THERM

PP-R PIPES & FITTINGS

"Quality Does Matter"

TECHNICAL MANUAL

Table of Content

INTRODUCTION

Having been supplying the electromechanical field for over a decade, I always dreamed of being able to manufacture what I am currently selling.

I often thought that one had to either be a trader or a manufacturer, but could never be both. I am here today to prove myself wrong.

Surrounded by a team of plastic experts (as I would like to call them), possessing more than 30 years of combined experience in plastics; investing in top notch technology, and sourcing superior raw materials from the world's best manufacturers; I formulated our strong trio, determined to deliver nothing less than world class quality to our valuable customers.

Quantum Industries started out with few Scribbles on a piece of paper, and as a result of the cross-pollination of theory, best practice and experience, coupled with a clear vision, today stretches across 45,000 Sq.Mtr., striving for global excellence, armed with the heartfelt diligent work every member of the Quantum team is putting in, associating its name with leaders of the industry, aspiring not only to raise the bar, but to set the standard for others.

Best regards,

Jawad Khawaja
CEO

PREFACE


QUALITY
RELIABILITY
SAFETY
SUCCESS
VALUES
SERVICE
GOALS
SUCCESS
GOALS
VISION
MISSION

Our Vision

> We aspire to position ourselves among the top PPR pipe manufacturers regionally while committing to make Q-Therm a synonym to quality, safety and reliability.

Our Mission

Success is not accidental, we believe it's a journey of progressive pursuit of excellence in all what we do, having this mantra in mind, our destination is clear, and the compass guiding us will never lead us astray because:

- **Our quality pledge,** to ourselves before others, mandates our commitment to international norms and standards, and to consistently surpass the expectations while delivering our products and services to the world.
- **Our customers,** are our associates and partners, they are the capital we strive to thrive, we will be always the next-door neighbor for them, venturing with them by all our expertise and resources, trying to be the reliable constant in their world of variables.
- **Our society is in the core of our concerns,** with our relentless attempt to participate in sharing the social responsibility with others, we create opportunities for training, qualifying, employing and even partnering with individual or societal organizations, in an approach to secure the future for all.

Q-THERM

1. What

Q-Therm, the PP-R piping systems offered by Quantum Industries provides a comprehensive solution for the transfer of all potable water requirements, as Q-therm products are.

DESIGNED:

To replace conventional piping systems.

ENGINEERED:

To withstand high working pressures and temperatures.

MADE:

Of the best PPR material.

PRODUCED:

With the state of the art German technology and machinery.

CONTROLLED:

By the top notch quality control equipments, according to international standards.

SUPPORTED:

By a team of professionals, dedicated with all their expertise to deliver the best to all clients.

Q-Therm Polypropylene random copolymers (PP-R) is thermoplastic material produced through the polymerization of propylene, with ethylene links introduced in the polymer chain. The Q-Therm material possesses a good durability, recyclability and environment-friendly characteristics.

Q-THERM

Material Data Sheet:

Properties		Test Method	Unit	Data
Density		ASTM D792	g/cm^3	0.91
Melt Index	230°C, 2.16kg	ASTM D1238	g/10min	0.25
	190°C, 5.0kg			0.45
Tensile Strength	yield point	ASTM D638	kg/cm^2	270
	break point			230
Elongation		ASTM D638	%	> 400
Flexural Modulus		ASTM D790	kg/cm^2	8,500
Izod Impact Stength	23°C	ASTM D256	kg · cm/cm	30
	0°C			8
	-20°C			3
Vicat Softening Point		ASTM D1525	°C	130
Melting Temperature		HS Method	°C	141
Surface Resistance		HS Method	Ω	$>10^{13}$
Mean coefficient of linear thermal expansion (0°C - 110°C)		Dilatometer	K^{-1}	$1.5*10^{-4}$

* The data of table are relative and represent empirical values obtained in various tests.

Condition		Required	Typical Value of PP-R	Test Method
20°C	16 MPa	1 hr	>10 hrs	ISO 1167
95°C	3.5 MPa	1,000 hrs	>5,000 hrs	ISO 1167
110°C	1.9 MPa	8,760 hrs	>10,000 hrs	ISO 1167

* Resistance to internal hydrostatic pressure.

2. Why

Choosing the right piping system is always the challenge while designing networks, as Quality, Safety and Reliability are the prime quests for any designer. What Q-Therm offers with its piping solutions are products made of environment friendly PP-r which has its unique physical and chemical properties. Q-Therm products stand as one of the safest means for potable water transfer. Its welding properties make it easy for quick installation by the end user in various applications. Hence, Q-Therm has been a primary consideration for present day piping solutions for its safety, service and reliability.

Advantages of Q-Therm products:

1. Environment:

Q-Therm's environment friendly materials contain no toxic wastes which would expose any hazard to the ecosystem we are living in. Polypropylene gives out no pollution when it is being produced or when disposed. Q-therm exerts much care on the fact that its products or the production processes should not pollute our sensitive ecosystem.

- **Recycling**
  Q-therm products are 100% recyclable and can be ground and re-used. Recently, there has been an increasing demand for polypropylene recycling, as it could be recycled many times and used in various applications.

2. Hygienic Suitability:

In this modern era, health and safety has always been under a critical eye. Transfer of potable water has to be through a reliable network system, which ensures the delivered fluid would not be subject to influence by any interactions within the carrier.

- **Non-Toxic**
  Q-Therm uses raw materials which are completely non-toxic for its production processes. Q-Therm maintains the up-to-date national and international regulations for complying with the same.

- **Smell and Taste Neutrality**
  Since Q-therm products do not interact with the fluids within its system, it gives no smell or taste difference to the transferred substance.

- **Opaqueness**
  Q-therm products, which are opaque, would prevent sun light penetration in its piping system and thus resisting bacterial and fungal growth.

Q-THERM

• Corrosion resistance

Compared to the old metallic pipes, Q-therm piping systems are corrosion free due to its' material properties and thus, lesser exposed to contamination. Also, the joints are connected through a weld-fusion process which eliminates not only the chances of corrosion within the piping system, but also gives Q-therm a longer service life. Moreover, the metal parts of the system are made of dezincification resistance brass, complying with WHO regulations.

3. Chemical resistance:

Polypropylene by nature is highly chemical resistant at a wide range of temperature and pressure. Due to its higher molecular weight, it resists most of the acids, lime and cement.

4. Mechanical Properties:

When it is designed to replace the conventional metal piping solutions, Q-therm offers a better alternative to what has been offered in the past. the mechanical properties of Q-therm products are,

• High Impact Resistance.
• Low Thermal conductivity.
• Resistance to current strays.
• High durability.
• Light Weight.

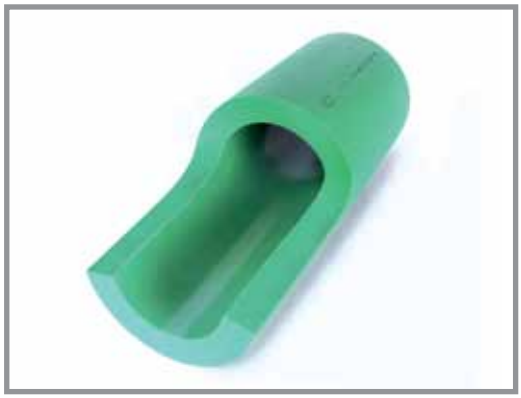
5. Sound Insulation:

In comparison to the metallic pipes, the sound insulation qualities of Q-therm pipe system related to water flow and hydraulic shock within a building reduces the noise transmission to a larger scope. This is due to the elasticity of Q-therm products which makes it more workable to absorb and reduce almost all vibrations which would appear in conventional piping systems.

6. Flow Performance:

• Low Pressure Loss

The inner surface finishing of Q-therm products is sleek, smooth and with very low irregularities which conveys a significant reduction in pressure loss. Thus, limestone build up is prevented inside the pipe.



7. Ease of Installation:

One of the major attractions of Q-therm products is its capability to be welded by fusion. Q-therm pipes and fittings are comparatively lighter in weight to the metallic pipes, consequently this would require a shorter time to establish a permanent connection/joint in the piping system. This is easily achieved with a suitable welding kit and by following the instructions mentioned in our **"HOW TO INSTALL"** chapter.

8. Long Service Life:

Q-therm piping systems are designed for a theoretical long service life of 50 years in application, subject to specific conditions. Though peak temperatures of 100 C° arising within the system for shorter period are harmless, permanent temperature from 70 C° up to 90 C° might marginally reduce the service life of the pipe.

Allowable operating pressures for PP-R pipes conveying water, safety factor (SF) = 1.25

		Q-therm Solid Pipe PN 10	Q-therm Solid Pipe PN 16	Q-therm Solid Pipe PN 20	Q-therm Solid Pipe PN 25
		Standard Dimension Ratio (SDR)			
Temperature	Years of service	11	7.4	6	5
°C		Allowable operating pressure (bar)			
10	1	21,1	33,4	42,1	53,0
	5	19,8	31,5	39,7	49,9
	10	19,3	30,7	38,6	48,7
	25	18,7	29,7	37,4	47,0
	50	18,2	28,9	36,4	45,9
	100	17,8	28,2	35,5	44,7
20	1	18,0	28,5	35,9	45,2
	5	16,9	26,8	33,7	42,5
	10	16,4	26,1	32,8	41,4
	25	15,9	25,2	31,7	39,9
	50	15,4	24,5	30,9	38,9
	100	15,0	23,9	30,1	37,8
30	1	15,3	24,2	30,5	38,5
	5	14,3	22,7	28,6	36,0
	10	13,9	22,1	27,8	35,0
	25	13,4	21,3	26,8	33,8
	50	13,0	20,7	26,1	32,9
	100	12,7	20,1	25,4	31,9

Q-THERM

		Q-therm Solid Pipe PN 10	Q-therm Solid Pipe PN 16	Q-therm Solid Pipe PN 20	Q-therm Solid Pipe PN 25
		Standard Dimension Ratio (SDR)			
Temperature	Years of service	11	7.4	6	5
°C		Allowable operating pressure (bar)			
40	1	13,0	20,6	25,9	32,6
	5	12,1	19,2	24,2	30,5
	10	11,8	18,7	23,5	29,6
	25	11,3	18,0	22,6	28,5
	50	11,0	17,4	22,0	27,7
	100	10,7	16,9	21,4	26,9
50	1	11,0	17,4	21,9	27,6
	5	10,2	16,2	20,4	25,7
	10	9,9	15,7	19,8	25,0
	25	9,5	15,1	19,0	24,0
	50	9,2	14,7	18,5	23,3
	100	9,0	14,2	17,9	22,6
60	1	9,2	14,7	18,5	23,3
	5	8,6	13,6	17,2	21,6
	10	8,3	13,2	16,6	21,0
	25	8,0	12,7	16,0	20,1
	50	7,7	12,3	15,5	19,5
70	1	7,8	12,3	15,5	19,6
	5	7,2	11,4	14,4	18,1
	10	7,0	11,1	13,9	17,5
	25	6,0	9,6	12,1	15,2
	50	5,1	8,1	10,2	12,8
80	1	6,5	10,3	13,0	16,4
	5	5,7	9,1	11,5	14,5
	10	4,8	7,7	9,7	12,2
	25	3,9	6,2	7,8	9,8
95	1	4,6	7,3	9,2	11,6
	5	3,1	4,9	6,2	7,8

3. Where

It's impossible to imagine life without water, and with today's life style, it is equally impossible to think of water apart from being safely and hygienically carried and transferred to us.

