"RBM TITA-FIX" SYSTEM

MULTI-LAYER PIPE AND FITTINGS FOR WATER DISTRIBUTION

CT0682.0_21
EN
March 2023

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PRODUCTION RANGE

RBM TITA-FIX MULTI-LAYER PIPE

	Code		External diameter [mm]	Pipe thickness [mm]	Length [m]	Maximum working pressure ** [bar]
	PE-Xc	PE-RT *				
COIL	1542.16.00	1545.16.00	16	2	100	10
	1542.20.00	1545.20.00	20			
	1542.26.00	1545.26.00	26	3	50	
	1542.32.00	1545.32.00	32			
	-	1545.40.00	40	3,5	25	
STRAIGHT LENGTH	1543.16.00	1546.16.00	16	2	4	10
	1543.20.00	1546.20.00	20			
	1543.26.00	1546.26.00	26	3		
	1543.32.00	1546.32.00	32			
	-	1546.40.00	40	3,5	5	
	-	1546.50.00	50	4		
	-	1546.63.00	63	4,5		

RBM TITA-FIX MULTI-LAYER PIPE WITH THERMAL INSULATION

	Code				External diameter [mm]	Pipe thickness [mm]	Thickness of the insulation layer [mm]	Length [m]	Max. working pressure ** [bar]
	PE-Xc	PE-RT *							
COIL	1541.16.50 **(G)**	1544.16.50 **(G)**	1946.16.20 **(B)**	1946.16.30 **(R)**	16	2	6***	50	10
	1541.20.50 **(G)**	1544.20.50 **(G)**	1946.20.20 **(B)**	1946.20.30 **(R)**	20		6		
	1541.26.50 **(G)**	1544.26.50 **(G)**	1946.26.20 **(B)**	1946.26.30 **(R)**	26	3			
	1541.32.50 **(G)**	1544.32.50 **(G)**	1946.32.20 **(B)**	1946.32.30 **(R)**	32			25	

(G) = Insulation color: Grey **(B)** = Insulation color: Blue **(R)** = Insulation color: Red

RBM TITA-FIX MULTI-LAYER PIPE WITH ANTI-CONDENSATION THERMAL INSULATION

	Code		External diameter [mm]	Pipe thickness [mm]	Thickness of the insulation layer [mm]	Length [m]	Max. working pressure ** [bar]
	PE-Xc	PE-RT *					
COIL	1541.16.40 **(V)**	1544.16.40 **(V)**	16	2	10***	50	10
	1541.20.40 **(V)**	1544.20.40 **(V)**	20				
	1541.26.40 **(V)**	1544.26.40 **(V)**	26	3			
	1541.32.40 **(V)**	1544.32.40 **(V)**	32			25	

(V) = Insulation color: Green

RBM TITA-FIX MULTI-LAYER PIPE WITH CORRUGATED PROTECTION SHEATH

	Codice		External diameter [mm]	Pipe thickness [mm]	External sheath		Length [m]	Max. working pressure ** [bar]
	PE-Xc	PE-RT *			Thickness	Colour		
COIL	1541.16.80 **(B)**	1544.16.80 **(B)**	16	2	25 mm	Blue	50	10
	1541.20.80 **(B)**	1544.20.80 **(B)**	20		32 mm	Blue		
	1541.16.90 **(R)**	1544.16.90 **(R)**	16		25 mm	Red		
	1541.20.90 **(R)**	1544.20.90 **(R)**	20		32 mm	Red		

(B) = Corrugated protection sheath color: Blue **(R)** = Corrugated protection sheath color: Red

* Multilayer pipe PE-RT/Al/PE-RT certificate SKZ HR 3.12 according to the specifications

** The working pressure varies according to the class of use to which the multi-layer pipe belongs: the maximum working pressure shown is valid for a class 1 *RBM Tita-Fix* tube. Please consult the appropriate section of this data sheet for further details.

*** Thicknesses in compliance with Law no. 10 of 9 January 1991: Standards for the implementation of the national energy plan concerning a rational use of energy, energy saving and the development of renewable sources of energy.

MAIN ACCESSORIES

Code *		Description
Series 671÷680, 812, 851÷853, 890, 962÷963, 999		**Press fittings (T_{max}=95°C; P_{max}=1000 kPa):** press fittings for multi-layer pipes from *Ø14 to Ø63 mm with wall thicknesses from 2 to 4.5 mm*. Various construction shapes (straight, angular, T-shaped, etc.) are available; with/without threaded connection (G3/4" *Euroconus, UNI-EN-ISO 228, RBM Standard* or *W28x19F*), from 1 to 3 press-fit connections with the possibility of having ways with smaller/larger dimensions. Possibility of having a fixing and positioning flange.
Series 70, 81, 82, 83, 222, 224		**Fittings to be tightened (T_{max}=110°C; P_{max}=1000 kPa):** fittings to be tightened for multi-layer pipes with *Ø14 to Ø20* with wall thicknesses from 2 *to 2.5 mm*. Threaded connections (G3/4" *Euroconus* or *Standard RBM).*
553.00.X2		**Portable manual shearing machine** (code 553.00.42, 553.00.52), suitable for pipes (*Ø6 ÷ Ø42 mm*) made of PE, PB, PP, PVC, PVDF. Shearing machine code 553.00.42 for multi-layer pipes up to *Ø35 mm.* Shearing machine code 553.00.52 for multi-layer pipes up to *Ø42 mm.*
553.00.X2		**Portable manual pipe cutter** (code 553.00.62, 553.00.72), suitable for pipes (*Ø6 ÷ Ø67 mm)* made of PVC and copper. Shearing machine code 553.00.62 for multi-layer pipes up to *Ø67 mm.* Shearing machine code 553.00.72 for multi-layer pipes up to *Ø32 mm.*
2179.00.02		**Portable manual pipe cutter** suitable for pipes (*Ø6 ÷ Ø26 mm)*
1165.00.02		**Portable, cordless drill driver** for preparing the RBM Tita-Fix multi-layer pipe for the connection with the fitting. Complete kit made up of: – 1 cordless drill driver; – 2 14.4V batteries with 1.5 Ah; – 1 battery charger for the drill driver; – 1 case containing the whole drill driver kit.
2007.00.02		**Handle for calibration/flaring tools.** It is used for preparing the RBM Tita-Fix multi-layer pipe manually.
2006.14…63.02		**Calibration/flaring tool**. It eliminates internal burr and is used, at the same time, for the calibration of the internal diameter in the cutting area of the multi-layer pipe (*Ø14 ÷ Ø63 mm).* These tools are equipped with a handle for manual use and are predisposed to work in connection with a screwdriver.
2008.00.02		**Complete calibration/flaring tool kit.** This case contains n° 4 calibration and flaring tools with Ø 16 – 20 – 26 – 32. It is equipped with a handle for using tools manually.
553.00.X2 681.14…63.02		**Portable press,** battery-operated (code: 553.00.02: battery 18V 3Ah) or electrically operated (code: 553.00.12: 230V ac power supply). **Pliers** (code: 681.14…63.02) for pipes from *Ø14 to Ø63 mm*, suitable for RBM presses.
1338.00.02		**Electric portable press for press fittings** (14.4V battery). Complete with battery charger case and containment, shock-proof case.
Fig. 1: 1339.00.02 Fig. 2: 1340.XX.02		**Pliers** (code 1339.00.02) **with interchangeable insert** (code 1340.0X.02) for pipes from *Ø14 to Ø32 mm.*
69.00.00 246.00.00		**Wrench for fittings to be tightened** with **Standard RBM (Ch 28)** connection or for **Euroconus (Ch 30)** fittings.
934.00.00		**Fixing plate for flanged fittings (code 852.04.X0 and code 853.04.X0)** Plate made of galvanized steel for flanged fittings with pre-fixed centre distance (80-100-120-150-160 mm). Possibility of cutting the connection points of the plate in order to obtain a centre distance of 80 mm only.
934.00.50		**Fixing and positioning bracket** This bracket is used for fixing and positioning the plate code cod. 934.00.00. It is made of galvanized steel and equipped with a fixing nut.
20.04.10 20.05.10 20.05.20		**Recessed stopcock with chromium plated cap and fittings to be tightened for multi-layer pipes** Maximum temperature: 95°C, maximum pressure: 1000 kPa. Brass body, chromium plated cap and control knob, elastomer gaskets, press-connections (for pipes from Ø16 to Ø26 mm, thickness from 2 to 3 mm) with dielectric PE cover and pipe tightening bush made of stainless steel.
1875.14…26.02		**Manual spring bender for multilayer pipe.** It avoids the crushing of the tube during the bending operation.
553.00.32		**Portable pipe bending kit for multi-layer pipes.** The kit contains the following: - manual hydraulic pump; - shock-proof containment and transport case; - pipe bending templates made of aluminium, suitable for the following diameters: 14 - 16 - 18 - 20 - 26 - 32; - Quick-connection counter-templates made of aluminium.

