



**Ke Kelit NZ**

**KELEN**  
**Australasian Technical**  
**Specification**

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## Reference Documents

This document should be read in conjunction with the following documents:

- Ke Kelit KELEN Technical Handbook
- Ke Kelit NZ Training Manual (most recent copy available upon request)

## Features and benefits

### Pipe Material

The KELEN Drinking Water Pipe System is a polyfusion welded pipe system.

The pipe material is PP-R, polypropylene type III (random copolymer) in accordance with ONORM EN ISO 15874 and BS4991. The pipes material properties are defined in EN ISO 15874 (supersedes DIN 8077 and Pr-EN 12202, all the requirements of these standards are now covered by

EN ISO 15874). The pipe system is tested, approved, audited regularly according to these standards.

Features: corrosion resistant, secure continuous joint, low pressure loss and low noise, low thermal conductivity.

KEO2 KELEN Pipe for cold water reticulation only. Pressure rating PN10. Grey coloured pipe with three Green lines along the length of the pipe for fitting and coupling alignment. Available in 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 75mm, 90mm, 110mm, 125mm and 160mm diameter sizes; in 4m standard lengths.

KEO8 KELEN Pipe for hot & cold water reticulation. Pressure rating PN16. Grey coloured pipe with three Blue lines along the length of the pipe for fitting and coupling alignment. Available in 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 75mm, 90mm and 110mm diameter sizes; in 4m standard lengths.

KEO0 KELEN for hot and cold water reticulation. Pressure rating PN20. Grey coloured pipe with three Red lines along the length of the pipe for fitting and coupling alignment. Available in 20mm, 25mm, 32mm, 40mm, 50mm, 63mm, 75mm, 90mm and 110mm diameter sizes; in 4m standard lengths.

KELEN Pipe systems are:

- Manufactured and evaluated according to EN ISO 15874 – 'Plastic piping systems for hot and cold water installations – Polypropylene (PP).
- Tested to AS/NZS 4020:2005 - 'Testing of products for use in contact with drinking water'.
- Manufactured in accordance with ISO 9001:2008 - 'Quality Management Systems'.
- Manufactured in accordance with ISO14001:2004 – "Environmental Management System".

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## Connection Types

Ke Kelit KELEN Drinking Water Pipe System (pipes and fittings) can be jointed in several ways as follows:

**Polyfusion Welding:** Suitable for 20mm - 110mm diameter pipes. Pipe and fitting are of the same PP-R material - no additional materials required. Pipe can only enter the fitting after they have been heated on the welding machine. The welded joint does not create weak points or weaken the integrity of the system. The weld does not reduce the flow at the joint. All polyfusion fittings are rated PN20, and are suitable for all pressure ratings.

**Butt Welding:** Suitable for 125mm - 160mm diameter pipes. Pipe and fitting are of the same PP-R material - no additional materials are required. The welded joint does not create weak points or weaken the integrity of the system. The weld does not reduce the flow at the joint.

**Threaded Adaptor Fittings:** Suitable for 20mm - 75mm diameter pipes. PP-R moulded fittings with metal-plated corrosion resistant DZR brass threads firmly anchored to the fitting and a high resistance to twisting and strain. Straight and elbow fittings available.

**Electrofusion Welding:** Suitable for 20mm - 160mm diameter pipes. E-UNI welding socket, suitable for repair jointing pipes in a confined space.

**Flange Connection:** Suitable for 20mm - 160mm diameter pipes and for flanged fittings.

Detachable. Elastic EPDM seal. Fusion welded: 20mm - 125mm diameter pipes. Butt welded: 160mm diameter pipe only.

**Detachable Union Fittings:** Suitable for 20mm - 90mm diameter pipes. Detachable fittings with an elastic EPDM seal. 3 joint types: KE55 – PP-R/male thread; KE56 – PP-R/PPR, and KE57 – PP-R/female thread.

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## Specification

Table 1.1: Classification of service conditions KELEN Drinking Water Pipes

Application class	Design temperature, $T_D$ °C	Time, $t^a$ , at $T_D$ years	$T_{max}$ °C	Time, $t$ , at $T_{max}$ years	$T_{mal}$ °C	Time at $T_{mal}$ h	Typical field of application
1 <sup>a</sup>	60	49	80	1	95	100	Hot water supply (60 °C)
2 <sup>a</sup>	70	49	80	1	95	100	Hot water supply (70 °C)
4 <sup>b</sup>	20	2,5	70	2,5	100	100	Underfloor heating and low temperature radiators
	Followed by						
	40	20					
	Followed by						
	60	25					
	Followed by (see next column)						
5 <sup>b</sup>	20	14	90	1	100	100	High temperature radiators
	Followed by						
	60	25					
	Followed by						
	80	10					
	Followed by (see next column)						
<sup>a</sup> A country may select either class 1 or class 2 to conform to its national regulations.							
<sup>b</sup> Where more than one design temperature appears for any class, the times should be aggregated (e.g. the design temperature profile for 50 years for class 5 is: 20 °C for 14 years followed by 60 °C for 25 years, 80 °C for 10 years, 90 °C for 1 year and 100 °C for 100 h).							
NOTE	For values of $T_D$ , $T_{max}$ and $T_{mal}$ in excess of those in this table, this International Standard does not apply.						