Q-therm, the comprehensive fluid carrier (both liquid and gases), safely and carefully delivers every drop of it to, a diversified range of applications mainly, but not limited to;

1. Pipe networks for potable water.
2. Floor heating purposes for residential houses.
3. Industrial pipeline networks.
4. For transporting aggressive fluids and pneumatic systems (considering the chemical resistance).
5. Pipe networks for agricultural and horticultural requirements.
6. Pipe networks for connection of heat pumps.

To know about the chemical resistance of Polypropylene to various chemical fluids, you may refer to us by sending your enquiry to info@quantumindustries.ae

Our engineers shall be of assistance in providing general guidelines on possible utilization of polypropylene piping for conveying chemical fluids.

4. How

Pipe networks have never been easier to install, thanks to the fusion properties of Q-Therm products which made plumping an easier job.

Advantages over conventional systems:

1. Easy installation by fusion technique.
2. Easy Repair/Maintenance.
3. Energy and time saving.

Q-therm products are coupled together by fusion techniques, accomplished by heating the pipe and fittings ends to a (250°C - 260°C) temperature using welding device. The heated ends are joined by pressing both the ends together. The fused joints are ready for use immediately after a short cooling period. To have perfect joints, the following steps must be adhered to:

4.1 FUSION PROCESS

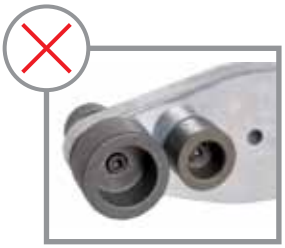
Fusion process takes place in two main steps, Preparation and Welding.

4.1.1 Preparation

Before the commencement of the fusion process, the welding device and the products require proper preparations for reliable and strong joints.

4.1.1.1 Welding Device

(Figure A)



(Figure B)

(Figure C)

Q-THERM

1. Always use Q-therm welding devices and welding tools.

2. Fasten the required tools firmly on the welding device using correct tools in a way not allowing loose contact and the tools to sit properly on the heating element as shown in figure A.

3. Fix smaller tools on the front and larger tools at the back, as shown in figure B & C.

4. Check for any impurities on the tools and if required clean the tools using non-fibrous coarse tissue.

5. Start the heating on the welding device and wait for at least 20-30 minutes so that it attains a temperature of 260°C before the welding process. This can be ensured from the light of the thermostat which will cut off once the temperature is attained.

(Figure D)

(Figure E)

4.1.1.2 PRODUCT

1. Cut the pipe perpendicular to the axis of the pipe using Q-therm pipe cutter as shown in figure D

2. Ensure the pipe and fittings are free from burrs, contamination and if necessary, clean them before use.

3. Mark the required welding depth on the pipe as per table 1 and the desired position of the fitting on the pipe as shown in figure E.

Q-THERM

4.1.2 Welding

1. Once the welding device and the products are ready for welding as mentioned in the above process, the products are inserted up to the marked welding depth into the welding device without turning the product as shown in figure F.
2. The heating time starts once the products reaches the required welding depth in the welding device. Refer to table 1 for heating time.
3. After the completion of the heating time, quickly remove the products from the welding device and join them immediately without turning until the marked welding depth as shown in figure G.
4. Do not exceed the marking depth while joining as it will reduce the bore or in extreme cases will close the hole.
5. After the cooling time (refer to table 1), the fused joints are ready for use.

(Figure F)

(Figure G)

Pipe Diameter	Welding Depth	Heating Time*	Welding Time*	Cooling Time*
(mm)	(mm)	sec	sec	min
20	14	5	4	2
25	15	7	6	4
32	16	8	6	4
40	18	12	6	4
50	20	18	8	6
63	24	24	8	8
75	26	30	8	8
90	29	40	10	8
110	32	50	10	8

* General Guidelines for Heated Tool Socket Welding acc. to DVS 2207 Part 11

(Table 1)

4.2 ELECTRO FUSION

Electro Fusion takes place in two main steps, Preparation and Welding by electro fusion socket.

4.2.1 Preparation

1. Cut the pipe perpendicular to the axis of the pipe using Q-therm pipe cutter as shown in figure D.
2. Mark the depth of the Q-therm electro fusion socket on the pipe as shown in table 2.
3. Peel the surface of the both the pipes up to the mark using Q-therm peeling tool.
4. Clean the pipes ends thoroughly and if necessary, clean them before use.

Electro Fusion Welding Depth									
ø (mm)	20	25	32	40	50	63	75	90	110
Depth (mm)	35.0	39.0	40.0	46.0	51.0	59.0	65.0	72.5	80.0

(Table 2)

4.2.2 Welding by Electro Fusion Socket

1. Assemble the Q-therm electro fusion socket on the pipe ends. Use pressing clamps if necessary.
2. Regulate fusion equipment for the right fusion temperature.
3. Start the fusion process, and do not move or stress the pipe and fitting during the whole process and the cooling time.

4.3 PIPE REPAIR

It is possible to repair a damaged Q-therm pipe using a special tool mounted on the welding device. In order to ensure that the repaired part can work under pressure, the following steps must be adhered to:

1. Mark the required depth (as per the wall thickness of the pipe) on the repair plug.
2. Heat the repair plug and the pipe using special mounted tools on the Q-therm welding device by following the steps as mentioned in fusion Process.(4.1).
3. After the cooling time, cut the protruded end of the repair plug.

4.4 PIPE BENDING

Q-therm pipes can be bent by blowing hot air directly on its pipe surface. The suitable temperature for bending without damage is 135-145 ^{0}C. The minimum bend radius should be ≥ 8 times the pipe diameter as shown in table 3.

Minimum Bend Radius									
Pipe diameter ø (mm)	20	25	32	40	50	63	75	90	110
Min. Bend Radius (mm)	160	200	260	320	400	500	600	720	880

(Table 3)

4.5 INSTALLATION GUIDELINES

The following section describes in detail, the optimal way of installing Q-therm piping network by various installation methods for different kinds of applications by the end user.

4.5.1 Clamping

Q-therm pipe clamps are perfectly suitable for Fixed and Slide Clamping installations. It is available in wide range of sizes and the rubber lining available does not mechanically damage the pipe surface. Depending on the area of application, the clamping is classified as Fixed Clamping and Slide Clamping. Combination of both clamping system results in ideal installation of the piping network.

4.5.1.1 Fixed Clamping

Fixed Clamps normally divides the pipelines into individual sections, avoiding uncontrolled movements of the pipe. During the design of the piping network, fixed clamp positions should be calculated and installed in such a way that the forces of the linear expansions as well as probable additional loads are accommodated.

4.5.1.2 Slide Clamping

Slide Clamps allows axial pipe movements without damaging the pipe. During the design of the piping network, slide clamps positions must be calculated and installed in such a way that the movements of the pipelines are not hindered by the fittings and are at a sufficient distance from the clamps installed in the piping network.

4.5.1.3 Clamping intervals

Clamping intervals for Q-therm pipes in concurrence with temperature and outside diameter must be maintained as shown in table 4 for effective clamping of the piping network.

Clamping intervals for Q-therm (SDR 6) & (SDR 7.4) pipes

Difference in Temperature ΔT (K)	Pipe diameter ø (mm)								
	20	25	32	40	50	63	75	90	110
	clamping interval (cm)								
0	85	105	125	140	165	190	205	220	250
20	60	75	90	100	120	140	150	160	180
30	60	75	90	100	120	140	150	160	180
40	60	70	80	90	110	130	140	150	170
50	60	70	80	90	110	130	140	150	170
60	55	65	75	85	100	115	125	140	160
70	50	60	75	80	95	105	115	125	140

(Table 4)

Q-THERM

4.5.2 Linear Expansion

Linear expansion is a very important design criteria for Q-therm pipes. For effective piping networks, it is advised to consider linear expansion during the design stage of the piping network.

Cold water piping network have practically no linear expansion and doesn't require any considerations.

The linear expansion of Q-therm pipes depends on the difference of operating temperature to installation temperature.

$\Delta T\ (K) = T_{\text{operating temperature}} - T_{\text{installation temperature}}$

Linear Expansion (ΔL) is calculated as per the formula stated below

$\Delta L = \Delta T \times L \times \alpha$

Where L = Installed pipe length in meters

α = Coefficient of linear expansion

The Coefficient of linear expansion for Q-therm pipes is 0.15 mm/mK

The linear expansion can be taken from the following table for a wide range of lengths and temperatures, where the values are measured in meters.

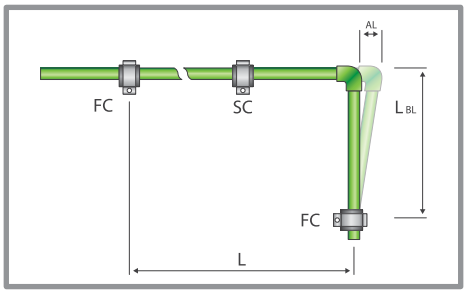
Pipe length (m)	Difference in Temperature ΔT (K)														
	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80
0.1	0.15	0.23	0.30	0.38	0.45	0.53	0.60	0.68	0.75	0.83	0.90	0.98	1.05	1.13	1.20
0.2	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50	1.65	1.80	1.95	2.10	2.25	2.40
0.3	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03	2.25	2.48	2.70	2.93	3.15	3.38	3.60
0.4	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70	3.00	3.30	3.60	3.90	4.20	4.50	4.80
0.5	0.75	1.13	1.50	1.88	2.25	2.63	3.00	3.38	3.75	4.13	4.50	4.88	5.25	5.63	6.00
0.6	0.90	1.35	1.80	2.25	2.70	3.15	3.60	4.05	4.50	4.95	5.40	5.85	6.30	6.75	7.20
0.7	1.05	1.58	2.10	2.63	3.15	3.68	4.20	4.73	5.25	5.78	6.30	6.83	7.35	7.88	8.40
0.8	1.20	1.80	2.40	3.00	3.60	4.20	4.80	5.40	6.00	6.60	7.20	7.80	8.40	9.00	9.60
0.9	1.35	2.03	2.70	3.38	4.05	4.73	5.40	6.08	6.75	7.43	8.10	8.78	9.45	10.13	10.80
1.0	1.50	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50	8.25	9.00	9.75	10.50	11.25	12.00
2.0	3.00	4.50	6.00	7.50	9.00	10.50	12.00	13.50	15.00	16.50	18.00	19.50	21.00	22.50	24.00
3.0	4.50	6.75	9.00	11.25	13.50	15.75	18.00	20.25	22.50	24.75	27.00	29.25	31.50	33.75	36.00
4.0	6.00	9.00	12.00	15.00	18.00	21.00	24.00	27.00	30.00	33.00	36.00	39.00	42.00	45.00	48.00
5.0	7.5	11.3	15.0	18.8	22.5	26.3	30.0	33.8	37.5	41.3	45.0	48.8	52.5	56.3	60.0
6.0	9.0	13.5	18.0	22.5	27.0	31.5	36.0	40.5	45.0	49.5	54.0	58.5	63.0	67.5	72.0
7.0	10.5	15.8	21.0	26.3	31.5	36.8	42.0	47.3	52.5	57.8	63.0	68.3	73.5	78.8	84.0
8.0	12.0	18.0	24.0	30.0	36.0	42.0	48.0	54.0	60.0	66.0	72.0	78.0	84.0	90.0	96.0
9.0	13.5	20.3	27.0	33.8	40.5	47.3	54.0	60.8	67.5	74.3	81.0	87.8	94.5	101.3	108.0
10.0	15.0	22.5	30.0	37.5	45.0	52.5	60.0	67.5	75.0	82.5	90.0	97.5	105.0	112.5	120.0
15.0	22.5	33.8	45.0	56.3	67.5	78.8	90.0	101.3	112.5	123.8	135.0	146.3	157.5	168.8	180.0
20.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0	135.0	150.0	165.0	180.0	195.0	210.0	225.0	240.0
25.0	37.5	56.3	75.0	93.8	112.5	131.3	150.0	168.8	187.5	206.3	225.0	243.8	262.5	281.3	300.0
40.0	60.0	90.0	120.0	150.0	180.0	210.0	240.0	270.0	300.0	330.0	360.0	390.0	420.0	450.0	480.0
45.0	67.5	101.3	135.0	168.8	202.5	236.3	270.0	303.8	337.5	371.3	405.0	438.8	472.5	506.3	540.0
50.0	75.0	112.5	150.0	187.5	225.0	262.5	300.0	337.5	375.0	412.5	450.0	487.5	525.0	562.5	600.0

4.5.3 Linear Expansion Compensation

Linear expansion can be compensated by different installation techinques in the piping network, either by Bend Technique or Expansion Loop technique.