* For the sake of brevity only some of the codes of the fittings available have been shown. Please consult the "accessory fittings" section for a more complete description

RBM TITA-FIX MULTI-LAYER PIPE

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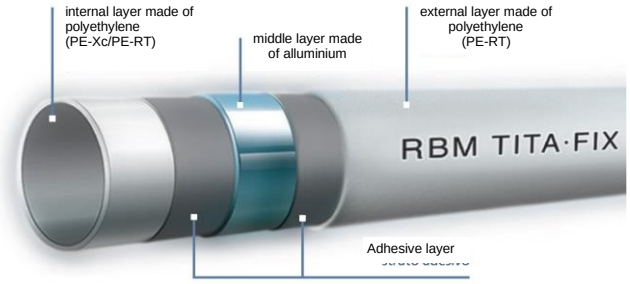
	Code		External diameter	Pipe thickness	Thickness of the aluminium layer	Volume of water contained in each metre of tube	Length	Water speed	Maximum working pressure **
	PE-Xc	PE-RT *	[mm]	[mm]	[mm]	[liters/meter]	[m]	[m/s]	[bar]
COIL	1542.16.00	1545.16.00	16	2	0,20	0,113	100	See diagram concerning pressure losses	10
	1542.20.00	1545.20.00	20		0,30	0,201			
	1542.26.00	1545.26.00	26	3	0,40	0,314	50	The recommended speed range is shown by marked lines	
	1542.32.00	1545.32.00	32		0,40	0,531			
	-	1545.40.00	40	3,5	0,50	0,855	25		
STRAIGHT LENGTH	1543.16.00	1546.16.00	16	2	0,20	0,113	4	See diagram concerning pressure losses	10
	1543.20.00	1546.20.00	20		0,30	0,201			
	1543.26.00	1546.26.00	26	3	0,40	0,314			
	1543.32.00	1546.32.00	32		0,40	0,531			
	-	1546.40.00	40	3,5	0,50	0,855		The recommended speed range is shown by marked lines	
	-	1546.50.00	50	4	0,60	1,385			
	-	1546.63.00	63	4,5	0,80	2,289			

DESCRIPTION



RBM Tita-Fix is available in 2 different types, PE-Xc or PE-RT, and can be used successfully both in the civil and industrial sector. Best results can be achieved in the case of underfloor heating as well as of water, heating and sanitary distribution systems and of heating systems using radiators and fan coil units..
With the RBM Tita-Fix pipes we have been able to combine the reliability and solidity of pipes made of metal with the practical installation of plastic pipes and to avoid the defects which characterize both types of products.
The main advantages of the RBM Tita-Fix systems are as follows:

- **Quick laying of pipes within installations**
  - Manual cold shaping of the pipe. Even very narrow curving radiuses do not lead to section deformations.
  - The pipe is light and robust (the aluminium core makes pipes resistant to heavy trampling and to accidental impacts)
  - After the shaping process, the shape taken remains unvaried: whole parts of a system can be pre-arranged in different areas of the building site (for example, supply cutout points of sanitary systems complete with end fittings).
- **Reduced elongation**
  Thermal expansion is very similar to that of metal pipes, that is to say it corresponds to about 1/4÷1/8 of the expansion which takes place in the case of plastic materials.
- **Container pressure loss and resistance to corrosion and to chemical agents.**
  The internal polyethylene layer has a very smooth surface and makes it possible to reduce pressure losses dramatically compared with traditional metal pipes. Furthermore, this layer
  - makes pipes particularly resistant against acid and basic chemical agents;
  - avoids incrustations and scale deposits (the formation of algae and of bacterial colonies is less probable; fluid dynamic characteristics can be maintained better in the long term);
  - makes possible effective protection of the aluminium core against chemical or natural corrosion.

  The special layout of the fittings used avoids the risk of electrochemical corrosion because of the isolation of the metal core.
- **Acoustic attenuation**
  (against noise caused by turbulence, vibrations, etc.).
- **Oxygen impermeability**
  The middle layer made of aluminium makes this product completely impermeable to oxygen, gas and water vapour, thus avoiding:
  - the proliferation of algae and bacterial colonies;
  - circuit corrosion phenomena
- **Ultraviolet impermeability**
  The internal layer made of polyethylene is protected by an aluminium layer which avoids the progressive degeneration resulting from damage caused by exposure to UV rays.