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Table 1.2 - KELEN Drinking Water Pipe System fulfils Applications Class 1 and 2

Applications	Temperature & Pressure	Size	Material	Joining	Fittings
Domestic Potable Cold Water	PN10: 20° / 10 bar. 40° max / 8 bar	20mm - 160mm	PP-R Manufactured to EN ISO 15874, PN10 Pipe system. (KELEN by Ke Kelit)	Polyfusion welding, butt welding, electrofusion welding and flange connections	Threaded (EN10226-1), Couplings (ISO 228-1)
Domestic Potable Hot & Cold Water	PN16: 20° / 16 bar. 60° max / 8 bar	20mm - 110mm	PP-R Manufactured to EN ISO 15874, PN16 Pipe system. (KELEN by Ke Kelit)	Polyfusion welding, butt welding, electrofusion welding and flange connections	Threaded (EN10226-1), Couplings (ISO 228-1)
Domestic Potable Hot & Cold Water	PN20: 20° / 20 bar. 70° max / 8 bar	20mm - 110mm	PP-R Manufactured to EN ISO 15874, PN20 Pipe system. (KELEN by Ke Kelit)	Polyfusion welding, butt welding, electrofusion welding and flange connections	Threaded (EN10226-1), Couplings (ISO 228-1)
Mechanical Services Application	PN10: 20° / 10 bar. 40° max / 8 bar	20mm - 160mm	PP-R Manufactured to EN ISO 15874, PN10 Pipe system. (KELEN by Ke Kelit)	Polyfusion welding, butt welding, electrofusion welding and flange connections	Threaded (EN10226-1), Couplings (ISO 228-1)
Mechanical Services Application	PN16: 20° / 16 bar. 60° max / 8 bar	20mm - 110mm	PP-R Manufactured to EN ISO 15874, PN16 Pipe system. (KELEN by Ke Kelit)	Polyfusion welding, butt welding, electrofusion welding and flange connections	Threaded (EN10226-1), Couplings (ISO 228-1)
Mechanical Services Application	PN20: 20° / 20 bar. 70° max / 8 bar	20mm - 110mm	PP-R Manufactured to EN ISO 15874, PN20 Pipe system. (KELEN by Ke Kelit)	Polyfusion welding, butt welding, electrofusion welding and flange connections	Threaded (EN10226-1), Couplings (ISO 228-1)

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## Print & Identification

Pipe is marked with the following information:

Number of manufacturing standard, manufacturers name and trademark, nominal outside diameter and nominal wall thickness, pipe dimension class, material, application class combined with operating pressure, manufacturer's information on production period and site. An example of pipe markings is as follows:

Kelen potable water pipe system |>>>>| Lic 1991 PPR A EN ISO 15874 gepr. DN 20 x 3,4 (d) Klasse 1/10 bar 60°, Klasse 2/8 bar 70°, PN20, S2,5 TW M1 34/10 100701 0223 KE KELIT.

Fittings: KE KELIT logo, Material, nominal diameter in mm (e.g. 20)

## Scope of Use

KELEN Drinking Water Pipe System is designed for use in Hot and Cold drinking water installation for new or renovation projects, Mechanical and Service applications provided the operating conditions are within the range of (PN10, PN16 and PN20) performance pipe system choices;

### 50 year service live

- KE02 KELEN pipe PN10 Temp/Pressure range of -5°C to 20°C / 10 bar; 30°C / 9 bar; 40°C / 8 bar
- KE02 KELEN pipe PN16 Temp/Pressure range of -5°C to 20°C / 16 bar; 40°C / 12 bar; 60°C / 8 bar
- KE02 KELEN pipe PN20 Temp/Pressure range of -5°C to 20°C / 20 bar; 40°C / 15 bar; 60°C / 10 bar; 70°C / 8 bar

### 25 year service live

- KE02 KELEN pipe PN16 Temp/Pressure range of 70°C / 6 bar
- KE02 KELEN pipe PN20 Temp/Pressure range of 80°C / 6 bar

KELEN pipe is for internal use within the frame and structure of the building and underground pipe service to building projects. The designer must correctly use the KELEN pipe diameter for its intended purpose and take into account the temperature, pressure and flow rate requirements (refer to KELEN Handbook).

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KELEN Pipe System can use the following prescribed water supply sources;

- Municipal Water supply; and
- Project site contained Rain Water supply; and
- Project site contained Bore Water supply.

KELEN Pipe systems shall have isolation devices which permit the installation or individual items of apparatus to be isolated from the supply system, for maintenance, testing, fault detection and repair.

For specific design of operating temperature, pressure or flow rates outside of the Scope of Use and Limitations of this Technical Manual, please refer directly to Ke Kelit NZ Limited for suitability and written pre-approval.

### Limitations – KELEN Pipe System

The KELEN pipe system is made from polypropylene copolymer (PP-R) plastics and needs to be treated carefully to prevent shocks, impact and buckling, which could compromise the performance of the pipe or system.

Protect the pipes from long term UV light exposure from the sun, the material is not resistant to long term direct UV sun exposure greater than 90 days.

- The usual time (6 months) for storage and pre-installation will have no effect on the material as it is UV stabilised.

Piping systems shall be constructed to avoid the likelihood of:

- Significant leakage or damage during normal or reasonably foreseeable abnormal conditions,
- Detrimental contamination of the contents by other substances,
- Adverse interaction between services, or between piping and electrical systems, and
- Any people having contact with pipes which could cause them harm.
- Pipes shall be protected against corrosion in the environment of their use.

You must observe the safe and secure pipe jointing guidelines, which sets out six methods of pipe jointing (see the KELEN Handbook for joint and installation guidelines)

- Always cut the pipe straight at a right angle to its axis. For polyfusion welding connections ensure that heating times are observed. Always mark the insertion depth and push the fittings completely on the pipe and observe the adjustment time and cooling times indicated in the Technical Handbook.

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- Any corrections to the alignment of the fittings up to a maximum of 5° must be made during the welding procedure (refer to KELEN handbook for permissible time adjustments) any later corrections will damage the joint.
- Machine welding times of pipe may alter slightly based on ambient temperature above or below 20°C, this will change the time required to push the pipe and fitting on to the heating element.
- Do NOT screw any tapered threaded pipes or any cast iron fittings into the female threads of the metal moulded fittings. Only join to faucets and components with straight threads. The threaded joint can be sealed by the usual methods (hemp, paste, Teflon tape) Do not over tighten the threads.
- You must observe the installation guidelines for the screw press and push fittings (see the KELEN Handbook for installation guidelines)

The linear expansion, loss of pressure behaviour and correct pipe sizing is clearly defined and must be accounted for in the design and installation of the KELEN Pipe System – refer to KELEN Handbook for details and calculation tables.