4.5.3.1 Bend technique

In this technique, linear expansion is compensated by providing change in direction in the piping network as shown in figure H.



(Figure H)

FC = Fixed Clamping, Slide Clamping

Bend Length is calculated as per the formula stated below

$L_{BL} = K \times \sqrt{d \times \Delta L}$

Where ΔL = Linear Expansion in mm
d = Outside Pipe Diameter in mm
K = Material Specific constant

The Material Specific constant (K) for Q-therm pipes is 15.

The Bend Length (L_{BL}) values can be taken from the following table considering the installed pipe diameter and determined linear expansion.

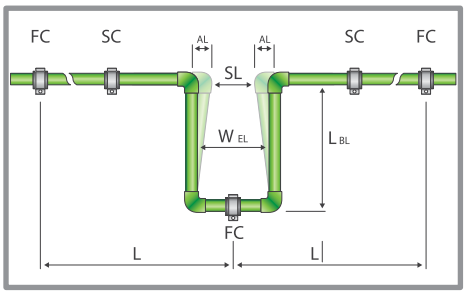
Pipe Diameter (mm	Linear Expansion (mm)											
	10	20	30	40	50	60	70	80	90	100	110	120
	Bend Length (mm)											
20	0.21	0.30	0.37	0.42	0.47	0.52	0.56	0.60	0.64	0.67	0.70	0.73
25	0.24	0.34	0.41	0.47	0.53	0.58	0.63	0.67	0.71	0.75	0.79	0.82
32	0.27	0.38	0.46	0.54	0.60	0.66	0.71	0.76	0.80	0.85	0.89	0.93
40	0.30	0.42	0.52	0.60	0.67	0.73	0.79	0.85	0.90	0.95	0.99	1.04
50	0.34	0.47	0.58	0.67	0.75	0.82	0.89	0.95	1.01	1.06	1.11	1.16
63	0.38	0.53	0.65	0.75	0.84	0.92	1.00	1.06	1.13	1.19	1.25	1.30
75	0.41	0.58	0.71	0.82	0.92	1.01	1.09	1.16	1.23	1.30	1.36	1.42
90	0.45	0.64	0.78	0.90	1.01	1.10	1.19	1.27	1.35	1.42	1.49	1.56
110	0.50	0.70	0.86	0.99	1.11	1.22	1.32	1.41	1.49	1.57	1.65	1.72

Q-THERM

4.5.3.2 Expansion Loop Technique

In this technique, linear expansion is compensated by installing expansion loop using long and straight pipes in the piping network as shown in figure I.

Q-therm recommends to use this technique in cases where linear expansion cannot be compensated by bending technique.



(Figure I)

The width (W_{EL}) and the bend length (L_{BL}) of the expansion loop are calculated as per the formula stated below.

$W_{EL} = 2 \times \Delta L + SL$ and $L_{BL} = K \times \sqrt{d \times \Delta L}$

Where ΔL = Linear Expansion in mm
SL = Safety length (150 mm)
d = Outside Pipe Diameter in mm
K = Material Specific constant

The Material Specific constant (K) for Q-therm pipes is 15.

Q-therm reccomends using a safety length (SL) of 150 mm and a minimum width of expansion loop (W_{EL}) of 200 mm .

4.5.4 THERMAL INSULATION

Q-Therm Products offers significantly higher degree of insulation properties due to its low coefficient of thermal conductivity of 0.15W/ (mK). Due to its high insulation properties, the insulation thickness can be reduced according to the following minimum insulation thickness.

Hot Water Pipe Applications		
Pipe Diameter (mm)	Insulation Thickness (mm) λ = 0.040 W/ (mK)	
	50%	100%
20	9.7	21.6
25	9.3	21
32	14.4	32.2
40	13.9	31.2
50	13.2	30.2
63	19	42.9
75	22.6	51.1
90	27.1	61.3
110	33.1	74.7

Cold Water Pipe Applications	
Type of Installation	Insulation Thickness λ = 0.040 W/ (mK)
Exposed installed pipe, unheated room	4 mm
Exposed installed pipe, heated room	9 mm
Pipe in duct, without hot water pipes	4 mm
Pipe in duct, besides hot water pipes	13 mm
Pipe in Risers	4 mm
Pipe in Risers, besides hot water pipes	13 mm
Pipe on concrete floor	4 mm

4.5.5 Installation Methods

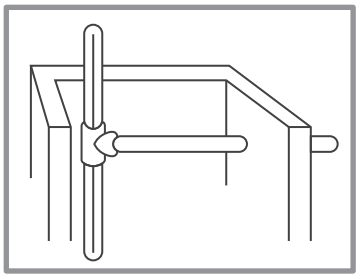
This section specifies some of the various methods of installation of Q-therm piping networks by the end user.

4.5.5.1 Concealed Installation

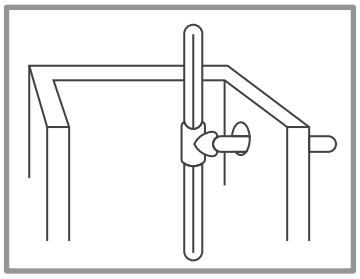
In this method of installation, Q-therm piping network is embedded within the walls, floor or concrete slabs and they don't require any consideration for linear expansion. The compressive strain and tensile stresses arising are absorbed by the material itself.

4.5.5.2 Duct Installation

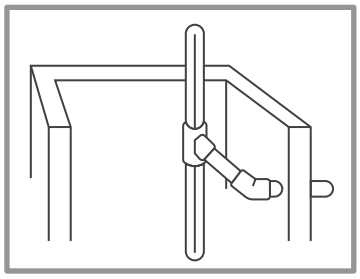
In this method of installation, branches are very common and these branches can be used to compensate linear expansion either by increasing the length of the branch in the utility duct (fig M), adequate large pipe sleeve to the branching pipe (figure N) or by creating a elbow branch corner (figure O).



(Figure M)



(Figure N)



(Figure O)

4.5.5.3 Exposed Installation

In this method of installation, Q-therm pipes are installed either on the surface of walls, floors or concrete slabs and requires a thorough study of linear expansion and clamping intervals during the design stage of Q-therm piping networks. Linear expansion and clamping intervals have been discussed in detail in above mentioned sections.

Cold water piping networks doesn't require any considerations for linear expansion. It is recommended to have expansion control after 10 meters of straight pipelines.

Q-THERM

4.6 CALCULATION GUIDELINES FOR PIPING NETWORK

Numerous guidelines are required to determine the pipe diameter in potable networks such as pressure loss in pipes, length of the piping network, maximum permissible flow rate, quantity and size of the water points connected, minimum supply pressure including pressure boosters, head variations, pressure reduction using pressure release valves, pressure loss by filters or softeners, Pipe pressure loss and co-efficient of loss for fittings.

Q-therm recommends using DIN1988 (Part 3) which specifies the calculation guidelines for the determination of the pipe diameter. The revised version of DIN 1988 provides simplified and differentiated methods of calculation.

The simplified method is suitable for clearly arranged pipes as in residential buildings. Differentiated methods offer the highest accuracy as well as the most accurate approximation of real operating conditions.

The pipe friction factor (R) and the calculated flow rate (v) for Q-therm pipes can be taken from the following tables.

Pressure losses and Flow rate for Q-therm Solid PN 20/ SDR 6 PIPE										
Temperature: 20^{0}C, Roughness: 0.0070mm, Density:998.2 Kg/m^{3}, Viscosity: 1.004 x 10^{-6}m^{2}/s										
V	Diameter	20mm	25mm	32mm	40mm	50mm	63mm	75mm	90mm	110mm
0.01 l/s	R	0.13	0.04	0.01	0.01	0.00	0.00	0.00	0.00	0.00
	v	0.07	0.05	0.03	0.02	0.01	0.01	0.01	0.00	0.00
0.02 l/s	R	0.41	0.14	0.04	0.02	0.01	0.00	0.00	0.00	0.00
	v	0.15	0.09	0.06	0.04	0.02	0.01	0.01	0.01	0.00
0.03 l/s	R	0.81	0.28	0.09	0.03	0.01	0.00	0.00	0.00	0.00
	v	0.22	0.14	0.08	0.05	0.03	0.02	0.02	0.01	0.01
0.04 l/s	R	1.32	0.45	0.14	0.05	0.02	0.01	0.00	0.00	0.00
	v	0.29	0.18	0.11	0.07	0.05	0.03	0.02	0.01	0.01
0.05 l/s	R	1.94	0.66	0.21	0.07	0.02	0.01	0.00	0.00	0.00
	v	0.37	0.23	0.14	0.09	0.06	0.04	0.03	0.02	0.01
0.06 l/s	R	2.66	0.90	0.28	0.10	0.03	0.01	0.01	0.00	0.00
	v	0.44	0.28	0.17	0.11	0.07	0.04	0.03	0.02	0.01
0.07 l/s	R	3.47	1.17	0.37	0.13	0.04	0.01	0.01	0.00	0.00
	v	0.51	032.	0.20	0.13	0.08	0.05	0.04	0.02	0.02
0.08 l/s	R	4.38	1.47	0.46	0.16	0.05	0.02	0.01	0.00	0.00
	v	0.58	0.37	0.23	0.14	0.09	0.06	0.04	0.03	0.02
0.09 l/s	R	5.37	1.81	0.57	0.19	0.07	0.02	0.01	0.00	0.00
	v	0.66	0.42	0.25	0.16	0.10	0.06	0.05	0.03	0.02
0.10 l/s	R	6.46	2.17	0.68	0.23	0.08	0.03	0.01	0.01	0.00
	v	0.73	0.46	0.28	0.18	0.11	0.07	0.05	0.04	0.02
0.12 l/s	R	8.90	2.98	0.93	0.32	0.11	0.04	0.02	0.01	0.00
	v	0.88	0.55	0.34	0.22	0.14	0.09	0.06	0.04	0.03
0.16 l/s	R	14.79	4.93	1.54	0.52	0.18	.06	0.03	0.01	0.00
	v	1.17	0.74	0.45	0.29	0.18	0.12	0.08	0.06	0.04