☞ **ATTENTION:** The pipe is supplied in a package which protects it during storage. The external layer of the pipe is made of polyethylene. This material must not be exposed to direct sunlight because it has a very low resistance to ultraviolet rays.

* Multilayer pipe PE-RT/Al/PE-RT certificate SKZ HR 3.12 according to the specifications
** The working pressure varies according to the class of use of the multi-layer pipe: the maximum pressure shown applies to the use of class 1 *RBM Tita-Fix* pipes. Please consult the specific section of this data sheet for further details.

COMPLIANCE WITH LAWS AND STANDARDS

RBM Tita-Fix complies with ***Law Decree no. 174 of 6 April 2004 of the Ministry of Health*** (G.U., general series no. 166).
Our products are manufactured in compliance with the specifications in **EN ISO 21003**: "Multi-layer pipe systems for hot and cold water".

MARKING EXAMPLE ACCORDING TO EN ISO 21003 *

The indications given should make it possible to quickly read product characteristics. The marking can be different from the one shown in the example

Multi-layer pipe PE-Xc	**RBM TITA-FIX PE-Xc Ø16x2.0 – EN ISO 21003 Class 1/10 bar – Tmal 95°C – Poper 10 bar – PE-Xc/Al/PE-RT type II – Alu 0.20 – XX00X – Made in Italy – (--)/(--)/(--) – (--):(--) – X0.00.000.00 – 000m – >l<**
Multi-layer pipe PE-RT	**RBM TITA-FIX PE-RT type II/Al/PE-RT type II Ø16x2.0 – SKZ X 000 – EN ISO 21003 Class 1/10, 2/10, 4/6, 5/6 bar – Tmal 95°C – Poper 10 bar – Alu 0.20 – XX00X – Made in Italy – (--)/(--)/(--) – (--):(--) – X0.00.000.00 – 000m – >l<**

RBM TITA-FIX PE-Xc	Name of producer and trade mark
RBM TITA-FIX PE-RT type II/Al/PE-RT	
Ø16x2.0	External diameter and wall thickness
SKZ X 000	It indicates that compliance with the standard is guaranteed by the "SKZ" and the distinguishing number has been issued by SKZ
EN ISO 21003	UNI standard number
Class 1/10 bar	Class to which the product belongs PE-Xc/Al/PE-RT
Class 1/10, 2/10, 4/6, 5/6 bar	Class to which the product belongs PE-RT/Al/PE-RT
Tmal 95°C - Poper 10 bar	Working temperature - Working pressure
PE-Xc/Al/PE-RT	Internal layer – middle layer – external layer
Alu 0.20	Thickness of the aluminium layer
XX00X	Series number
Made in Italy	Identification of the country of production
(--)/(--)/(--) – (--):(--)	Production date and time
X0.00.000.00	Batch number
000m – >l<	Number of metres

TECHNICAL CHARACTERISTICS

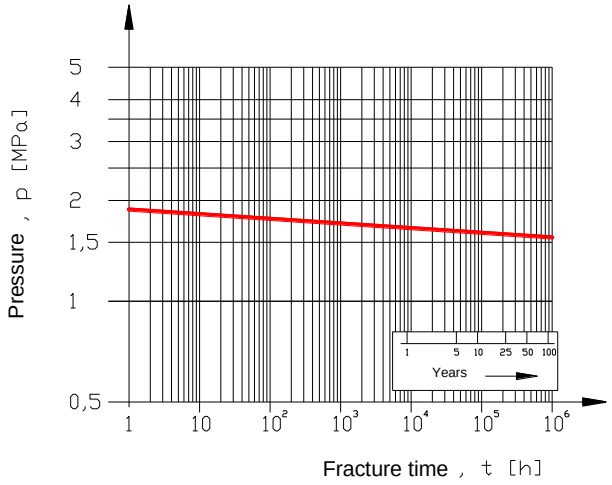
Conveyable fluids***	The pipe is atoxic and complies with Ministerial Decree 174/2004. It may therefore be used for conveying water destined to human use**. Furthermore, all fluids compatible with the material of which the pipe is made can also be conveyed (see ISO/TR 10358 technical report: "Plastic pipes and fittings – Combined chemical/resistance classification table).						
PE-Xc	1542.16.00	1542.20.00	1542.26.00	1542.32.00	-	-	-
	1543.16.00	1543.20.00	1543.26.00	1543.32.00	-	-	-
PE-RT	1545.16.00	1545.20.00	1545.26.00	1545.32.00	1545.40.00	-	-
	1546.16.00	1546.20.00	1546.26.00	1546.32.00	1546.40.00	1546.50.00	1546.63.00
Dimensions [mm]	**16 x 2**	**20 x 2**	**26 x 3**	**32 x 3**	**40 x 3,5**	**50 x 4**	**63 x 4,5**
Thickness of the aluminium layer [mm]	0,20	0,30	0,40	0,40	0,50	0,60	0,80
Pipe weight per metre [Kg/m]	0,108	0,151	0,279	0,346	0,510	0,870	1,300

Characteristics	Value	Measurement unit
Pipe roughness (Ra according to DIN EN ISO 4287, ASME B46.1)	1,7	µm
Thermal conductivity (minimum)	0,43	$\frac{W}{m \times K}$
Thermal expansion coefficient	0.026	$\frac{mm}{m \times °C}$
Gas permeability	Completely impermeable to O_2, to vapour and to gases in general	
Cross-linking degree (only PE-Xc multi-layer pipe)	≥ 65	%
Minimum permitted bending radius****	5d	mm
Resistance to internal pressure (test according to the EN 921 standard):		
– at 95°C with a test pressure of P=20.2 bar	≥ 165	hours
– at 95°C with a test pressure of P=19.7 bar	≥ 1000	hours
Minimum guaranteed resistance against detachment	≥ 40	$\frac{N}{mm^2}$

Composition:	*RBM Tita-fix PE-Xc*	PE-Xc/Al/PE-RT
	RBM Tita-fix PE-RT	PE-RT/Al/PE-RT
Control of the pipe appearance and dimensions		The check was carried out using a laser system, a spark-tester and a manual procedure.
Check for internal obstructions		The product was checked in accordance with the company's internal control system.
Check for defects in the pipe wall		Durante la verifica (compiuta mediante un sistema di controllo interno all'azienda), non sono state evidenziate perdite.
Bending and flaring test		The control was carried out in accordance with EN ISO 21003.
Product storage recommendations		The pipe is supplied in a package which protects it during storage. The external layer of the pipe is made of polyethylene. This material **must not be exposed to direct sunlight** because it has very low resistance to ultraviolet rays.