Always consult with Ke Kelit NZ Limited for acceptable and permitted disinfection procedures as written in the KE KELIT disinfection guidelines when

- Thermal Disinfection method is used; and
- Gradual or Continual disinfection method is used; and
- Use of Chlorine Dioxide, Chlorine or Ozone treatment; and
- Length of time permitted for treatment of Disinfection (in most cases maximum 6 months)
- Excessive concentration or dosages can lead to premature ageing of the pipe system.

The water supply from the prescribed sources (check Scope of Use) can be used, providing the water has been treated from all harmful contaminants as set out within this technical manual and are within the temperature, pressure and flow rate range of the KELEN Pipe System.

- Copper and copper ions have a destabilizing effect and their presence in the system shall be avoided.
- The conditions of elevated temperatures (>65°C) with the presence of copper ions, particularly when chlorine is present and velocity is above 1m/s, can have a detrimental effect on the expected service life.

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Water supply systems must be installed in a manner that:

- Pipe water to sanitary fixtures and sanitary appliances flow rates that are adequate for the correct functioning of those fixtures and appliances under normal conditions; and
- A non-potable water supply system used for personal hygiene shall be installed in a manner that avoids the likelihood of illness or injury being caused by the system; and
- Avoids the likelihood of leakage; and
- Allows reasonable access to components likely to need maintenance; and
- Observe the recommend pipe support spacing's; and
- Allows the system and any backflow prevention devices to be isolated for testing and maintenance.

To install the KELEN Pipe System correctly a minimal amount of expenditure is required for tools for your own security you must use and maintain the Ke Kelit tools.

Never use naked flame to bend the pipes at any temperature. Cold water supply KELEN pipe at ambient temperature can be bent up to, but not exceeding 8 times the pipe diameter.

Note: At all times avoid permanent damage from bending that may cause failure of pipe performance.

Pressure testing of the KELEN Pipe System must not exceed the performance set out by the manufacturer Ke Kelit NZ documentation to local and government authority standards. (With all installations, testing procedures to be carried out are set out in the KELEN Handbook. These tests must be carried out and documented)

Domestic Hot and Cold water pipes penetrating concrete or masonry elements shall be protected from the likelihood of damage and either wrapped with a flexible material, or passed through a sleeve or duct, to permit free movement for expansion and contraction.

Testing should be carried out before concealing pipework behind interior linings, flooring or within concrete.

In order to qualify for the Guarantee Cover each installation must use KELEN Pipe System parts only and complete all necessary Testing and Project registration.

A minimum 50 year service life and 25 year service life performance is limited by the temperature and pressure range as set out in the Scope of Use. When using the KELEN Pipe System above 80°C but less than 90°C maximum temperature, the service life will decrease and be less than 25 years. For any KELEN product use outside of the temperature, pressure and flow rates described within this Technical manual or KELEN Handbook the designer must prior to any application refer directly to

Ke Kelit NZ Limited for suitability and written pre-approval.

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The operating conditions of the system should be carefully monitored to ensure the operation conditions are within the recommended temperature and pressure for a give pipe system.

Measures which should be taken include, but are not limited to:

- Monitor and regulate Solar energy storage system;
- Install an in line mixer valve installed for hot water pipe regulated by boiler.

The design and suitability of the KELEN Pipe System is limited by its performance. All users must take into account all written documentation within the Technical Manual and Handbook available from Ke Kelit NZ Limited and the manufacturer.

For any specific design use, written pre-approval, product limitation, suitability and information, consult with Ke Kelit NZ Limited on Phone +64(0)4 568 4870.

## Installation

Installation can only be carried out by a Registered Certifying Plumber or a Registered Licensed Plumber under the supervision of a Certifying Plumber as set out by the Plumbers Gasfitters and Drainlayers Act 2006. Installers are required to also hold a Ke Kelit Installation training card and Ke Kelit approved tools must only be used as outlined in the Ke Kelit training and KELEN Handbook.

Installations are to be carried out in accordance with Ke Kelit NZ Limited written instructions and documentation together with all national and local plumbing regulations.

The initial pressure test needs always to be conducted according to local regulations. For potable water installations in New Zealand this is a static pressure test at 1500 kPa for no less than 30 Minutes, in accordance with AS/NZS 3500.1 section 16 and AS/NZS 3500.4 section 11. The system should then be left at its operating pressure for a period of 48 hours and subsequently checked for leaks.

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## Warranty

Ke Kelit provides the following guarantee for the KELEN Pipe System (provided the Ke Kelit installation instructions have been followed).

For a period of 10 years after the date of manufacture we guarantee cover

- For damages to the pipe systems which can be proven to be attributable to production or material defects.
- For damages to property or persons suffered by third parties as a result of defects in our product. Claims are subject to liability regulations
- For expenditure incurred by a third party for removing defective products and for installing defect free products supplied by Ke Kelit.
- Claims cannot be made for stoppages in production and loss of earnings, whether they are based on the points above or any other grounds.

The guarantee does not provide cover for defects that arise as a result of errors made during installation. Ke Kelit installation instructions must be followed at all times.

To provide further cover the manufacturer has taken out product liability insurance for the sum of €1,000,000 for damages to property and persons

In addition to this, years 11 to 25 after the date of manufacture, Ke Kelit provides “parts only” cover for failure which can be proven to be attributable to production or material defects. This excludes installation costs and costs of damages.

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## Environmental Management System

The producer of the system (pipes & fittings), KE KELIT Kunststoffwerk GmbH, has fully implemented an Environmental Management system according to ISO14001:2004 and keeps it up to date and enforced.

## Quality Assurance

The producer of the system (pipes & fittings), KE KELIT Kunststoffwerk GmbH, has fully implemented a Quality Management system according to EN/ISO 9001:2008 and keeps it up to date and enforced.

In order to achieve the quality targets set out in ISO 9001:2008, the following tests are carried out during the manufacturing process.

Internal testing in the Ke Kelit Laboratory.

- Raw material parameters
- Dimensions
- Quality of manufactured goods
- Bursting pressure
- Behaviour under heat conditions

Furthermore, the pipe and fittings have been evaluated according to EN ISO 15874 and tested by authorised external testing institutes. The following tests are performed as part of the EN ISO 15874 evaluation.