Q-THERM

V	Diameter	20mm	25mm	32mm	40mm	50mm	63mm	75mm	90mm	110mm
0.18 l/s	R	18.24	6.07	1.89	0.64	0.22	0.07	0.03	0.01	0.01
	v	1.32	0.83	0.51	0.32	0.21	0.13	0.09	0.06	0.04
0.20 l/s	R	22.00	7.31	2.27	0.77	0.26	0.09	0.04	0.02	0.01
	v	1.46	0.92	0.57	0.36	0.23	0.14	0.10	0.07	0.05
0.30 l/s	R	45.52	15.02	4.63	1.57	0.53	0.18	0.08	0.03	0.01
	v	2.19	1.39	0.85	0.54	0.34	0.22	0.15	0.11	0.07
0.40 l/s	R	76.63	25.16	7.73	2.60	0.88	0.29	0.13	0.05	0.02
	v	2.92	1.85	1.13	0.72	0.46	0.29	0.20	0.14	0.09
0.50 l/s	R	115.12	37.63	11.51	3.86	1.30	0.43	0.19	0.08	0.03
	v	3.65	2.31	1.42	0.90	0.57	0.36	0.25	0.18	0.12
0.60 l/s	R	160.87	52.38	15.97	5.34	1.79	0.60	0.26	0.11	0.04
	v	4.38	2.77	1.70	1.08	0.60	043	0.31	0.21	0.14
0.70 l/s	R	213.78	69.37	21.09	7.04	2.35	0.79	0.34	0.14	0.05
	v	5.12	3.23	1.98	1.26	0.80	0.51	0.36	0.25	0.17
0.80 l/s	R	273.78	88.57	26.85	8.94	2.99	1.00	0.43	0.18	0.07
	v	5.85	3.70	2.27	1.44	0.91	0.58	0.41	0.28	0.19
0.90 l/s	R	340.84	109.97	33.25	11.05	3.69	1.23	0.53	0.22	0.09
	v	6.58	4.16	2.55	1.62	1.03	0.65	0.46	.032	0.21
1.00 l/s	R	414.91	133.53	40.28	13.37	4.45	1.48	0.64	0.27	0.10
	v	7.31	4.62	2.83	1.80	1.14	0.72	0.51	0.35	0.24
1.20 l/s	R	584.00	187.12	56.21	18.60	6.17	2.05	0.89	0.37	0.14
	v	8.77	5.54	3.40	2.16	1.37	0.87	0.61	0.42	0.28
1.40 l/s	R	780.86	249.26	74.61	24.61	8.15	2.70	1.17	0.49	0.19
	v	10.23	6.47	3.97	2.52	1.60	1.01	0.71	0.50	0.33
1.60 l/s	R	1005.40	319.89	95.44	31.40	10.38	3.43	1.48	0.62	0.24
	v	11.69	7.39	4.53	2.88	1.83	1.15	0.81	0.57	0.38
1.80 l/s	R	1257.54	398.96	118.68	38.95	12.85	4.24	1.83	0.76	0.29
	v	13.15	8.32	5.10	3.24	2.05	1.30	0.92	0.64	0.43
2.00 l/s	R	1537.22	486.44	144.32	47.26	15.56	5.12	2.21	0.92	0.35
	v	14.61	9.24	5.67	3.60	2.28	1.44	1.02	0.71	0.47
2.20 l/s	R	1844.39	582.30	172.34	56.32	18.51	6.09	2.62	1.09	0.41
	v	16.08	10.17	6.23	3.96	2.51	1.59	1.12	0.78	0.52
2.40 l/s	R	2179.03	686.53	202.74	66.13	21.70	7.12	3.07	1.27	0.48
	v	17.54	11.09	6.80	4.32	2.74	1.73	1.22	0.85	0.57
2.60 l/s	R	2541.12	799.10	235.50	76.68	25.12	8.24	3.54	1.47	0.56
	v	19.00	12.01	7.37	4.68	2.97	1.88	1.32	0.92	0.61
2.80 l/s	R	2930.62	920.01	270.62	87.97	28.78	9.42	4.05	1.68	0.64
	v	20.64	12.94	7.93	5.04	3.20	2.02	1.43	0.99	0.66
3.00 l/s	R	3347.53	1049.24	308.09	100.00	32.66	10.68	4.59	1.90	0.72
	v	21.92	13.86	8.50	5.40	3.42	2.17	1.53	1.06	0.71
3.20 l/s	R	3791.84	1186.78	347.91	112.75	36.78	12.02	5.15	2.13	0.81
	v	23.38	14.79	9.07	5.76	3.65	2.31	1.63	1.13	0.76
3.40 l/s	R	4263.53	1332.63	390.07	126.24	41.13	13.42	5.75	2.38	0.90
	v	24.85	15.71	9.63	6.12	3.88	2.45	1.73	1.20	0.80

Q-THERM

V	Diameter	20mm	25mm	32mm	40mm	50mm	63mm	75mm	90mm	110mm
3.60 l/s	R	4762.59	1486.78	434.56	140.46	45.71	14.90	6.38	2.64	1.00
	v	26.31	16.63	10.20	4.48	4.11	2.60	1.83	1.27	0.85
3.80 l/s	R	5289.02	1649.23	481.40	155.40	50.51	16.45	7.04	2.91	1.10
	v	27.77	17.56	10.77	6.84	4.34	2.74	1.94	1.34	0.90
4.00 l/s	R	5842.81	1819.97	530.56	1717.07	55.54	18.07	7.73	3.19	1.21
	v	29.23	18.48	11.33	7.20	4.57	2.89	2.04	1.41	095
4.20 l/s	R	6423.96	1998.99	582.05	187.46	60.80	19.77	8.45	3.49	1.32
	v	30.69	19.41	11.90	7.56	4.79	3.03	2.14	1.49	0.99
4.40 l/s	R	7032.46	2186.30	635.87	204.57	66.28	21.53	9.20	3.80	1.43
	v	32.15	20.33	12.46	7.92	5.02	3.18	2.24	1.56	1.04
4.60 l/s	R	7668.31	2381.89	692.02	222.41	71.99	23.36	9.98	4.12	1.55
	v	33.61	21.25	13.03	8.28	5.25	3.32	2.34	1.63	1.09
4.80 l/s	R	8331.50	2585.76	750.49	240.96	77.92	25.27	10.78	4.45	1.68
	v	35.08	22.18	13.60	8.64	5.48	3.46	2.44	1.70	1.13
5.00 l/s	R	9022.03	2797.90	811.28	260.24	84.08	27.24	11.62	4.79	1.81
	v	36.54	23.10	14.16	9.00	5.71	3.61	2.55	1.77	1.18
5.20 l/s	R	9739.91	3018.31	874.39	290.23	90.46	29.28	12.49	5.14	1.94
	v	38.00	24.03	14.73	9.36	5.94	3.75	2.65	1.84	1.23
5.40 l/s	R	10485.12	3247.00	939.82	300.96	97.06	31.40	13.38	5.51	2.07
	v	39.46	24.95	15.30	9.72	6.16	3.90	2.75	1.91	1.28
5.60 l/s	R	11257.66	3483.96	1007.57	322.36	103.89	33.58	14.30	5.89	2.22
	v	40.92	25.88	15.86	10.08	6.39	4.04	2.85	1.98	1.32
5.80 l/s	R	12057.54	3729.18	1077.64	344.50	110.94	35.83	15.25	6.28	2.36
	v	42.38	26.80	16.43	10.44	6.62	4.19	2.95	2.05	1.37
6.00 l/s	R	12884.75	3982.67	1150.02	367.36	118.21	38.15	16.23	6.68	2.51
	v	43.84	27.72	17.00	10.80	6.85	4.33	3.06	2.12	1.42
6.20 l/s	R	13739.29	4244.43	1224.72	390.93	125.70	40.54	17.24	7.09	2.66
	v	45.31	28.65	17.56	11.16	7.08	4.48	3.16	2.19	1.47
6.40 l/s	R	14621.17	4514.45	1301.73	415.22	133.41	43.00	18.28	7.51	2.82
	v	46.77	29.57	18.13	11.52	7.30	4.62	3.26	2.26	1.51
6.60 l/s	R	15530.37	4792.74	1381.05	440.22	141.35	45.53	19.35	7.95	2.99
	v	48.23	30.50	18.70	11.88	7.53	4.76	3.36	2.33	1.56
6.80 l/s	R	16466.89	5079.29	1462.69	465.93	149.50	48.12	20.44	8.39	3.15
	v	49.69	31.42	19.26	12.24	7.76	4.91	3.46	2.41	1.61
7.00 l/s	R	17430.75	5374.10	1546.64	492.36	157.88	50.79	21.56	8.85	3.32
	v	51.15	32.34	19.83	12.60	7.99	5.05	3.57	2.48	1.65
7.50 l/s	R	19959.93	6147.28	1766.63	561.54	179.78	57.75	24.49	10.04	3.77
	v	54.81	34.65	21.25	13.50	8.56	5.41	3.82	2.65	1.77
8.00 l/s	R	22659.89	6972.08	2001.06	635.17	203.05	65.13	27.60	11.31	4.24
	v	58.46	36.96	22.66	14.40	9.13	5.77	4.07	2.83	1.89
9.00 l/s	R	28572.11	8776.52	2513.23	795.77	253.72	81.18	34.33	14.04	5.25
	v	65.77	41.59	25.50	16.20	10.27	6.50	4.58	3.18	2.13
10.0 l/s	R		10787.40	3083.09	974.11	309.86	98.90	41.76	17.05	6.37
	v		46.21	28.33	17.99	11.41	7.22	5.09	3.54	2.36

Q-THERM

V	Diameter	20mm	25mm	32mm	40mm	50mm	63mm	75mm	90mm	110mm
12.0 l/s	R		15428.32	4395.84	1383.98	438.49	139.40	58.69	23.89	8.90
	v		55.45	34.00	21.59	13.70	8.66	6.11	4.24	2.84
14.0 l/s	R		20894.66	5939.17	1864.66	588.89	186.56	78.35	31.82	11.83
	v		64.69	39.66	25.19	15.98	10.11	7.13	4.95	3.31
16.0 l/s	R			7712.99	2416.10	760.99	240.38	100.73	40.82	15.14
	v			45.33	28.79	18.26	11.55	8.15	5.66	3.78
18.0 l/s	R			9717.25	3038.24	954.77	300.83	125.81	50.88	18.84
	v			50.99	32.39	20.54	12.99	9.17	6.37	4.25
20.0 l/s	R			11951.91	3731.06	1170.21	367.89	153.59	62.01	22.91
	v			56.66	35.99	22.83	14.44	10.19	7.07	4.73
22.0 l/s	R			14416.97	4494.54	1407.28	441.56	184.05	74.19	27.37
	v			62.32	39.59	25.11	15.88	11.20	7.78	5.20
24.0 l/s	R			17112.39	5328.65	1665.98	521.81	217.19	87.41	32.19
	v			67.99	43.19	27.39	17.32	12.22	8.49	5.67
26.0 l/s	R				6233.40	1946.30	608.66	253.01	101.69	37.40
	v				46.79	29.68	18.77	13.24	9.20	6.14
28.0 l/s	R				7208.77	2248.23	702.08	291.50	117.01	42.97
	v				50.39	31.96	20.21	14.26	9.90	6.62
30.0 l/s	R				8254.76	2571.76	802.08	332.65	133.38	48.92
	v				53.98	34.24	21.65	15.28	10.61	7.09
32.0 l/s	R				9371.36	2916.89	908.66	376.48	150.78	55.24
	v				57.58	36.52	23.10	16.30	11.32	7.56
34.0 l/s	R				10558.56	3283.62	1021.81	422.96	169.23	61.93
	v				61.18	38.81	24.54	17.32	12.03	8.04
3.60 l/s	R				11816.37	3671.94	1141.52	472.11	188.71	68.99
	v				64.78	41.09	25.98	18.33	12.73	8.51
38.0 l/s	R					4081.85	1267.80	523.92	209.23	76.41
	v					43.37	27.43	19.35	13.44	8.98
40.0 l/s	R					4513.35	1400.65	578.39	230.79	84.20
	v					45.65	28.87	20.37	14.15	9.45
42.0 l/s	R					4966.44	1540.06	635.51	253.38	92.36
	v					47.94	30.32	21.39	14.85	9.93
2.40 l/s	R					5441.11	1686.03	695.29	277.00	100.89
	v					50.22	31.76	22.41	15.56	10.40
46.0 l/s	R					5937.36	1838.56	757.73	301.66	109.78
	v					52.50	33.20	23.43	16.27	10.87
48.0 l/s	R					6455.20	1997.65	822.82	327.35	119.03
	v					54.78	34.65	24.45	16.98	11.34
50.0 l/s	R					6994.62	2163.29	890.56	354.08	128.65
	v					57.07	36.09	25.46	17.68	11.82
52.0 l/s	R					7555.63	2335.50	960.96	381.84	138.64
	v					59.35	3753	26.48	18.39	12.29
54.0 l/s	R					8138.21	2514.27	1034.01	410.63	148.99
	v					61.63	38.98	27.50	19.10	12.76