* The indications given should make it possible to quickly read product characteristics. The marking can be different from the one shown in the example. Please read the EN ISO 21003 Standard for further details.
** "Water destined for human use" refers to treated and non-treated water such as drinking water, water used to prepare drinks and food and water for domestic use in general regardless of its origin and of whether it is made available through a distribution network, in tanks, bottles or containers. The above mentioned term also refers to water used in food factories producing, processing, storing or marketing products or substances destined for human use***.
*** Please refer to the laws in force and to the above mentioned standards and decrees for further details.
**** This is the minimum radius measured on the axis plane of the pipe on the bending point. "d" refers to the external diameter of the pipes.

REFERENCE REGRESSION CURVE (AT 95°C) FOR THE RBM TITA-FIX PIPE



Regression curve at **95°C** according to **EN ISO 21003**.

The curve was calculated according to the following equation:

$$\log t = 25{,}1712 - 75{,}0663 \times \log p$$

Where
- **t** is the fracture time (in **hours**)
- **p** is the pressure (in **MPa**)

The diagram on the side refers to the pressure trend as a function of time.
In the case of pipes made of homogeneous plastic materials, diagrams referring to the trend of circumferential stresses as a function of time are used.

Under operating conditions multi-layer pipes are subject to creeping phenomena which are very similar to those of pipes made of homogeneous plastic materials (such as PE-X, PB, PP).

Please refer to the table below for determining the suitability of *RBM Tita-Fix* pipes (the table has been taken from EN ISO 21003): the regression graph shows only indicative values.

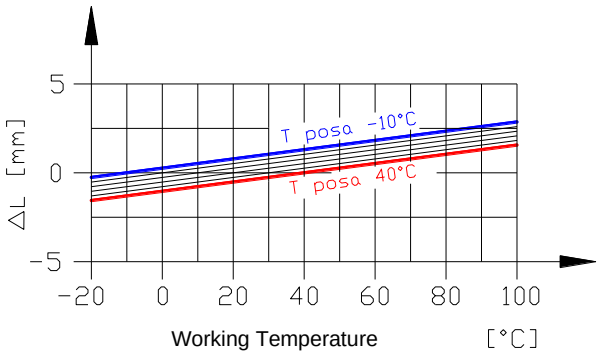
Class*	P_{oper} [bar]	Working conditions for a 50-year use at the Working P shown$_r$	Application field
1	**10**	49 years at a working temperature (**WorkingT**) ** of 60°C, 1 year at a maximum temperature (T_{max}) of 80°C and 100 hours at the failure temperature (Failure**T**) of 95°C	Supply of warm water for sanitary use (60°C) **
2	**10**	49 years at a working temperature (**WorkingT**) ** of 70°C, 1 year at a maximum temperature (T_{max}) of 80°C and 100 hours at the failure temperature (Failure**T**) of 95°C	Supply of warm water for sanitary use (70°C) **
4	**6**	25 years at a working temperature (**WorkingT**) of 60°C, 20 years at a working temperature (**WorkingT**) of 40°C, 2.5 years at a temperature (**WorkingT**) of 20°C, 2.5 years at a maximum temperature (T_{max}) of 70°C and 100 hours at a failure temperature (Failure**T**) of 100°C	Underfloor heating and low temperature radiators
5	**6**	10 years at a working temperature (**WorkingT**) of 80°C, 25 years at a working temperature (**WorkingT**) of 60°C, 14 years at a temperature (**WorkingT**) of 20°C, 1 year at a maximum temperature (T_{max}) of 90°C and 100 hours at a failure Temperature (Failure**T**) of 100°C	Heating with high temperature radiators

When there are different operating temperatures for a single class, you can add the duration of each temperature
(example in Class 5 for a 50 year profile - 20 °C for 14 years + 60 °C for 25 years + 80 °C for 10 years + 90 °C for 1 year + 100 °C for 100 hours).

All systems that meet the specifications in the table are also suitable for transporting cold water for a period of 50 years at temperature T=20 °C and pressure P=10 bar.

THERMAL EXPANSION DIAGRAM

Linear thermal expansion diagram. Expansion of one metre of *RBM Tita-Fix* pipe



The diagram on the side shows the linear expansion of 1 m of pipe (measured at a "T_{Laying}") as soon as the pipe is put into operation.

The changes in length were calculated using the following, well known, formula:

$$\Delta L = \alpha \times L_{laying} \times \left(T_{working} - T_{laying}\right)$$