- Appearance
- Opacity
- Dimensions
- Hydrostatic Strength
- Longitudinal Reversion
- Melt mass flow rate
- Impact strength

The KELEN system has also been tested and evaluated to AS/NZS 4020:2005 Testing of products for use in contact with drinking water.

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## New Zealand Building Code Compliance

KELEN Drinking Water Pipe System can demonstrate compliance to the following NZBC Clauses:

Kelen Polypropylene Random Copolymer (PP R) Pipe System				
Description: Kelen Polypropylene Random Copolymer (PP R), water pipe system ranging from 20mmØ to 160mmØ for use with brand matched fusion welded fittings and adaptors				
NZ Building Code Applicable Performance Clauses	Manufacturing Standards Tests Applied		Limitations	Comments
B2.3.1 <i>Building elements</i> must, with only normal maintenance, continue to satisfy the performance requirements of this code for the lesser of the <i>specified intended life</i> of the <i>building</i> , if stated, or:  (a) the life of the building, being not less than 50 years, if: (ii) those <i>building elements</i> are difficult to access or replace, or (iii) failure of those <i>building elements</i> to comply with the <i>building code</i> would go undetected during both normal use and maintenance of the <i>building</i> .	Original Manufacturing Standard (EN ISO15874)/ (DIN8077)	Additional Tests	Installation requirements limit maximum temperature to 70 degrees and pressure to 2000 kPa  Not exposed to UV for greater than 90 days	Manufacturing plant has ISO 9001 Accreditation <sup>1</sup>  G12/VM1 has reference to DIN 8077 as an acceptable manufacturing standard for PP R pipe and fittings. The Kelen system is manufactured to EN ISO15874 which TGM endorse as containing all the tests required for DIN 8077
	TGM Test Report for hydrostatic testing shows that Kelen passed all required tests. Thermal stability by hydrostatic strength test is to 1.9MPa at 110° for one year. <sup>2</sup>			
F2.3.1 The quantities of gas, liquid, radiation or solid particles emitted by materials used in the <i>construction</i> of <i>buildings</i> , shall not give rise to harmful concentrations at the surface of the material where the material is exposed, or in the atmosphere of any space.				DIN 8077 is referenced as a compliant manufacturing standard via G12/VM1 PP-R can claim a history of use in the built environment with no identified failures of consequence to F2.3.1
G10.3.1 Piping systems shall be constructed to avoid the likelihood of: (a) significant leakage or damage during normal or reasonably foreseeable abnormal conditions,	TGM Test Report refers to pressure strength tests carried out in accordance with ISO 1167-1 & 1167-2 TGM Test Report tests for watertightness of pipe and fittings as a system.		Installation is limited to persons authorised under the Plumbers, Gasfitters & Drainlayers Act 2006 who have passed the Ke Kelit training course	Manufacturing plant has ISO 9001 Accreditation
G12.3.2 A potable <i>water supply system</i> must be— (c) installed using components that will not contaminate the water.		WRc-NSF report tests to “AS/NZS 4020: 2005 Products for use with Potable Water” <sup>3,4</sup>		DIN 8077 is referenced as a compliant manufacturing standard via G12/VM1

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<p>G12.3.7 <i>Water supply systems</i> must be installed in a manner that—</p> <p>(a) pipes water to sanitary fixtures and sanitary appliances flow rates that are adequate for the correct functioning of those fixtures and appliances under normal conditions; and</p> <p>(b) avoids the likelihood of leakage;</p>	<p>TGM Test Report refers to pressure strength tests carried out in accordance with ISO 1167-1 &amp; 1167-2 TGM Test Report tests for watertightness of pipe and fittings as a system<sup>3</sup></p>		<p>Installation is limited to persons authorised under the Plumbers, Gasfitters &amp; Drainlayers Act 2006 who have passed the Ke Kelit training course</p> <p>Installation handbook has pipe-sizing tables with use methodology taught on the training course.<sup>5</sup></p>	<p>Manufacturing plant has ISO 9001 Accreditation</p> <p>DIN 8077 is referenced as a compliant manufacturing standard via G12/VM1</p>
<p>H1.3.4 Systems for the heating, storage, or distribution of hot water to and from sanitary fixtures or sanitary appliances must, having regard to the energy source used,—</p> <p>(a) limit the energy lost in the heating process; and (b) be constructed to limit heat losses from storage vessels and from distribution systems; and (c) be constructed to facilitate the efficient use of hot water.</p>			<p>Volume of water in pipe lengths for compliance with H1. Pipe lengths which satisfy H1 are to be calculated based on the data given in Kelen Handbook<sup>6</sup></p> <p>Hot water pipes embedded in concrete or buried underground shall be thermally insulated and installed in a duct.<sup>9</sup></p>	<p>H1/AS1 5.0 dictates that hot water systems complying with NZS4305 satisfy the requirements of NZBC H1.3.4.</p> <p>NZS4305 3.2.1 dictates maximum hot water volume in pipe runs to kitchen. This is satisfied provided the limitations indicated are satisfied.</p> <p>Kelox Pipe Insulation satisfies the requirements of NZS4305 3.8.</p> <p>All other aspects of NZS4305 are satisfied provided the installation is in accordance with NZS4305 and the KeKelit Technical Literature.<sup>5</sup></p>

<sup>1</sup> Manufacturer is Ke Keli Kuntstoffwerk GmbH, A-4020 Linz, Ignaz-Mayer-street 17, Austria

<sup>2</sup> Page 7 TGM test report dated 15 12 2008

<sup>3</sup> Page 3 TGM test report dated 15 12 2008

<sup>4</sup> Page 2 WRC-NSF Final Report Revision 3a, 15 07 11

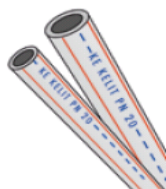
<sup>5</sup> Pages 34-42 Kelen Handbook 2015

<sup>6</sup> Pages 56-57 Kelen Handbook 2015

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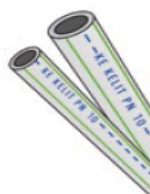
## Component drawings and product codes