Q-THERM

V	Diameter	20mm	25mm	32mm	40mm	50mm	63mm	75mm	90mm	110mm
56.0 l/s	R					8742.37	2699.59	1109.71	440.45	159.71
	v					63.92	40.42	28.52	19.81	13.23
58.0 l/s	R					9368.11	2891.46	1188.06	471.30	170.79
	v					66.20	41.86	29.54	20.51	13.71
60.0 l/s	R						3089.90	1269.07	503.18	182.23
	v						43.31	30.56	21.22	14.18
62.0 l/s	R						3294.89	1352.72	536.09	194.04
	v						44.75	31.58	21.93	14.65
64.0 l/s	R						3506.43	1439.03	570.04	206.21
	v						46.19	32.59	22.64	15.13
66.0 l/s	R						3724.53	1527.99	605.01	218.74
	v						47.64	33.61	23.34	15.60
68.0 l/s	R						3949.18	1619.59	641.01	231.64
	v						49.08	34.63	24.05	16.07
70.0 l/s	R						4180.39	1713.85	678.05	244.89
	v						50.53	35.65	24.76	16.54
72.0 l/s	R						4418.16	1810.76	716.11	258.52
	v						51.97	36.67	25.46	17.02
74.0 l/s	R						4662.47	1910.31	755.20	272.50
	v						53.41	37.69	26.17	17.49
76.0 l/s	R						4913.34	2012.52	795.32	286.85
	v						54.86	38.71	26.88	17.96
78.0 l/s	R						5170.76	2117.38	836.47	301.56
	v						56.30	39.73	27.59	18.43

V = Volumetric current (l/s), R = Pressure gradient (mbar/m), v =Flow rate (m/s)

Pressure losses and Flow rate for Q-therm Solid PN 16/ SDR 7.4 PIPE										
Temperature: 20^{0}C, Roughness: 0.0070mm, Density:998.2 Kg/m^{3}, Viscosity: 1.004 x 10^{-6}m^{2}/s										
V	Diameter	20mm	25mm	32mm	40mm	50mm	63mm	75mm	90mm	110mm
0,01 l/s	R	0,09	0,03	0,01	0,00	0,00	0,00	0,00	0,00	0,00
	v	0,06	0,04	0,02	0,02	0,01	0,01	0,00	0,00	0,00
0,02 l/s	R	0,27	0,10	0,03	0,01	0,00	0,00	0,00	0,00	0,00
	v	0,12	0,08	0,05	0,03	0,02	0,01	0,01	0,01	0,00
0,03 l/s	R	0,54	0,19	0,06	0,02	0,01	0,00	0,00	0,00	0,00
	v	0,18	0,12	0,07	0,05	0,03	0,02	0,01	0,01	0,01
0,04 l/s	R	0,88	0,31	0,09	0,03	0,01	0,00	0,00	0,00	0,00
	v	0,25	0,16	0,09	0,06	0,04	0,02	0,02	0,01	0,01
0,05 l/s	R	1,28	0,45	0,14	0,05	0,02	0,01	0,00	0,00	0,00
	v	0,31	0,20	0,12	0,08	0,05	0,03	0,02	0,01	0,01
0,06 l/s	R	1,76	0,61	0,18	0,06	0,02	0,01	0,00	0,00	0,00
	v	0,37	0,24	0,14	0,09	0,06	0,04	0,03	0,02	0,01

Q-THERM

V	Diameter	20mm	25mm	32mm	40mm	50mm	63mm	75mm	90mm	110mm
0,07 l/s	R	2,29	0,80	0,24	0,08	0,03	0,01	0,00	0,00	0,00
	v	0,43	0,28	0,17	0,11	0,07	0,04	0,03	0,02	0,01
0,08 l/s	R	2,89	1,00	0,30	0,11	0,04	0,01	0,01	0,00	0,00
	v	0,49	0,31	0,19	0,12	0,08	0,05	0,03	0,02	0,02
0,09 l/s	R	3,55	1,23	0,37	0,13	0,05	0,02	0,01	0,00	0,00
	v	0,55	0,35	0,21	0,14	0,09	0,05	0,04	0,03	0,02
0,10 l/s	R	4,27	1,48	0,44	0,15	0,05	0,02	0,01	0,00	0,00
	v	0,61	0,39	0,24	0,15	0,10	0,06	0,04	0,03	0,02
0,12 l/s	R	5,87	2,03	0,61	0,21	0,07	0,02	0,01	0,00	0,00
	v	0,74	0,47	0,28	0,18	0,12	0,07	0,05	0,04	0,02
0,16 l/s	R	9,74	3,35	1,00	0,35	0,12	0,04	0,02	0,01	0,00
	v	0,98	0,63	0,38	0,24	0,16	0,10	0,07	0,05	0,03
0,18 l/s	R	12,00	4,12	1,23	0,43	0,15	0,05	0,02	0,01	0,00
	v	1,11	0,71	0,43	0,27	0,17	0,11	0,08	0,05	0,04
0,20 l/s	R	14,47	4,96	1,48	0,51	0,18	0,06	0,03	0,01	0,00
	v	1,23	0,79	0,47	0,30	0,19	0,12	0,09	0,06	0,04
0,30 l/s	R	29,85	10,17	3,01	1,04	0,36	0,12	0,05	0,02	0,01
	v	1,84	1,18	0,71	0,45	0,29	0,18	0,13	0,09	0,06
0,40 l/s	R	50,15	17,00	5,01	1,72	0,60	0,19	0,09	0,04	0,01
	v	2,46	1,57	0,95	0,61	0,39	0,24	0,17	0,12	0,08
0,50 l/s	R	75,21	25,40	7,45	2,55	0,88	0,29	0,13	0,05	0,02
	v	3,07	1,96	1,18	0,76	0,49	0,30	0,22	0,15	0,10
0,60 l/s	R	104,94	35,31	10,33	3,53	1,22	0,40	0,17	0,07	0,03
	v	3,68	2,36	1,42	0,91	0,58	0,36	0,26	0,18	0,12
0,70 l/s	R	139,27	46,72	13,62	4,64	1,60	0,52	0,23	0,10	0,04
	v	4,30	2,75	1,66	1,06	0,68	0,42	0,30	0,21	0,14
0,80 l/s	R	178,15	59,60	17,33	5,90	2,03	0,66	0,29	0,12	0,05
	v	4,91	3,14	1,89	1,21	0,78	0,49	0,34	0,24	0,16
0,90 l/s	R	221,55	73,92	21,45	7,28	2,50	0,81	0,36	0,15	0,06
	v	5,53	3,54	2,13	1,36	0,87	0,55	0,39	0,27	0,18
1,00 l/s	R	269,43	89,69	25,97	8,80	3,02	0,98	0,43	0,18	0,07
	v	6,14	3,93	2,37	1,51	0,97	0,61	0,43	0,30	0,20
1,20 l/s	R	378,58	125,51	36,19	12,23	4,19	1,35	0,59	0,25	0,09
	v	7,37	4,72	2,84	1,82	1,17	0,73	0,52	0,36	0,24
1,40 l/s	R	505,47	166,98	47,97	16,17	5,52	1,78	0,78	0,32	0,12
	v	8,60	5,50	3,31	2,12	1,36	0,85	0,60	0,42	0,28
1,60 l/s	R	650,00	214,05	61,29	20,61	7,03	2,26	0,99	0,41	0,16
	v	9,82	6,29	3,78	2,42	1,55	0,97	0,69	0,48	0,32
1,80 l/s	R	812,11	266,69	76,14	25,55	8,69	2,79	1,22	0,50	0,19
	v	11,05	7,07	4,26	2,73	1,75	1,09	0,77	0,54	0,36
2,00 l/s	R	991,77	324,88	92,51	30,97	10,52	3,37	1,47	0,61	0,23
	v	12,28	7,86	4,73	3,03	1,94	1,21	0,86	0,60	0,40
2,20 l/s	R	1188,92	388,58	110,38	36,89	12,51	4,00	1,75	0,72	0,28
	v	13,51	8,65	5,20	3,33	2,14	1,34	0,95	0,65	0,44