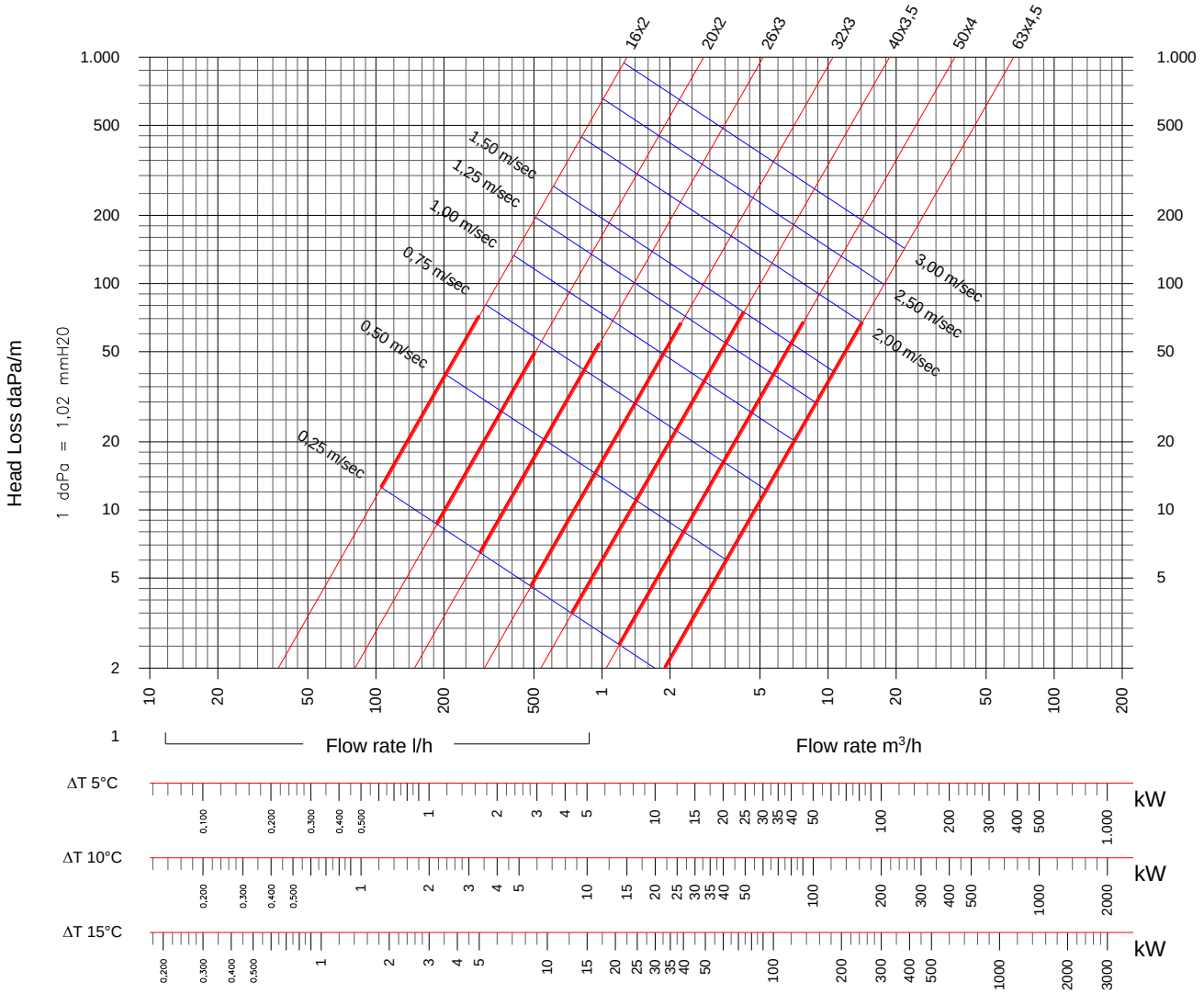
where

ΔL	refers to the change in pipe length expressed in mm;
α	is the linear expansion coefficient (0.026 $\frac{mm}{m°C}$);
L_{laying}	is the length of the pipe at the laying temperature (1 m);
T_{laying}	is the temperature at which the pipe is installed;
$T_{working}$	is the temperature at which the pipe is used.

* The classification according to application classes has been taken from EN ISO 21003. Please refer to this standard for further details.
** The choice of class 1 and 2 must be made in accordance with national regulations

FLUID DYNAMIC CHARACTERISTICS

Pressure loss in new RBM Tita-Fix pipes conveying water at 15°C



The graph shows the pressure drop as a function of the fluid flow rate in l/h or in m^3/h or as a function of the system potential in KW (please use the scale suitable for the ΔT temperature gradient of the water).

The diagram refers to water at a temperature of 15°C. In the case of different temperatures, the values obtained from the graph must be corrected in order to take into account the influence of the temperature on the volumic mass (ρ) and on the viscosity (v) of water. The correction factors to be taken into consideration are shown in the table below:

Project temperature [°C]	10	15	20	30	40	50	60	70	80	90
Pressure loss correction [daPa/m]	1,030	1,000	0,968	0,908	0,859	0,817	0,785	0,763	0,740	0,716
Correction of the flow rate [l/h] when the power is known	1,001	1,000	0,999	0,997	0,993	0,989	0,984	0,978	0,972	0,966
Correction of the power [W] when the flow rate is known	0,999	1,000	1,001	1,003	1,007	1,011	1,016	1,022	1,029	1,035

Correction factors take into account the difference between the diagram values calculated (at 15°C) and any differing project temperature. The value shown in the diagram must be multiplied by the correction factor.
Please consult the “Use and tables” chapter in the RBM price list for further details.

RBM TITA-FIX MULTI-LAYER PIPE WITH THERMAL INSULATION
- suitable for heating systems and sanitary water distribution systems. -

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	Code				External diameter	Pipe thickness	Thickness of the aluminium layer	Thickness of the insulation layer	Length	Water Speed	Maximum working pressure **
	PE-Xc	PE-RT *			[mm]	[mm]	[mm]	[m]	[m/s]	[bar]	[bar]
COIL	1541.16.50 **(G)**	1544.16.50 **(G)**	1946.16.20 **(B)**	1946.16.30 **(R)**	16	2	0,20	6***	50	See diagram concerning pressure losses The recommended speed range is shown by marked lines	10
	1541.20.50 **(G)**	1544.20.50 **(G)**	1946.20.20 **(B)**	1946.20.30 **(R)**	20		0,30	6			
	1541.26.50 **(G)**	1544.26.50 **(G)**	1946.26.20 **(B)**	1946.26.30 **(R)**	26	3	0,40				
	1541.32.50 **(G)**	1544.32.50 **(G)**	1946.32.20 **(B)**	1946.32.30 **(R)**	32		0,40		25		

(G) = Insulation color: Grey **(B)** = Insulation color: Blue **(R)** = Insulation color: Red

CHARACTERISTICS

The RBM Tita-fix multilayer pipe insulated with an insulating conduit assures a dramatic decrease of heat losses in consideration of the low thermal conductivity, thus making the pipe suitable for heating and domestic hot water distribution installations.

The insulating conduit is in self-extinguishing, closed cell CFC-free polyethylene foam, with thicknesses compliant with It. law 10/91 for pipes running in heated rooms and/or within structures that do not face either the outside or unheated rooms.

Characteristics of the insulation sheath

- Density: 35 kg/m^3
- Thermal conductivity at 40°C:
  - sheath only: 0.038 W/mK
  - sheath and pipe (average value): 0.069 W/mK
- Permeability to vapour: 5482 μ
- Fire reaction: Class 1 – BL-s2-d0

Characteristics of the multi-layer pipe

They are the same as those of the RBM Tita-Fix multi-layer pipes.