### KELEN - Pipe PP-R



1502001	KE 00 PN20 20mm x 3.4mm x 4m
1502501	KE 00 PN20 25mm x 4.2mm x 4m
1503201	KE 00 PN20 32mm x 5.4mm x 4m
1504001	KE 00 PN20 40mm x 6.7mm x 4m
1505001	KE 00 PN20 50mm x 8.4mm x 4m
1506301	KE 00 PN20 63mm x 12.5mm x 4m
1507501	KE 00 PN20 75mm x 15.0mm x 4m
1509001	KE 00 PN20 90mm x 15.4mm x 4m
1511001	KE 00 PN20 110mm x 18.4mm x 4m

### KELEN - Pipe PP-R



1702000	KE 02 PN10 20mm x 1.9mm x 4m
1702500	KE 02 PN10 25mm x 2.3mm x 4m
1703200	KE 02 PN10 32mm x 3mm x 4m
1704000	KE 02 PN10 40mm x 3.7mm x 4m
1705000	KE 02 PN10 50mm x 4.6mm x 4m
1706300	KE 02 PN10 63mm x 5.8mm 4m
1707500	KE 02 PN10 75mm x 6.9mm 4m
1709000	KE 02 PN10 90mm x 8.2mm 4mm
1711000	KE 02 PN10 110mm x 8.2mm 4m
1712500	KE 02 PN10 125mm x 11.4mm x 4m
1716000	KE 02 PN10 160mm x 14.6mm x4m

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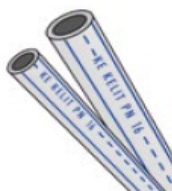


### KELEN - Pipe ALU-composite

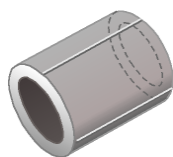


1652000	K 06 PN20 KELIT-ALU Composite 20mm x 2.8mm x 4m
1652500	K 06 PN20 KELIT-ALU Composite 25mm x 3.5mm x 4m
1653200	K 06 PN20 KELIT-ALU Composite 32mm 4.4mm x 4m
1654000	K 06 PN20 KELIT-ALU Composite 40mm x 5.5mm 4m
1655000	K 06 PN20 KELIT-ALU Composite 50mm 6.9mm x 4m
1656300	K 06 PN20 KELIT-ALU Composite 63mm x 8.6mm x 4m
1657500	K 06 PN20 KELIT-ALU Composite 75mm x 10.3mm x 4m
1659000	K 06 PN20 KELIT-ALU Composite 90mm x 12.3mm x 4mm

### KELEN - Pipe PP-R

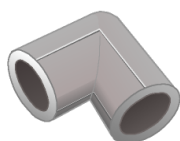


1682001	KE 08 PN16 20mm x 2.28mm x 4m
1682501	KE 08 PN16 25mm x 3.5mm x 4m
1683201	KE 08 PN16 32mm x 4.4mm x 4m
1684001	KE 08 PN16 40mm x 5.5mm x 4m
1685001	KE 08 PN16 50mm x 6.9mm x 4m
1686301	KE 08 PN16 63mm x 8.6mm x 4m
1687501	KE 08 PN16 75mm x 10.3mm x 4m
1689001	KE 08 PN16 90mm x 12.3mm x 4m
1681101	KE 08 PN16 110mm x 15.1mm x 4m

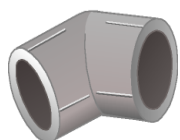


2521501	KE 10 PN20 Socket Coupling d20mm
2522001	KE 10 PN20 Socket Coupling d25mm
2522501	KE 10 PN20 Socket Coupling d32mm
2523001	KE 10 PN20 Socket Coupling d40mm
2523501	KE 10 PN20 Socket Coupling d50mm
2524001	KE 10 PN20 Socket Coupling d63mm
2524501	KE 10 PN20 Socket Coupling d75mm
2525001	KE 10 PN20 Socket Coupling d90mm
2525501	KE 10 PN20 Socket Coupling d110mm

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2501501	KE 20 PN20 Elbow 90° d20mm
2502001	KE 20 PN20 Elbow 90° d25mm
2502501	KE 20 PN20 Elbow 90° d32mm
2503001	KE 20 PN20 Elbow 90° d40mm
2503501	KE 20 PN20 Elbow 90° d50mm
2504001	KE 20 PN20 Elbow 90° d63mm
2504501	KE 20 PN20 Elbow 90° d75mm
2505001	KE 20 PN20 Elbow 90° d90mm
2505501	KE 20 PN20 Elbow 90° d110mm



2511501	KE 70 PN20 Elbow 45° d20mm
2512001	KE 70 PN20 Elbow 45° d25mm
2512501	KE 70 PN20 Elbow 45° d32mm
2513001	KE 70 PN20 Elbow 45° d40mm
2513501	KE 70 PN20 Elbow 45° d50mm
2514001	KE 70 PN20 Elbow 45° d63mm
2514501	KE 70 PN20 Elbow 45° d75mm
2515001	KE 70 PN20 Elbow 45° d90mm
2515501	KE 70 PN20 Elbow 45° d110mm



2711501	KE 26 PN20 M/F Elbow 90° d20mm
2712001	KE 26 PN20 M/F Elbow 90° d25mm
2712501	KE 26 PN20 M/F Elbow 90° d32mm



2721501	KE 27 PN20 M/F Elbow 45° d20mm
2722001	KE 27 PN20 M/F Elbow 45° d25mm

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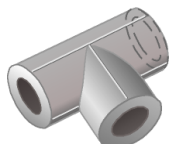


2561501	KE 30 PN20 Equal tee d20mm
2562001	KE 30 PN20 Equal tee d25mm
2562501	KE 30 PN20 Equal tee d32mm
2563001	KE 30 PN20 Equal tee d40mm
2563501	KE 30 PN20 Equal tee d50mm
2564001	KE 30 PN20 Equal tee d63mm
2564501	KE 30 PN20 Equal tee d75mm
2565001	KE 30 PN20 Equal tee d90mm
2565501	KE 30 PN20 Equal tee d110mm