Q-THERM

V	Diameter	20mm	25mm	32mm	40mm	50mm	63mm	75mm	90mm	110mm
2,40 l/s	R	1403,55	457,79	129,75	43,28	14,66	4,68	2,04	0,84	0,32
	v	14,74	9,43	5,68	3,63	2,33	1,46	1,03	0,71	0,48
2,60 l/s	R	1635,62	532,49	150,61	50,15	16,96	5,41	2,36	0,97	0,37
	v	15,96	10,22	6,15	3,94	2,53	1,58	1,12	0,77	0,52
2,80 l/s	R	1885,14	612,68	172,95	57,51	19,42	6,19	2,69	1,11	0,43
	v	17,19	11,00	6,62	4,24	2,72	1,70	1,20	0,83	0,56
3,00 l/s	R	2152,07	698,33	196,77	65,33	22,04	7,02	3,05	1,25	0,48
	v	18,42	11,79	7,10	4,54	2,91	1,82	1,29	0,89	0,60
3,20 l/s	R	2436,42	789,45	222,07	73,63	24,81	7,89	3,43	1,41	0,54
	v	19,65	12,58	7,57	4,84	3,11	1,94	1,38	0,95	0,64
3,40 l/s	R	2738,16	886,03	248,84	82,39	27,73	8,81	3,82	1,57	0,60
	v	20,88	13,36	8,04	5,15	3,30	2,06	1,46	1,01	0,68
3,60 l/s	R	3057,30	988,06	277,08	91,63	30,80	9,78	4,24	1,74	0,67
	v	22,10	14,15	8,52	5,45	3,50	2,19	1,55	1,07	0,72
3,80 l/s	R	3393,82	1095,53	306,79	101,33	34,02	10,79	4,68	1,92	0,74
	v	23,33	14,93	8,99	5,75	3,69	2,31	1,63	1,13	0,76
4,00 l/s	R	3747,73	1208,45	337,96	111,50	37,40	11,85	5,13	2,11	0,81
	v	24,56	15,72	9,46	6,06	3,89	2,43	1,72	1,19	0,80
4,20 l/s	R	4119,01	1326,81	370,59	122,13	40,93	12,95	5,61	2,30	0,88
	v	25,79	16,50	9,94	6,36	4,08	2,55	1,81	1,25	0,84
4,40 l/s	R	4507,66	1450,61	404,68	133,23	44,60	14,10	6,11	2,50	0,96
	v	27,02	17,29	10,41	6,66	4,28	2,67	1,89	1,31	0,88
4,60 l/s	R	4913,68	1579,84	440,23	144,79	48,43	15,30	6,62	2,71	1,04
	v	28,25	18,08	10,88	6,96	4,47	2,79	1,98	1,37	0,92
4,80 l/s	R	5337,07	1714,51	477,24	156,81	52,40	16,54	7,15	2,93	1,12
	v	29,47	18,86	11,35	7,27	4,66	2,91	2,07	1,43	0,96
5,00 l/s	R	5777,81	1854,60	515,71	169,29	56,53	17,83	7,71	3,15	1,21
	v	30,70	19,65	11,83	7,57	4,86	3,03	2,15	1,49	1,00
5,20 l/s	R	6235,92	2000,12	555,63	182,23	60,80	19,16	8,28	3,39	1,29
	v	31,93	20,43	12,30	7,87	5,05	3,16	2,24	1,55	1,04
5,40 l/s	R	6711,39	2151,07	597,00	195,64	65,22	20,54	8,87	3,63	1,39
	v	33,16	21,22	12,77	8,18	5,25	3,28	2,32	1,61	1,08
5,60 l/s	R	7204,21	2307,44	639,83	209,50	69,78	21,96	9,48	3,87	1,48
	v	34,39	22,01	13,25	8,48	5,44	3,40	2,41	1,67	1,12
5,80 l/s	R	7714,39	2469,24	684,11	223,82	74,50	23,43	10,11	4,13	1,58
	v	35,61	22,79	13,72	8,78	5,64	3,52	2,50	1,73	1,16
6,00 l/s	R	8241,92	2636,46	729,84	238,60	79,36	24,94	10,76	4,39	1,68
	v	36,84	23,58	14,19	9,08	5,83	3,64	2,58	1,79	1,20
6,20 l/s	R	8786,80	2809,10	777,02	253,84	84,37	26,50	11,42	4,66	1,78
	v	38,07	24,36	14,67	9,39	6,02	3,76	2,67	1,85	1,24
6,40 l/s	R	9349,04	2987,16	825,65	269,53	89,52	28,10	12,11	4,94	1,88
	v	39,30	25,15	15,14	9,69	6,22	3,88	2,75	1,91	1,28
6,60 l/s	R	9928,62	3170,64	875,73	285,68	94,82	29,74	12,81	5,23	1,99
	v	40,53	25,94	15,61	9,99	6,41	4,01	2,84	1,96	1,32

Q-THERM

V	Diameter	20mm	25mm	32mm	40mm	50mm	63mm	75mm	90mm	110mm
6,80 l/s	R	10525,55	3359,54	927,25	302,29	100,27	31,43	13,53	5,52	2,10
	v	41,75	26,72	16,09	10,29	6,61	4,13	2,93	2,02	1,36
7,00 l/s	R	11139,83	3553,86	980,23	319,36	105,86	33,16	14,27	5,82	2,22
	v	42,98	27,51	16,56	10,60	6,80	4,25	3,01	2,08	1,40
7,50 l/s	R	12751,43	4063,35	1119,00	364,01	120,49	37,69	16,21	6,60	2,51
	v	46,05	29,47	17,74	11,35	7,29	4,55	3,23	2,23	1,50
8,00 l/s	R	14471,43	4606,69	1266,81	411,52	136,02	42,49	18,25	7,43	2,82
	v	49,12	31,44	18,92	12,11	7,77	4,86	3,44	2,38	1,60
9,00 l/s	R	18236,63	5794,90	1589,53	515,05	169,80	52,90	22,69	9,22	3,50
	v	55,26	35,37	21,29	13,63	8,74	5,46	3,87	2,68	1,80
10,0 l/s	R	-	7118,43	1948,35	629,93	207,19	64,40	27,58	11,19	4,24
	v	-	39,30	23,66	15,14	9,72	6,07	4,30	2,98	2,00
12,0 l/s	R	-	10171,36	2774,23	893,66	292,78	90,64	38,70	15,66	5,92
	v	-	47,16	28,39	18,17	11,66	7,28	5,16	3,57	2,40
14,0 l/s	R	-	13765,32	3744,31	1202,62	392,73	121,15	51,60	20,83	7,86
	v	-	55,02	33,12	21,20	13,60	8,50	6,02	4,17	2,80
16,0 l/s	R	-		4858,51	1556,75	506,99	155,92	66,27	26,69	10,05
	v	-	-	37,85	24,22	15,55	9,71	6,88	4,76	3,20
18,0 l/s	R	-	-	6116,78	1956,00	635,54	194,94	82,70	33,24	12,50
	v	-	-	42,58	27,25	17,49	10,93	7,74	5,36	3,60
20,0 l/s	R	-	-	7519,10	2400,35	778,35	238,19	100,87	40,48	15,19
	v	-	-	47,31	30,28	19,43	12,14	8,60	5,95	4,00
22,0 l/s	R	-	-	9065,44	2889,78	935,41	285,66	120,79	48,39	18,13
	v	-	-	52,04	33,31	21,38	13,35	9,47	6,55	4,40
24,0 l/s	R	-	-	10755,78	3424,28	1106,72	337,35	142,44	56,98	21,32
	v	-	-	56,77	36,34	23,32	14,57	10,33	7,14	4,80
26,0 l/s	R	-	-	-	4003,83	1292,25	393,24	165,83	66,25	24,75
	v	-	-	-	39,36	25,26	15,78	11,19	7,74	5,20
28,0 l/s	R	-	-	-	4628,43	1492,01	453,33	190,94	76,18	28,43
	v	-	-	-	42,39	27,21	17,00	12,05	8,34	5,60
30,0 l/s	R	-	-	-	5298,07	1705,99	517,63	217,78	86,79	32,35
	v	-	-	-	45,42	29,15	18,21	12,91	8,93	6,00
32,0 l/s	R	-	-	-	6012,75	1934,18	586,12	246,35	98,06	36,51
	v	-	-	-	48,45	31,09	19,42	13,77	9,53	6,40
34,0 l/s	R	-	-	-	6772,46	2176,59	658,81	276,64	110,00	40,91
	v	-	-	-	51,47	33,03	20,64	14,63	10,12	6,80
36,0 l/s	R	-	-	-	7577,20	2433,21	735,69	308,65	122,61	45,55
	v	-	-	-	54,50	34,98	21,85	15,49	10,72	7,20
38,0 l/s	R	-	-	-	-	2704,03	816,76	342,38	135,89	50,43
	v	-	-	-	-	36,92	23,07	16,35	11,31	7,60
40,0 l/s	R	-	-	-	-	2989,06	902,01	377,83	149,83	55,55
	v	-	-	-	-	38,86	24,28	17,21	11,91	8,00
42,0 l/s	R	-	-	-	-	3288,29	991,46	414,99	164,43	60,91
	v	-	-	-	-	40,81	25,49	18,07	12,50	8,40

Q-THERM

V	Diameter	20mm	25mm	32mm	40mm	50mm	63mm	75mm	90mm	110mm
44,0 l/s	R	-	-	-	-	3929,35	1085,09	453,87	179,69	66,51
	v	-	-	-	-	44,69	26,71	18,93	13,10	8,80
46,0 l/s	R	-	-	-	-	4271,18	1182,90	494,47	195,62	72,35
	v	-	-	-	-	46,64	27,92	19,79	13,69	9,20
48,0 l/s	R	-	-	-	-	4627,22	1284,90	536,78	212,21	78,43
	v	-	-	-	-	48,58	29,14	20,65	14,29	9,60
50,0 l/s	R	-	-	-	-	4997,44	1391,08	580,81	229,47	84,74
	v	-	-	-	-	50,52	30,35	21,51	14,88	10,00
52,0 l/s	R	-	-	-	-	5381,87	1501,45	626,55	247,38	91,29
	v	-	-	-	-	52,47	31,56	22,37	15,48	10,40
54,0 l/s	R	-	-	-	-	5780,49	1616,00	674,00	265,95	98,08
	v	-	-	-	-	54,41	32,78	23,23	16,07	10,80
56,0 l/s	R	-	-	-	-	6193,31	1734,73	723,17	285,19	105,10
	v	-	-	-	-	56,35	33,99	24,09	16,67	11,20
58,0 l/s	R	-	-	-	-	-	1857,64	774,05	305,08	112,36
	v	-	-	-	-	-	35,21	24,95	17,27	11,60
60,0 l/s	R	-	-	-	-	-	1984,73	826,64	325,64	119,86
	v	-	-	-	-	-	36,42	25,81	17,86	12,00
62,0 l/s	R	-	-	-	-	-	2116,00	880,94	346,85	127,59
	v	-	-	-	-	-	37,63	26,67	18,46	12,40
64,0 l/s	R	-	-	-	-	-	2251,45	936,96	368,73	135,56
	v	-	-	-	-	-	38,85	27,54	19,05	12,80
66,0 l/s	R	-	-	-	-	-	2391,08	994,68	391,26	143,77
	v	-	-	-	-	-	40,06	28,40	19,65	13,20
68,0 l/s	R	-	-	-	-	-	2534,89	1054,12	414,46	152,21
	v	-	-	-	-	-	41,28	29,26	20,24	13,60
70,0 l/s	R	-	-	-	-	-	2682,88	1115,27	438,31	160,89
	v	-	-	-	-	-	42,49	30,12	20,84	14,00
72,0 l/s	R	-	-	-	-	-	2835,05	1178,12	462,82	169,80
	v	-	-	-	-	-	43,70	30,98	21,43	14,40
74,0 l/s	R	-	-	-	-	-	2991,40	1242,69	487,99	178,95
	v	-	-	-	-	-	44,92	31,84	22,03	14,80
76,0 l/s	R	-	-	-	-	-	3151,92	1308,97	513,82	188,34
	v	-	-	-	-	-	46,13	32,70	22,62	15,20
78,0 l/s	R	-	-	-	-	-	3316,63	1376,96	540,31	197,96
	v	-	-	-	-	-	47,35	33,56	23,22	15,60
80,0 l/s	R	-	-	-	-	-	3485,51	1446,66	567,45	207,81
	v	-	-	-	-	-	48,56	34,42	23,81	16,00
85,0 l/s	R	-	-	-	-	-	3925,99	1628,38	638,19	233,48
	v	-	-	-	-	-	51,59	36,57	25,30	17,00
90,0 l/s	R	-	-	-	-	-	4392,59	1820,79	713,05	260,62
	v	-	-	-	-	-	54,63	38,72	26,79	17,99
95,0 l/s	R	-	-	-	-	-	-	2023,89	792,01	289,22
	v	-	-	-	-	-	-	40,87	28,28	18,99

Q-THERM

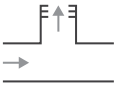
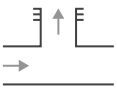
V	Diameter	20mm	25mm	32mm	40mm	50mm	63mm	75mm	90mm	110mm
100,0 l/s	R	-	-	-	-	-	-	2237,66	875,09	319,29
	v	-	-	-	-	-	-	43,02	29,77	19,99
110,0 l/s	R	-	-	-	-	-	-	2697,25	1053,56	383,84
	v	-	-	-	-	-	-	47,33	32,75	21,99
120,0 l/s	R	-	-	-	-	-	-	3199,56	1248,47	454,25
	v	-	-	-	-	-	-	51,63	35,72	23,99
130,0 l/s	R	-	-	-	-	-	-	3744,58	1459,80	530,51
	v	-	-	-	-	-	-	55,93	38,70	25,99
140,0 l/s	R	-	-	-	-	-	-	-	1687,55	612,63
	v	-	-	-	-	-	-	-	41,68	27,99
150,0 l/s	R	-	-	-	-	-	-	-	1931,73	700,61
	v	-	-	-	-	-	-	-	44,65	29,99