MARKING EXAMPLE

The indications given should make it possible to quickly read product characteristics. The marking can be different from the one shown in the example

Multi-layer pipe PE-Xc	**RBM TITA-FIX PE-Xc Ø16X2.0 – CLASSE 1 – BL-s2-d0 – LEGGE 10/91 – XX00X – Made in Italy – (- -)/(- -)/(- -) – (- -):(- -) – X0.00.000.00 – [LINEA] – 000m – >I<**
Multi-layer pipe PE-RT	**RBM TITA-FIX PE-RT/Al/PE-RT Ø16X2.0 – CLASSE 1 – BL-s2-d0 – LEGGE 10/91 – XX00X – Made in Italy – (- -)/(- -)/(- -) – (- -):(- -) – X0.00.000.00 – [LINEA] – 000m – >I<**

RBM TITA-FIX PE-Xc **RBM TITA-FIX PE-RT/Al/PE-RT**	Name of the producer and trade mark
Ø16X2.0	External diameter and wall thickness
CLASSE 1 – BL-s2-d0	Fire resistance class.
LEGGE 10/91	Reference to law no. 10 of 9 January 1991: Standards for the implementation of the National Energy Plan concerning a rational use of Energy, Energy consumption and the development of renewable Energy sources.
XX00X	Series number
Made in Italy	Identification of the country of production
(--)/(--)/(--) – (--):(--)	Production date and time
X0.00.000.00	Batch number
[LINEA]	Reference to the production line
000m – >I<	Number of metres

RAPID EVALUATION OF HEAT LOSSES

Size	Thermal flow and surface temperature					
	40°C		60°C		80°C	
	W/m	°C	W/m	°C	W/m	°C
16x2	6,1	27,6	12,5	34,6	19,1	41,3
20x2	7,0	28,1	14,4	35,6	22,0	42,7
26x3	8,3	28,4	17,1	36,2	26,0	43,7

The table shows the heat loss per metre expressed in Watts, obtainable using the insulation supplied and the consequent temperature value reached on the external layer.
The values refer to pipes conveying hot water at 3 different temperatures laid in rooms having a temperature of 20°C.
For example, an insulated 20x2 pipe conveying water at 60°C loses 14.4 W per metre and the surface temperature corresponds to about 36°C.
The table has the purpose of giving technicians a general reference in order to make it possible for them to assess the performance of the component they have chosen

* Multilayer pipe PE-RT/Al/PE-RT certificate SKZ HR 3.12 according to the specifications
** The working pressure varies according to the use class to which the multi-layer pipe belongs: the maximum working pressure shown is valid for a class 1 *RBM Tita-Fix* tube. Please consult the appropriate section of this data sheet for further details.
*** Thicknesses in compliance with Law no. 10 of 9 January 1991: Standards for the implementation of the national energy plan concerning a rational use of energy, energy saving and the development of renewable sources of energy.

RBM TITA-FIX MULTI-LAYER PIPE WITH ANTI-CONDENSATION INSULATION
- Suitable for hydronic cooling and heating systems -

*

	Code		External diameter	Pipe thickness	Thickness of the aluminium layer	Thickness of the insulation layer	Length	Water Speed	Maximum working pressure**
	PE-Xc	PE-RT *	[mm]	[mm]	[mm]	[mm]	[m]	[m/s]	[bar]
COIL	1541.16.40 (V)	1544.16.40 (V)	16	2	0,20	10***	50	See diagram concerning pressure losses The recommended speed range is shown by marked lines	10
	1541.20.40 (V)	1544.20.40 (V)	20		0,30				
	1541.26.40 (V)	1544.26.40 (V)	26	3	0,40				
	1541.32.40 (V)	1544.32.40 (V)	32		0,40		25		

(V) = Insulation color: Green

CHARACTERISTICS

The RBM Tita-fix multilayer pipe insulated with an anti-condensate, thermal insulating conduit assures a dramatic decrease of heat losses in consideration of the low thermal conductivity, thus making the pipe suitable for hydronic refrigeration and heating installations.

The insulating conduit is in self-extinguishing, closed cell CFC-free polyethylene foam, with thicknesses compliant with It. law 10/91 for pipes running in heated rooms and/or within structures that do not face either the outside or unheated rooms.

Characteristics of the insulation sheath

- Density: 35 kg/m^3
- Thermal conductivity at 40°C:
  - sheath only: 0.038 W/mK
  - sheath and pipe (average value): 0.062 W/mK
- Permeability to vapour: 5482 μ
- Fire reaction: Class 1 – BL-s2-d0

Characteristics of the multi-layer pipe

They are the same as those of RBM Tita-Fix multi-layer pipes.

MARKING EXAMPLE

The indications given should make it possible to quickly read product characteristics. The marking can be different from the one shown in the example

Multi-layer pipe PE-Xc	**RBM TITA-FIX PE-Xc Ø16X2.0 – CLASSE 1 – BL-s2-d0 – LEGGE 10/91 – ANTICONDENSA – XX00X – Made in Italy – (- -)/(- -)/(- -) – (- -):(- -) – X0.00.000.00 – [LINEA] – 000m – >I<**
Multi-layer pipe PE-RT	**RBM TITA-FIX PE-RT/Al/PE-RT Ø16X2.0 – CLASSE 1 – BL-s2-d0 – LEGGE 10/91 – ANTICONDENSA – XX00X – Made in Italy – (- -)/(- -)/(- -) – (- -):(- -) – X0.00.000.00 – [LINEA] – 000m – >I<**

RBM TITA-FIX PE-Xc **RBM TITA-FIX PE-RT/Al/PE-RT**	Name of the producer and trade mark
Ø16X2.0	External diameter and wall thickness
CLASSE 1 – BL-s2-d0	Fire resistance class.
LEGGE 10/91	Reference to law no. 10 of 9 January 1991: Standards for the implementation of the National Energy Plan concerning a rational use of Energy, Energy consumption and the development of renewable Energy sources.
ANTICONDENSA	Reference to the use of the sheath
XX00X	Series number
Made in Italy	Identification of the country of production
(--)/(--)/(--) – (--):(--)	Production date and time
X0.00.000.00	Batch number
[LINEA]	Reference to the production line
000m – >I<	Number of metres

RAPID EVALUATION OF HEAT LOSSES

Size	Thermal flow and surface temperature					
	10°C (*)		40°C		60°C	
	W/m	°C	W/m	°C	W/m	°C
16x2	-5,2	25,0	5,2	25,1	10,6	29,6
20x2	-6,0	24,7	5,9	25,5	12,0	30,4
26x3	-7,0	24,4	6,9	25,8	14,1	31,1

The table shows the heat loss per metre, obtainable using the insulation supplied expressed in Watts and the consequent temperature value reached on the external layer.
The values refer to pipes conveying hot water at 2 different temperatures laid in rooms having a temperature of 20°C.
The values marked with (*) in the table refer to cooled water and to pipes laid in rooms having a temperature of 30°C.
For example, an insulated 20x2 pipe conveying water at 10°C (average between 7 and 12.5°C) loses 6.0 W per metre and the surface temperature corresponds to about 25°C.
The latter value must be higher than the dewpoint temperature of the environment in order to avoid the formation of surface condensation.