2572001	KE 35 PN20 Reducer tee 25mm x 20mm x 25mm
2573501	KE 35 PN20 Reducer tee 32mm x 20mm x 32mm
2573001	KE 35 PN20 Reducer tee 32mm x 25mm x 32mm
2575001	KE 35 PN20 Reducer tee 40mm x 20mm x 40mm
2574501	KE 35 PN20 Reducer tee 40mm x 25mm x 40mm
2574001	KE 35 PN20 Reducer tee 40mm x 32mm x 40mm
2577001	KE 35 PN20 Reducer tee 50mm x 20mm x 50mm
2576501	KE 35 PN20 Reducer tee 50mm x 25mm x 50mm
2576001	KE 35 PN20 Reducer tee 50mm x 32mm x 50mm
2575501	KE 35 PN20 Reducer tee 50mm x 40mm x 50mm
2579001	KE 35 PN20 Reducer tee 63mm x 25mm x 63mm
2578501	KE 35 PN20 Reducer tee 63mm x 32mm x 63mm
2578001	KE 35 PN20 Reducer tee 63mm x 40mm x 63mm
2577501	KE 35 PN20 Reducer tee 63mm x 50mm x 63mm
2579801	KE 35 PN20 Reducer tee 75mm x 32mm x 75mm
2579601	KE 35 PN20 Reducer tee 75mm x 40mm x 75mm
2579401	KE 35 PN20 Reducer tee 75mm x 50mm x 75mm
2579201	KE 35 PN20 Reducer tee 75mm x 63mm x 75mm
2579051	KE 35 PN20 Reducer tee 90mm x 63mm x 90mm

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2579101	KE 35 PN20 Reducer tee 90mm x 75mm x 90mm
2579151	KE 35 PN20 Reducer tee 110mm x 63mm x 110mm
2579301	KE 35 PN20 Reducer tee 110mm x 75mm x 110mm
2579351	KE 35 PN20 Reducer tee 110mm x 90mm x 110mm




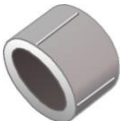


2580101	KE 36 PN20 Reducer tee 20mm x 25mm x 20mm
2580001	KE 36 PN20 Reducer tee 25mm x 20mm x 20mm
2580201	KE 36 PN20 Reducer tee 25mm x 25mm x 20mm
2580301	KE 36 PN20 Reducer tee 32mm x 20mm x 25mm
2580401	KE 36 PN20 Reducer tee 32mm x 25mm x 20mm
2580501	KE 36 PN20 Reducer tee 32mm x 25mm x 25mm
2580601	KE 36 PN20 Reducer tee 32mm x 32mm x 20mm
2580701	KE 36 PN20 Reducer tee 32mm x 32mm x 25mm



2572101	KE 38 PN20 tee M/F 25mm x 20mm x 25mm
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2652001	KE 41 PN20 M/F Reducer d25mm x 20mm
2653501	KE 41 PN20 M/F Reducer d32mm x 20mm
2653001	KE 41 PN20 M/F Reducer d32mm x 25mm
2655001	KE 41 PN20 M/F Reducer d40mm x 20mm
2654501	KE 41 PN20 M/F Reducer d40mm x 25mm
2654001	KE 41 PN20 M/F Reducer d40mm x 32mm
2657001	KE 41 PN20 M/F Reducer d50mm x 20mm
2656501	KE 41 PN20 M/F Reducer d50mm x 25mm
2656001	KE 41 PN20 M/F Reducer d50mm x 32mm
2655501	KE 41 PN20 M/F Reducer d50mm x 40mm
2658201	KE 41 PN20 M/F Reducer d63mm x 25mm
2657901	KE 41 PN20 M/F Reducer d63mm x 32mm
2657601	KE 41 PN20 M/F Reducer d63mm x 40mm

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	2657301	KE 41 PN20 M/F Reducer d63mm x 50mm
	2659101	KE 41 PN20 M/F Reducer d75mm x 50mm
	2659001	KE 41 PN20 M/F Reducer d75mm x 63mm
	2659801	KE 41 PN20 M/F Reducer d90mm x 63mm
	2659501	KE 41 PN20 M/F Reducer d90mm x 75mm
	2772201	KE 41 PN20 M/F Reducer d110mm x 63mm
	2772101	KE 41 PN20 M/F Reducer d110mm x 75mm
	2772001	KE 41 PN20 M/F Reducer d110mm x 90mm
	2472001	KE 47 KELEN saddle fitting 40-63x20
	2472501	KE 47 KELEN saddle fitting 40-63x25
	2475001	KE 47 KELEN saddle fitting 75-125x20
	2475501	KE 47 KELEN saddle fitting 75-125x25
	2551501	KE 60 PN20 End Cap d20mm
	2552001	KE 60 PN20 End Cap d25mm
	2552501	KE 60 PN20 End Cap d32mm
	2553001	KE 60 PN20 End Cap d40mm
	2553501	KE 60 PN20 End Cap d50mm
	2554001	KE 60 PN20 End Cap d63mm
	2554501	KE 60 PN20 End Cap d75mm
	2555001	KE 60 PN20 End Cap d90mm
	2555501	KE 60 PN20 End Cap d110mm
	2552101	KE 61 PN20 Stopper d25mm
	2541501	KE 90 PN20 Curved pipe d20mm
	2542001	KE 90 PN20 Curved pipe d25mm
	2542501	KE 90 PN20 Curved pipe d23mm

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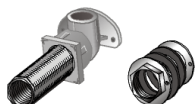