V-Volumetric Current (l/s), R- Pressure losses (mbar/m), v-Flow rate (m/s)

Loss Co-efficient (r) in Fittings

Fitting	Symbol	Remark	r value
Socket			0.25
Reducer		Reduction	
		1 step	0.40
		2 steps	0.50
		3 steps	0.60
		4 steps	0.70
		5 steps	0.80
		6 steps	0.90
Elbow 90°			1.20
Elbow 45°			0.50
Tee		Passage in case of separation of flow	
		Separation of flow	1.20
		Conjunction of flow	0.80
		Counter current in case of separation of flow	1.80
		Counter current in case of conjunction of flow	3.00

Q-THERM

Fitting	Symbol	Comment	r value
Reducing tee	The r - Value results from the addition of tee and reducer		
Cross		Separation of flow	2.10
		Conjunction of flow	3.70
Female Threaded Adaptor			0.50
Male Threaded Adaptor			0.70
Female Threaded Elbow			1.40
Male Threaded Elbow			1.60
Female Threaded Tee		20 x 3/4" x 20	1.40
		20 x 1/2" x 20	1.60
		25 x 3/4" x 25	
		32 x 1" x 32	
		25 x 1/2" x 25	1.80
		32 x 3/4" x 32	
Male Threaded Tee		20 x 1/2" x 20	1.80

4.7 HANDLING, TRANSPORT AND STORAGE

4.7.1 Handling

1. During the installation process, utmost care should be taken to prevent damages by nicks and cuts to Q-therm pipes surface.
2. When temperatures get close to 0^0C, Q-therm products tends to become fragile. Extra care is specially required when cutting the pipes.
3. In case of mechanical handling, use protective sling and padded supports. Avoid using metal chains and hooks as it will damage the pipe surface.

4.7.2 TRANSPORT

1. Always support Q-therm pipes along their full length during transport.
2. Avoid crossing, bending and over stacking of Q-therm pipes during transport to avoid deformation.

4.7.3 STORAGE

1. Always Store Q-therm products in clean and dry areas away from direct sunlight and UV radiation
2. The maximum height of Q-therm pipes arranged in a pallet should not exceed height of 1.5meters.
3. Always support the pipe along their full length by a solid base to avoid deformation of the pipes.
4. for temporary outdoor storage or at site, Cover Q-therm products from direct sunlight using tarpaulin sheets to avoid UV radiation.

QUALITY ASSURANCE

Quality Control & Assurance:

Quantum Quality Definition:

As quality is a subjective term for which each person has his own definition, we in Quantum Industries chose to have a definition that can serve as a way of life, stemming from all what we believed that quality should be, acting as the backbone of the quality culture we aspire to cultivate, not only in the products we make, but also in everything we do, as we know that quality is not luxury, it's a matter of existence.

Our definition of quality is dynamic, improving and evolving, it's alive definition, but is always resting on our five quality pillars, the 5C's:

01  Compliance with international norms and standards.

02  Customer satisfaction.

03  Commitment to timely delivery.

04  Consistency in all what we do.

05  Cost effectiveness.

Quantum industries quality department ensures that, Q-therm piping systems are produced through a stringent supervision, strict adherence to regulations and proper control of all work related operations. Every carefully observed process and result obtained are recorded and documented.

Q-therm products and its manufacturing processes conform to respective national and international regulations and Q-therm's own Internal Quality System.

Q-therm achieves its desired quality in all its products by using state-of-art machinery, strict process control, regular in-process inspection, adherence to standards and regulations supported with continuous research and development.

QUALITY ASSURANCE

01 Machinery

To obtain products with best quality standards, the machinery to produce them should be equipped with modern technologies, capable of delivering such demanded quality. Q-therm's carefully chosen machineries are specially designed to produce items, which excels in all quality aspects.

02 Testing Incoming Raw Material

One of the contributing factors to Q-therm's quality products is allowing only premium quality raw material to be used in its manufacturing processes. Thorough inspection and tests are conducted to ensure that the incoming material meets the required specification. Materials which do not conform to the specified requirements are not released for production.

03 Process Control

Before each start-up, the related process parameter and machines are checked and approved by QC. A sample taken before the start up of each production is submitted to QC for technicians to test and verify the following:

- Visual Appearance and surface finish of product.
- Dimensional conformance of samples to standards and norms.
- Machine parameter data from Extrusion and Injection Machines.

QUALITY ASSURANCE

Once the test results attained are conforming to the required standards, the acceptance is endorsed by QC. The process mentioned above is embedded in Q-therm's Internal Control System and is performed at the beginning of each production to ensure Q-therm's adherence to its strict quality system procedures.

The production process is continuously monitored in regular intervals and the in-process data are recorded. This helps to alarm if there are any deviations in quality during the entire production process, and facilitates better traceability of the products.

The tests conducted during the production process for each product are;

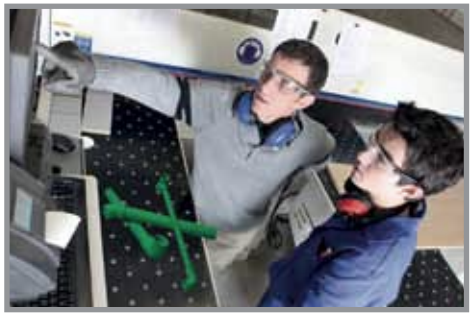
- Dimensional accuracy throughout production process.
- Surface finish and visual appearance of products.
- Impact tests.
- Heat reversion Tests.
- Internal Pressure tests.

04 Final Inspection

All Q-therm products go through inspections and tests conducted by the Quality Department. Once the test results conforms and passes all the pre-defined procedures and specifications, the finished goods are allowed to be released to warehouse for storage and delivery.

05 Employee Training

Apart from designing tight system procedures to ensure quality, Q-therm provides its' employees, a continuous training which supports Q-therm's commitment to deliver supreme quality in its products for all customers. Q-therm's dedicated, qualified and well trained skilled professional supports the internal quality control system of Q-therm products, using top notch QC equipments for their tests and analyses.



STANDARDS:

DIN 8077	Polypropylene (PP) Pipe Dimensions
DIN 8078	Polypropylene (PP) Pipes, general quality requirements testing & chemical resistance of pipes and fittings
DIN 1988	DVGW Code of practice. (Drinking water supply systems; materials, components, appliances, design & installation)
DIN 8076	Standard for testing metal threaded joints
DIN 2999	Standards for fittings with threaded metallic inserts
DIN 16928	Installation, Pipes and fittings connection
DIN 4109	Noise control in Buildings
DIN 4140	Insulation of service installations
DVS 2207	Welding of thermoplastic pipes and fittings
DVS 2208	Welding machines and devises for thermoplastic pipes and fittings
OHSAS 18001	British standard for Health and safely management system
BS 6920	Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of water.

QUALITY ASSURANCE

CERTIFICATIONS:

DVGW
In Process

SKZ
In Process

ISO 9001
In Process

PRODUCT RANGE

PRODUCT RANGE
Pipes

Q-therm (PP-R Solid Pipe)

SDR: 11 / PN 10 | **Standard Color:** Green
Standard: 8077/8078 | **Standard Pipe Length:** 4 meters
Material: PP-R 80

Art. No	Size / mm	Packing Unit
171SP1001	20 x 1.9	25
171SP1002	25 x 2.3	25
171SP1003	32 x 2.9	10
171SP1004	40 x 3.7	10
171SP1005	50 x 4.6	5
171SP1006	63 x 5.8	5
171SP1007	75 x 6.8	4
171SP1009	90 x 8.2	3
171SP1010	110 x 10.0	2

- Unit: pipe 4 meters

Q-therm (PP-R Solid Pipe)

SDR: 7.4 PN 16 | **Standard Color:** Green
Standard: 8077/8078 | **Standard Pipe Length:** 4 meters
Material: PP-R 80

Art. No	Size / mm	Packing Unit
171SP1601	20 x 2.8	25
171SP1602	25 x 3.5	25
171SP1603	32 x 4.4	10
171SP1604	40 x 5.5	10
171SP1605	50 x 6.9	5
171SP1606	63 x 8.6	5
171SP1607	75 x 10.3	4
171SP1609	90 x 12.3	3
171SP1610	110 x 15.1	2

- Unit: pipe 4 meters

PRODUCT RANGE
Pipes

Q-therm (PP-R Solid Pipe)

SDR: 6 / PN 20 | **Standard Color:** Green
Standard: 8077/8078 | **Standard Pipe Length:** 4 meters
Material: PP-R 80

Art. No	Size / mm	Packing Unit
171SP2001	20 x 3.4	25
171SP2002	25 x 4.2	25
171SP2003	32 x 5.4	10
171SP2004	40 x 6.7	10
171SP2005	50 x 8.3	5
171SP2006	63 x 10.5	5
171SP2007	75 x 12.5	4
171SP2009	90 x 15.0	3
171SP2010	110 x 18.3	2

- Unit: pipe 4 meters

Q-therm (PP-R STABI) Aluminun Composite Pipes

SDR: 6 / PN 25 | **Standard Color:** Green
Standard: 8077/8078 | **Standard Pipe Length:** 4 meters
Material: PP-R 80, Aluminum

Art. No	Size / mm	Packing Unit
171ST2501	20 x 3.4	25
171ST2502	25 x 4.2	25
171ST2503	32 x 5.4	10
171ST2504	40 x 6.7	10
171ST2505	50 x 8.3	5
171ST2506	63 x 10.5	5
171ST2507	75 x 12.5	4
171ST2509	90 x 15.0	3
171ST2510	110 x 18.3	2

- Unit: pipe 4 meters

PRODUCT RANGE
Pipes

Q-therm (PP-R STABI) Aluminun Composite Pipes with UV

SDR: 6 / PN 25 | **Standard Color:** Green
Standard: 8077/8078 | **Standard Pipe Length:** 4 meters
Material: PP-R 80, Aluminum

Art. No	Size / mm	Packing Unit
171SU2501	20 x 3.4	25
171SU2502	25 x 4.2	25
171SU2503	32 x 5.4	10
171SU2504	40 x 6.7	10
171SU2505	50 x 8.3	5
171SU2506	63 x 10.5	5
171SU2507	75 x 12.5	4
171SU2509	90 x 15.0	3
171SU2510	110 x 18.3	2

- Unit: pipe 4 meters

Q-therm (PP-R FIBER) Fiber Composite Pipes

SDR: 6 / PN 25 | **Standard Color:** Green
Standard: 8077/8078 | **Standard Pipe Length:** 4 meters
Material: PP-R 80, Glass Fiber

Art. No	Size / mm	Packing Unit
171FP2501	20 x 3.4	25
171FP2502	25 x 4.2	25
171FP2503	32 x 5.4	10
171FP2504	40 x 6.7	10
171FP2505	50 x 8.3	5
171FP2506	63 x 10.5	5
171FP2507	75 x 12.5	4
171FP2509	90 x 15.0	3
171FP2510	110 x 18.3	2

- Unit: pipe 4 meters

PRODUCT RANGE
Fittings & Accessories

Q-therm (Socket)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171SO0001	20	10
171SO0002	25	10
171SO0003	32	5
171SO0004	40	5
171SO0005	50	5
171SO0006	63	1
171SO0007	75	1
171SO0009	90	1
171SO0010	110	1

