pressure test is performed during winter.

Marking of water circuits
Each water circuit should be marked inside the manifold cabinet with exact length and where it delivers water to. A circuit form accompanying the cabinet should be used.

Protection against Legionellosis
Water in pipes that are rarely or never used may be at risk of bacterial growth. A pipe in tube system should therefore not have unused water circuits. Unused circuits should be drained of water and plugged or closed at the manifold.

Cold and hot water pipes should not be in contact with each other to avoid heat transmission. Cold water pipes should not be laid in areas with high temperature, for example in timberwork or bathroom floors with floor heating.

7. Factory production control

JRG Sanipex pipe in tube system is produced by Georg Fischer JRG AG, Hauptstrasse 130, 4450 Sissach, Switzerland.

The holder of the approval is responsible for maintaining the factory production control to ensure that JRG Sanipex pipe in tube system is manufactured in compliance with the preconditions upon which this approval is based.

The manufacturing of the products and the manufacturer's system for factory production control (FPC) is subject to continuous surveillance in accordance with the contract regarding SINTEF Technical Approval.

The manufacturer has a quality management system certified in accordance with EN ISO 9001 and an environmental management system certified in accordance with EN ISO 14001.

8. Basis for the approval

The product's characteristics are documented in reports issued by independent bodies. The technical documentation serves as the basis for SINTEF's product assessment with respect to the guidelines for SINTEF Technical Approval, and recommendations as outlined in SINTEF Building Research Design Guides.

9. Marking

All packaging shall be marked with the manufacturer's name or mark, product name and production date. Individual products are marked with the manufacturers name or mark. The approval mark for SINTEF Technical Approval, TG 2464, may also be used.

10. Liability

The holder/manufacturer has sole product liability according to current law. Claims can only be made against SINTEF under general law or other special grounds.

for SINTEF

Hans Boye Skogstad
Approval Manager