2623501 KE 83 PN20 Wall bracket 90° d20mm x 1/2"

2623601 KE 83 PN20 Wall bracket 90° d20mm x 3/4"

2623651 KE 83 PN20 Wall bracket 90° d25mm x 1/2"

2623701 KE 83 PN20 Wall bracket 90° d25mm x 3/4"



2626001 KE 83HA PN20 Cavity wall joint 90° d20mm x 1/2"x50mm



2626501 KE 83SP PN20 Flushing box joint 90° d20mm x 1/2"x15mm



2620501 KE 81LA PN20 Wall bracket 90° d20mm x 1/2"



2593501 KE 11 PN20 Male Adaptor d20mm x 1/2"

2594001 KE 11 PN20 Male Adaptor d20mm x 3/4"

2595501 KE 11 PN20 Male Adaptor d25mm x 1/2"

2596001 KE 11 PN20 Male Adaptor d25mm x 3/4"

2598001 KE 11 PN20 Male Adaptor d32mm x 3/4"

2598501 KE 11 PN20 Male Adaptor d32mm x 1" S

2598801 KE 11 PN20 Male Adaptor d40mm x 1" S

2599001 KE 11 PN20 Male Adaptor d40mm x 1 1/4" S

2599501 KE 11 PN20 Male Adaptor d50mm x 1 1/2" S

2599801 KE 11 PN20 Male Adaptor d63mm x 2" S

2600001 KE 11 PN20 Male Adaptor 75mm x 2 1/2" S



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2583501 KE 13 PN20 Female Adaptor d20mm x 1/2"



2584001 KE 13 PN20 Female Adaptor d20mm x 3/4"

2585501 KE 13 PN20 Female Adaptor d25mm x 1/2"

2586001 KE 13 PN20 Female Adaptor d25mm x 3/4"

2588001 KE 13 PN20 Female Adaptor d32mm x 1" S

2588801 KE 13 PN20 Female Adaptor 40mm x 1" S

2589001 KE 13 PN20 Female Adaptor d40mm x 1 1/4" S

2589501 KE 13 PN20 Female Adaptor d50mm x 1 1/4" S

2589801 KE 13 PN20 Female Adaptor d63mm x 2" S

2590001 KE 13 PN20 Female Adaptor d75mm x 2 1/2" S



2613501 KE 21 PN20 Male Elbow adaptor 90° d20mm x 1/2"



2616001 KE 21 PN20 Male Elbow adaptor 90° d25mm x 3/4"

2618501 KE 21 PN20 Male Elbow adaptor 90° d32mm x 1" S



2472051 KE 43 KELEN saddle fitting female 40-63x1/2"

2475051 KE 43 KELEN saddle fitting female 75-125x1/2"



2603501 KE 23 PN20 Female Elbow adaptor 90° d20mm x 1/2"



2603601 KE 23 PN20 Female Elbow adaptor 90° d20mm x 3/4"

2605901 KE 23 PN20 Female Elbow adaptor 90° d25mm x 1/2"



2606001 KE 23 PN20 Female Elbow adaptor 90° d25mm x 3/4"

2608401 KE 23 PN20 Female Elbow adaptor 90° d32mm x 3/4"

2608501 KE 23 PN20 Female Elbow adaptor 90° d32mm x 1" S



2643501 KE 31 PN20 Male Tee d20mm x 1/2"

2643601 KE 31 PN20 Male Tee d20mm x 1/2" BF

2644001 KE 31 PN20 Male Tee d20mm x 3/4"

2646001 KE 31 PN20 Male Tee d25mm x 3/4"

2648601 KE 31 PN20 Male Tee d32mm x 1" S

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2643701 KE 31LA PN20 Male Tee (50mm thread) d20mm x 1/2"



2633501 KE 33 PN20 Female Tee d20mm x 1/2"

2633601 KE 33 PN20 Female Tee d20mm x 1/2" BF

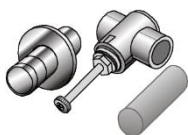
2634001 KE 33 PN20 Female Tee d25mm x 1/2"

2636001 KE 33 PN20 Female Tee d25mm x 3/4"

2638601 KE 33 PN20 Female Tee d32mm x 1" S

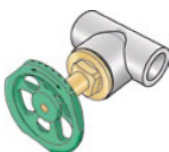


2633701 KE33HA PN20 Female Extension Tee 20mm x 1/2"x50mm  
BF



2660101 KE 50 PN20 Isolating Valve Chrome Plated d20mm x 1/2"

2660301 KE 50 PN20 Isolating Valve Chrome Plated d25mm x 3/4"



2660531 KE 50PF PN10 Isolating Valve & KE 50F Handle  
d20mmx3/4"

2660731 KE 50PF PN10 Isolating Valve & KE 50F Handle  
d25mmx3/4"

2660831 KE 50PF PN10 Isolating Valve & KE 50F Handle  
d32mmx3/4"



2660501 KE 50A PN20 Valve - Metal Seat d20mm x 1/2"

2660551 KE 50A PN20 Valve - Metal Seat d20mm x 1/2" BF

2660401 KE 50A PN20 Valve - Metal Seat d20mm x 5/8"

2660701 KE 50A PN20 Valve - Metal Seat d25mm x 3/4"



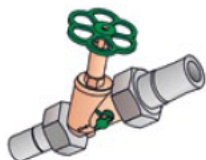
2660521 KE 50P PN10 Valve - Plastic Seat d20mm x 3/4"

2660721 KE 50P PN10 Valve - Plastic Seat 25mm x 3/4"

2660821 KE 50P PN10 Valve - Plastic Seat d32mm x 3/4"

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2670201	KE 52 PN20 Slanted Seat Valve With KE 57 Union d20-DN15
2670251	KE 52 PN20 Slanted Seat Valve With KE 57 Union d25-DN20
2670321	KE 52 PN20 Slanted Seat Valve With KE 57 Union d32-DN25
2670401	KE 52 PN20 Slanted Seat Valve With KE 57 Union d40-DN32
2670501	KE 52 PN20 Slanted Seat Valve With KE 57 Union d50-DN40
2670631	KE 52 PN20 Slanted Seat Valve With KE 57 Union d63-DN50



2742001	KE 55 PN20 Union d20mm x 1/2"
2742501	KE 55 PN20 Union d25mm x 3/4"
2743001	KE 55 PN20 Union d32mm x 1"
2743501	KE 55 PN20 Union d40mm x 1 1/4"
2744001	KE 55 PN20 Union d50mm x 1 1/2"
2744501	KE 55 PN20 Union d63mm x 2"
2745001	KE 55 PN20 Union d75mm x 2 1/2"
2745501	KE 55 PN20 Union d90mm 3"