Q-therm (End Cap)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171EC0001	20	25
171EC0002	25	25
171EC0003	32	10
171EC0004	40	10
171EC0005	50	5
171EC0006	63	5
171EC0007	75	4
171EC0009	90	3
171EC0010	110	2

PRODUCT RANGE
Fittings & Accessories

Q-therm (Reducing Socket)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171RS0201	25x20	10
171RS0301	32x20	5
171RS0302	32x25	5
171RS0401	40x20	5
171RS0402	40x25	5
171RS0403	40x32	5
171RS0501	50x20	5
171RS0502	50x25	5
171RS0503	50x32	5
171RS0504	50x40	5
171RS0601	63x20	1
171RS0602	63x25	1
171RS0603	63x32	1
171RS0604	63x40	1
171RS0605	63x50	1
171RS0704	75x40	1
171RS0705	75x50	1
171RS0706	75x63	1
171RS0905	90x50	1
171RS0906	90x63	1
171RS0907	90x75	1
171RS1006	110x63	1
171RS1007	110x75	1
171RS1009	110x90	1

PRODUCT RANGE
Fittings & Accessories

Q-therm (Equal Tee)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171ET0001	20	10
171ET0002	25	10
171ET0003	32	5
171ET0004	40	5
171ET0005	50	5
171ET0006	63	1
171ET0007	75	1
171ET0009	90	1
171ET0010	110	1

Q-therm (Elbow 90°)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171E90001	20	10
171E90002	25	10
171E90003	32	5
171E90004	40	5
171E90005	50	5
171E90006	63	1
171E90007	75	1
171E90009	90	1
171E90010	110	1

PRODUCT RANGE
Fittings & Accessories

Q-therm (Reducing Tee)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171RT0201	25x20x25	10
171RT0301	32x20x32	5
171RT0302	32x25x32	5
171RT0401	40x20x40	5
171RT0402	40x25x40	5
171RT0403	40x32x40	5
171RT0501	50x20x50	5
171RT0502	50x25x50	5
171RT0503	50x32x50	5
171RT0504	50x40x50	1
171RT0601	63x20x63	1
171RT0602	63x25x63	1
171RT0603	63x32x63	1
171RT0604	63x40x63	1
171RT0605	63x50x63	1
171RT0701	75x20x75	1
171RT0702	75x25x75	1
171RT0703	75x32x75	1
171RT0704	75x40x75	1
171RT0705	75x50x75	1
171RT0706	75x63x75	1
171RT0904	90x40x90	1
171RT0905	90x50x90	1
171RT0906	90x63x90	1
171RT0907	90x75x90	1
171RT1005	110x50x110	1
171RT1006	110x63x110	1
171RT1007	110x75x110	1
171RT1009	110x90x110	1

PRODUCT RANGE
Fittings & Accessories

Q-therm (Elbow 45°)
Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171E45001	20	10
171E45002	25	10
171E45003	32	5
171E45004	40	5
171E45005	50	5
171E45006	63	1
171E45007	75	1
171E45009	90	1
171E45010	110	1

Q-therm (Bypass Bend)
Pressure rating: PN 20

Art. No	Size / mm	Packing unit
171BB0001	20	10
171BB0002	25	10
171BB0003	32	5

Q-therm (Cross)
Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171CR0001	20	10
171CR0002	25	10
171CR0003	32	5

PRODUCT RANGE
Fittings & Accessories

Q-therm (Presure Test Plug)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171TP0001	20	100
171TP0002	25	100
171TP0003	32	100

Q-therm (Plastic Clamp)

Art. No	Size / mm	Packing unit
171PC0001	20	210
171PC0002	25	210
171PC0003	32	100
171PC0004	40	100

Q-therm (Plastic Union)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171PU0001	20	10
171PU0002	25	10
171PU0003	32	5

PRODUCT RANGE
Fittings & Accessories

Q-therm (Female Elbow 90°)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171FE0101	20x1/2"	10
171FE0102	20x3/4"	10
171FE0201	25x1/2"	10
171FE0202	25x3/4"	10
171FE0302	32x3/4"	5
171FE0303	32x1"	5

Q-therm (Male Elbow 90°)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171ME0101	20x1/2"	10
171ME0102	20x3/4"	10
171ME0201	25x1/2"	10
171ME0202	25x3/4"	10
171ME0302	32x3/4"	5
171ME0303	32x1"	5

Q-therm (Female Tee)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171FT0101	20x1/2"	10
171FT0102	20x3/4"	10
171FT0201	25x1/2"	10
171FT0202	25x3/4"	10
171FT0302	32x3/4"	5
171FT0303	32x1"	5

PRODUCT RANGE
Fittings & Accessories

Q-therm (Male Tee)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171MT0101	20x1/2"	10

Q-therm (Wall Mount)

Pressure rating: PN 25

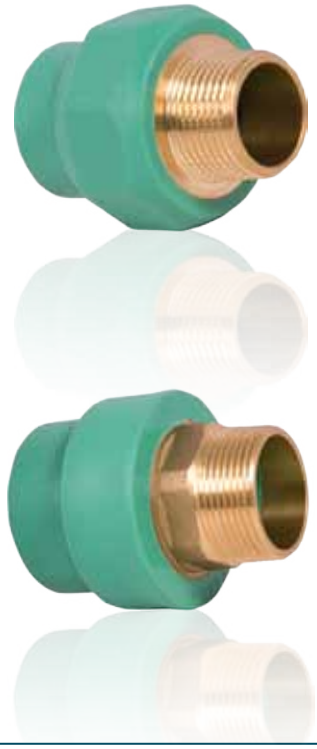
Art. No	Size / mm	Packing unit
171WM0101	20x1/2"	10
171WM0201	25x1/2"	10

Q-therm (Female Adaptor)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171FA0101	20x1/2"	10
171FA0102	20x3/4"	10
171FA0201	25x1/2"	10
171FA0202	25x3/4"	10
171FA0302	32x3/4"	5
171FA0303	32x1"	5
171FA0403	40x1"	5
171FA0404	40x1 1/4"	5
171FA0505	50x1 1/2"	1
171FA0606	63x2"	1
171FA0707	75x2 1/2"	1
171FA0908	90x3"	1
171FA1009	110x4"	1

PRODUCT RANGE
Fittings & Accessories



Q-therm (Male Adaptor)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171MA0101	20x1/2"	10
171MA0102	20x3/4"	10
171MA0201	25x1/2"	10
171MA0202	25x3/4"	10
171MA0302	32x3/4"	5
171MA0303	32x1"	5
171MA0403	40x1"	5
171MA0404	40x1 1/4"	5
171MA0505	50x1 1/2"	5
171MA0606	63x2"	5
171MA0707	75x2 1/2"	5
171MA0908	90x3"	1
171MA1009	110x4"	1

Q-therm (Union Female Adaptor)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171HF0101	20x1/2"	10
171HF0202	25x3/4"	10
171HF0303	32x1"	10
171HF0404	40x1 1/4"	5
171HF0505	50x1 1/2'	5
171HF0606	63x2"	5

PRODUCT RANGE
Fittings & Accessories

Q-therm (Union Male Adaptor)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171HM0101	20x1/2"	10
171HM0202	25x3/4"	10
171HM0303	32x1"	10
171HM0404	40x1 1/4"	5
171HM0505	50x1 1/2"	5
171HM0606	63x2"	5

Q-therm (Valve Body)

Pressure rating: PN 20

Art. No	Size / mm	Packing unit
171VB0102	20x3/4"	1
171VB0202	25x3/4"	1
171VB0302	32x3/4"	1

Q-therm (Ball Valve Hot/Cold)

Pressure rating: PN 25

Art. No	Size / mm	Packing unit
171BV0001	20	1
171BV0002	25	1
171BV0003	32	1
171BV0004	40	1
171BV0005	50	1
171BV0006	63	1

PRODUCT RANGE
Fittings & Accessories

Q-therm (Concealed Valve)
Pressure rating: PN 20

Art. No	Size / mm	Packing unit
171CV0001	20	1
171CV0002	25	1
171CV0003	32	1

Q-therm (Stop Valve)
Pressure rating: PN 20

Art. No	Size / mm	Packing unit
171SV0001	20	1
171SV0002	25	1
171SV0003	32	1

Q-therm (Concealed Valve Handle)
Pressure rating: PN 20

Art. No	Size / mm	Packing unit
171CH0002	3/4'	1

Q-therm (Stop Valve Handle)
Pressure rating: PN 20

Art. No	Size / mm	Packing unit
171SH0002	3/4'	1

PRODUCT RANGE
Fittings & Accessories

Q-therm (PPR Flange with Gasket)

Pressure rating: PN 16

Art. No	Size / mm	Packing unit
171PF0004	40	1
171PF0005	50	1
171PF0006	63	1
171PF0007	75	1
171PF0009	90	1
171PF0010	110	1

Q-therm (Flange Adaptor)

Pressure rating: PN 16

Art. No	Size / mm	Packing unit
171FA0004	40	1
171FA0005	50	1
171FA0006	63	1
171FA0007	75	1
171FA0009	90	1
171FA0010	110	1

Q-therm (Rubber Clamp)

Art. No	Size / mm	Packing unit
171RC0002	20 - 25 mm	1
171RC0003	32 - 36 mm	1
171RC0004	38 - 43 mm	1
171RC0005	47 - 51 mm	1
171RC0006	60 - 65 mm	1
171RC0007	75 - 80 mm	1
171RC0009	87 - 92 mm	1
171RC0010	107 - 112 mm	1

PRODUCT RANGE
Welding Tools

Q-therm (Welding Machine-Set)

Art. No	Size / mm	Packing unit
171WS0106	20 - 63	1
171WS0710	75 - 110	1

Q-therm (Welding Tools)

Art. No	Size / mm	Packing unit
171WT0001	20 mm	1
171WT0002	25 mm	1
171WT0003	32 mm	1
171WT0004	40 mm	1
171WT0005	50 mm	1
171WT0006	63 mm	1
171WT0007	75 m	1
171WT0009	90 mm	1
171WT0010	110 mm	1

Q-therm (Repair Pin)

Art. No	Size / mm	Packing unit
171RP0009	9	1

Q-therm (Normal Pipe Cutter)

Art. No	Size / mm	Packing unit
171NC0006	20 - 63	1
171NC0010	75 - 110	1

PRODUCT RANGE
Welding Tools

Q-therm (Automatic Pipe Cutter)

Art. No	Size / mm	Packing unit
171AC0004	16 - 42	1
171AC0007	75	1

Q-therm (Suddle Welding Head)

Art. No	Size / mm	Packing unit
171ST0601	63/20mm	1
171ST0602	63/25mm	1
171ST0603	63/32mm	1
171ST0701	75/20mm	1
171ST0702	75/25mm	1
171ST0703	75/32mm	1
171ST0901	90/20mm	1
171ST0902	90/25mm	1
171ST0903	90/32mm	1
171ST1001	110/20mm	1
171ST1002	110/25mm	1
171ST1003	110/32mm	1

Q-therm (Peeling Device)

Art. No	Size / mm	Packing unit
171PD0002	20-25mm	1
171PD0004	32-40mm	1
171PD0006	50-63mm	1
171PD0007	75mm	1
171PD0009	75-90mm	1
171PD0010	110mm	1

Notes:

QUANTUM
INDUSTRIES

كوانتم اندستريز ذ.م.م
Quantum Industries L.L.C
P.O.Box 86488 RAK, UAE.

☎ +971 7 25 89 177
+971 7 25 89 178
@ info@quantumindustries.ae
www.quantumindustries.ae