* Multilayer pipe PE-RT/Al/PE-RT certificate SKZ HR 3.12 according to the specifications.
** The working pressure varies according to the use class to which the multi-layer pipe belongs: the maximum working pressure shown is valid for a class 1 *RBM Tita-Fix* tube. Please consult the appropriate section of this data sheet for further details.
*** Thicknesses in compliance with Law no. 10 of 9 January 1991: Standards for the implementation of the national energy plan concerning a rational use of energy, energy saving and the development of renewable sources of energy.

RBM TITA-FIX MULTI-LAYER PIPE WITH CORRUGATED PROTECTION SHEATH
- Suitable for sanitary water distribution systems -


*

	Code		External diameter	Pipe thickness	Thickness of the aluminium layer	External sheath		Length	Water Speed	Maximum working pressure**
	PE-Xc	PE-RT *	[mm]	[mm]	[mm]	diameter [mm]	colour	[m]	[m/s]	[bar]
COIL	1541.16.80 **(B)**	1544.16.80 **(B)**	16	2	0,20	25	Blue	50	See diagram concerning pressure losses The recommended speed range is shown by marked lines	10
	1541.20.80 **(B)**	1544.20.80 **(B)**	20		0,30	32	Blue			
	1541.16.90 **(R)**	1544.16.90 **(R)**	16		0,20	25	Red			
	1541.20.90 **(R)**	1544.20.90 **(R)**	20		0,30	32	Red			

(B) = Corrugated protection sheath color: Blue **(R)** = Corrugated protection sheath color: Red

DESCRIPTION

The RBM Tita-Fix multi-layer pipe with corrugated protection sheath has the same characteristics as the other RBM Tita-Fix pipes, but is provided also with an external protection sheath.

This insulation sheath does not alter the chemical/physical characteristics of the pipe and makes it suitable for sanitary water distribution systems.

The external corrugated sheath is made of polypropylene and is available in blue and red.
The characteristics of this pipe are the same as those of the other RBM Tita-Fix multi-layer pipes.

ACCESSORY FITTINGS

PREPARATION OF THE PIPE FOR CONNECTION TO THE FITTING CHOSEN

Before installing any type of fitting on the RBM Tita-Fix pipe, it is **necessary and essential** to prepare the multi-layer pipe for connection to the fitting.
The preparation of the multi-layer pipe for connection to the fitting is mandatory to avoid failures of the pipe/fitting system during operation.
RBM s.p.a. is not liable for damage caused by incorrect putting into operation and maintenance, by the non-compliance to these instructions and by an incorrect use of the system. Multi-layer pipes must not be used for purposes different from the ones provided for in this manual.

PREPARATION

Steps for correct and accurate **preparation** of the tube for connection to the fitting:

- Cut the multi-layer pipe using the appropriate cutting machine (code 553.00.X2) which makes it possible to avoid burr and to cut perpendicularly to the pipe axis (FIG 1);
- Flare and calibrate the pipe using the appropriate calibration/flaring tool. Bring the tool to the end of the pipe and perform calibration and flaring. This operation can be carried out
  - either manually, using the appropriate handle (FIG. 2)
  - or using the cordless portable drill driver (FIG. 3). The use of a drill driver is **strongly recommended** for a better preparation of the pipe.

NB The calibration and flaring operations of the tube is mandatory since it makes possible the insertion of the fitting without deforming or cut O-ring, that is the single sealing element between the fitting and the tube.


FIG. 1

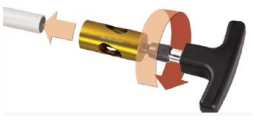


FIG. 2

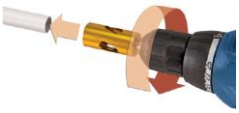


FIG. 3

FIG. 4

The machined multi-layer pipe (FIG. 4) is now ready for connection to the fitting chosen.
Any bending of the pipes should be made with the appropriate manual spring bender or with the bender kit in order to avoid tube's crushing or breaking. The minimum bending radius must be greater than 5 times the diameter of the pipe.

ACCESSORIES FOR CALIBRATION/FLARING TOOLS

CALIBRATION/ FLARING TOOLS
They allow the elimination of internal and external burrs and the calibration of the internal diameter of the tube, in correspondence with the cutting area.

Code	Meas.
2006.14.02	Ø 14x2
2006.16.02	Ø 16x2
2006.18.02	Ø 18x2
2006.20.02	Ø 20x2
2006.26.02	Ø 26x2

Code	Meas.
2006.32.02	Ø 32x3
2006.40.02	Ø 40x3,5
2006.50.02	Ø 50x4
2006.63.02	Ø 63x4,5

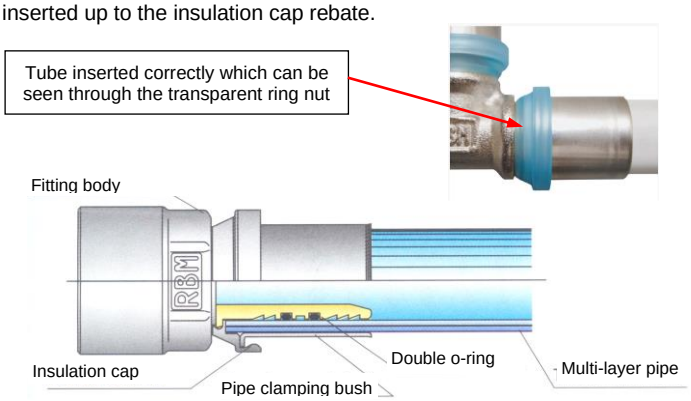
Measures external diameter x pipe thickness

* Multilayer pipe PE-RT/Al/PE-RT certificate SKZ HR 3.12 according to the specifications.
** The working pressure varies according to the use class to which the multi-layer pipe belongs: the maximum working pressure shown is valid for a class 1 *RBM Tita-Fix* tube. Please consult the appropriate section of this data sheet for further details.

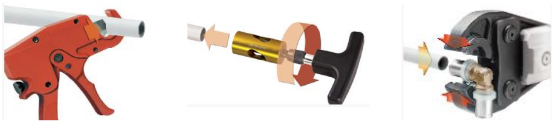
FITTINGS

PRESS FITTINGS

The use of press fittings simplifies dramatically the connection of the multi-layer pipe.
Connection is made quicker and easy thanks to the total lack of sealing materials, pastes and lubricating liquids.
Mechanical tightness can be obtained by changing the shape of the stainless steel bush. This can be done by pressing using the appropriate tool. The disengagement pressure is noticeably higher than the working pressure of the multi-layer pipe. The insulation cap is transparent and makes it possible to check whether the pipe has been inserted correctly into the fitting.
N.B.: In order to allow for a perfect connection, the pipe must be inserted up to the insulation cap rebate.