2752001	KE 56 PN20 Union d20mm
2752501	KE 56 PN20 Union d25mm
2753001	KE 56 PN20 Union d32mm
2753501	KE 56 PN20 Union d40mm
2754001	KE 56 PN20 Union d50mm
2754501	KE 56 PN20 Union d63mm
2755001	KE 56 PN20 Union d75mm
2755501	KE 56 PN20 Union d90mm

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2762001	KE 57 PN20 Union With Female Thread d20mm x 1"
2762501	KE 57 PN20 Union With Female Thread d25mm x 1 1/4"
2763001	KE 57 PN20 Union With Female Thread 32mm x 1 1/2"
2763501	KE 57 PN20 Union With Female Thread d40mm x 2"
2764001	KE 57 PN20 Union With Female Thread d50mm x 2 1/4"
2764501	KE 57 PN20 Union With Female Thread 63mm x 2 3/4"
2765001	KE 57 PN20 Union With Female Thread 75mm x 3 1/4"
2765501	KE 57 PN20 Union With Female Thread 90mm x 3 3/4"



*includes cleaning tissue*

2531501	KE 17 PN20 E-Repair Socket d20mm
2532001	KE 17 PN20 E-Repair Socket d25mm
2532501	KE 17 PN20 E-Repair Socket d32mm
2533001	KE 17 PN20 E-Repair Socket d40mm
2533501	KE 17 PN20 E-Repair Socket d50mm
2534001	KE 17 PN20 E-Repair Socket d63mm
2534501	KE 17 PN20 E-Repair Socket d75mm
2535001	KE 17 PN20 E-Repair Socket d90mm
2535501	KE 17 PN20 E-Repair Socket d110mm
2535601	KE 17 PN20 E-Repair Socket d125mm
2535801	KE 17 PN20 E-Repair Socket d160mm



2730111	KE 18 PN10 Backing Ring d20mm
2730121	KE 18 PN10 Backing Ring d25mm
2730131	KE 18 PN10 Backing Ring d32mm
2730141	KE 18 PN10 Backing Ring d40mm
2730151	KE 18 PN10 Backing Ring d50mm
2730161	KE 18 PN10 Backing Ring d63mm
2730171	KE 18 PN10 Backing Ring d75mm
2730181	KE 18 PN10 Backing Ring d90mm
2730191	KE 18 PN10 Backing Ring d110mm
2730201	KE 18 PN10 Backing Ring d125mm

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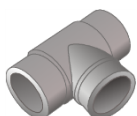
2506001 KE 20ST PN10 Butt Weld Elbow 90° d125mm

2506501 KE 20ST PN10 Butt Weld Elbow 90° d160mm



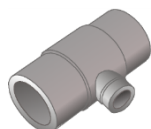
2516501 KE 70ST PN10 Butt Weld Elbow 45° d125mm

2517001 KE 70ST PN10 Butt Weld Elbow 45° d160mm



2566001 KE 30ST PN10 Butt Weld Tee 125mm x 125mm x 125mm

2566501 KE 30ST PN10 Butt Weld Tee 160mm x 160mm x 160mm



2780404 KE 35ST PN10 Butt Weld Reducing Tee d125mm x 63mm

2780402 KE 35ST PN10 Butt Weld Reducing Tee d125mm x 90mm

2780401 KE 35ST PN10 Butt Weld Reducing Tee d125mm x 110mm

2780602 KE 35ST PN10 Butt Weld Reducing Tee d160mm x 90mm

2780601 KE 35ST PN10 Butt Weld Reducing Tee d160mm x 110mm

2780801 KE 35ST PN10 Butt Weld Reducing Tee d160mm x 125mm



2770401 KE 41ST PN10 Butt Weld Reducer d125mm x 75mm

2770501 KE 41ST PN10 Butt Weld Reducer d125mm x 90mm

2770551 KE 41ST PN10 Butt Weld Reducer d125mm x 110mm

2771001 KE 41ST PN10 Butt Weld Reducer d160mm x 90mm

2771101 KE 41ST PN10 Butt Weld Reducer d160mm x 110mm

2771501 KE 41ST PN10 Butt Weld Reducer d160mm x 125mm



2720108 KE 18ST PN10 Welding Neck d110mm

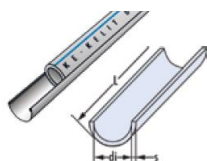
2720106 KE 18ST PN10 Welding Neck d125mm

2720109 KE 18ST PN10 Welding Neck d160mm



2803301 KE 99 Repair Plug 7 - 11mm

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2670300	K 88 Pipe Channel 20mm x 2m
2670600	K 88 Pipe Channel 25mm x 2m
2670900	K 88 Pipe Channel 32mm x 2m
2671000	K 88 Pipe Channel 40mm x 2m
2671100	K 88 Pipe Channel 50mm x 2m
2671300	K 88 Pipe Channel 63mm x 2m
2671500	K 88 Pipe Channel 75mm x 2m
2672000	K 88 Pipe Channel 90mm x 2m
2672100	K 88 Pipe Channel 110mm x 2m



2803120	K 95 Stopper 1/2" long
2803220	K 95 Stopper 3/4" long



MRING16	16mm Bifix Rubber Lined Pipe Clamp M10
MRING20	20mm Bifix Rubber Lined Pipe Clamp M10
MRING25	25mm Bifix Rubber Lined Pipe Clamp M10
MRING32	32mm Bifix Rubber Lined Pipe Clamp M10
MRING40	40mm Bifix Rubber Lined Pipe Clamp M10
MRING50	50mm Bifix Rubber Lined Pipe Clamp M10
MRING63	63mm Bifix Rubber Lined Pipe Clamp M10
MRING75	75mm Bifix Rubber Lined Pipe Clamp M10
MRING90	90mm Bifix Rubber Lined Pipe Clamp M10
MRING110	110mm Bifix Rubber Lined Pipe Clamp M10
MRING125	125mm Bifix Rubber Lined Pipe Clamp M10
MRING135	135mm Bifix Rubber Lined Pipe Clamp M10
MRING160	160mm Bifix Rubber Lined Pipe Clamp M10
MRING200	200mm Bifix Rubber Lined Pipe Clamp M10

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