3 SIMPLE OPERATIONS FOR MOUNTING THE FITTING



Cutting of the multi-layer tool which makes it possible to cut without generating burr and perpendicularly to the pipe axis.

Deburring and calibration of the cut pipe using the appropriate tool. Rotate the gauge until you reach the bevelling area.

Insertion of the pipe in the fitting up to the cap and pressing of the bush using the appropriate pliers

Please refer to the specific section of the data sheet for further information concerning the preparation of the pipe for connection to the fitting.

Press fittings are available for multiplayer pipes from Ø14 to Ø63 mm having a wall thickness from 2 to 4.5 mm.
Fittings are available in different construction shapes (straight, angular, “T” shaped, flanged, elbow shaped or offset).
According to their use, fittings can be provided with:

- 1 threaded connection (with/without rotating nut). This can be either Euroconus G 3/4” UNI-EN-ISO 228, RBM Standard (W24.5 x 19F) or Withworth (W28 x 19F).
- 1 to 3 press connections provided with a dielectric cap for connection to the multi-layer pipe (connections can be for pipes having the same diameter or for pipes with different diameters: for example two identical connections and one with smaller /larger dimensions).
- 1 flange for fixing the fitting on the wall or on plates placed on a fixing and positioning bracket.

	Construction type	Threaded connections	Press connections	Code
2 connections	Straight	1 rotating Euroconus G 3/4", Standard RBM (W24.5X19F) or Withworth (W28x19F)	1	812.14...26.X0 826.14...20.X0 96X.14...26.X0
		1 female UNI-EN-ISO 228	1	672.14...63.X0
		1 male UNI-EN-ISO 228	1	673.14...63.X0
		0	2	671.14...63.X0
		0	2 (one with reduced dimensions)	890.16...63.X0
	Angular	1 female UNI-EN-ISO 228	1	675.14...50.X0 853.04.X0 (with flange)
		1 male UNI-EN-ISO 228	1	676.14...40.X0
		0	2	674.14...63.X0

	Threaded connections	Press fittings	Code
3 connections	Threaded female central connection UNI-EN-ISO 228	2	678.14...50.X0
	Threaded female central connection UNI-EN-ISO 228 (with flange)	2	852.04.X0
	Threaded male central connection UNI-EN-ISO 228	2	680.14...40.X0
	Threaded female lateral connection UNI-EN-ISO 228	2	679.14...32. X0
	0	3 (identical)	677.14...63.X0
		3 (1 central one with reduced dimensions)	851.14...63.X0
		3 (1 lateral one with reduced dimensions)	
		3 (1 central one with larger dimensions)	
		3 (1 lateral one with larger dimensions)	
		3 (different ones: 26x3, 20x2, 16x2)	999.20.00

CONSTRUCTION CHARACTERISTICS

Body	: Externally nickel-plated brass
Gaskets	: Elastomer
Pipe clamp bush	: INOX
Pipe clip dielectric cap	: transparent PE

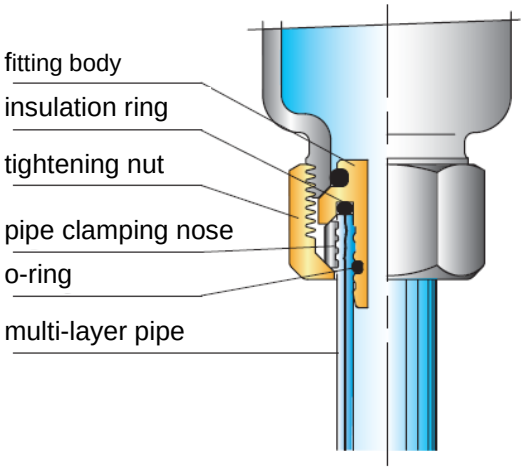
TECHNICAL CHARACTERISTICS

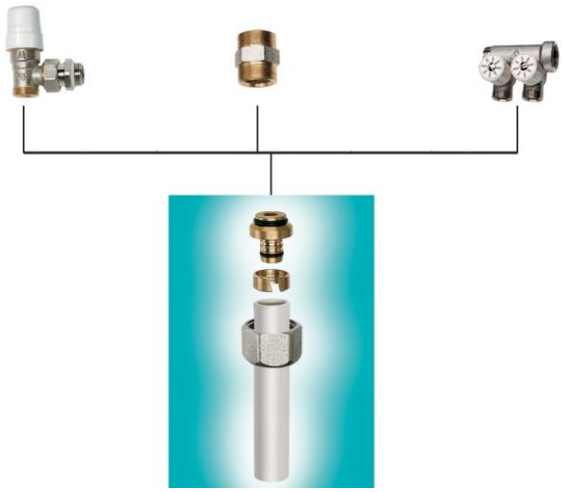
Maximum working pressure	: 1000 kPa
Usage temperature	: +95 °C

FITTINGS

FITTINGS TO BE TIGHTENED

This fitting is particularly suitable for the connection of terminal elements such as valves and manifolds and in all those cases in which the component to be connected can be subjected to maintenance and/or a periodical control.





Fittings to be tightened available for multi-layer pipes from *Ø14* to *Ø20 with wall thicknesses from 2 to 2.5 mm.*
Various construction shapes (straight, curved or "T" shaped).
G3/4" *Euroconus UNI-EN-ISO 228* or *Standard RBM W 24.5X19F connections*.

Construction type	Number of threaded connections	Threaded connection type	Code
2 straight connections	1	Standard RBM nut	70.14…20.X0
		Euroconus nut	224.14...20.X0
	2	Standard RBM male connections	81.00.00
		1 male connection (3/8" or 1/2") 1 male connection – Standard RBM	83.0X.00
		1 male connection (Euroconus or 1/2") 1 male connection - Euroconus	222.05.X0

CONSTRUCTION CHARACTERISTICS	
Nut / Body	: Nickel-plated brass
Core / nose cone	: Brass
Gaskets (where present)	: Elastomer

TECHNICAL CHARACTERISTICS	
Maximum working pressure	: 1000 kPa
Usage temperature	: +110 °C

MAIN ACCESSORIES FOR FITTINGS TO BE TIGHTENED

Code		Description
69.00.00		**Wrench for fittings to be tightened with an "RBM Standard" thread** Suitable for fittings code 70.XX.00
246.00.00		**Wrench for "EUROCONUS" fittings to be tightened** Suitable for fittings code 224.XX.00

RBM reserves the right to make improvements and changes to the products described and to their technical details at any moment and without notice: always refer to: the instructions enclosed with the components supplied; this sheet is an aid if they prove to be too schematic. Please contact our technical office for any doubts, problems or clarification.

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