HAMZA TS

HDPE
THE FUTURE OF WATER PIPELINES



HAMZA WATERTIGHTSOLUTIONS SINCE 1949

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HAMZA WATERTIGHTSOLUTIONS SINCE 1949

HISTORY

VISION

- TECHNOLOGICAL LICENSING AND INTERNATIONAL COLLABORATION
    EASY TO INSTALL
    EASY TO WELD EASY TO WELD
    ELECTRIC WELDING
    WHY HAMZA TS “TOTAL SECURITY”?
    PLASTIC DUCTWORK SYSTEMS

- INNOVATIVE PRODUCT DESIGN
    2.1. HAMZA HDPE
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- ADVANCED TECHNOLOGICAL FACILITIES AND EQUIPMENT
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    3.2. RAW MATERIALS FEEDING AND QUALITY MEASUREMENTS
    3.3. AUTOMATED ULTRASONIC QUALITY CONTROL TECHNOLOGY
    3.4. QUALITY CONTROL ASSURANCE

- AFTER SALES SERVICE AND TECHNICAL SUPPORT

-R&D & CONTINUOUS IMPROVEMENT

WHY IS HAMZA TS TOTAL SECURE?

PREFABRICATED FITTINGS

HAMZA TS DIMENSIONS*

PERMISSIBLE WORKING PRESSURE FOR HAMZA TS PE 100 RC

HDPE PIPES PRESSURE RATING AND STANDARD DIMENSIONAL RATIO

COMPARISON BETWEEN PE80, PE100,AND PE 100 RC

HDPE CERTIFICATES

. . . HISTORY . . .





The brand "**HAMZA**" was established by Mr. Abd Elwahab **HAMZA** in 1949 as a specialized plumbing contractor.
Nowadays **HAMZA** group consists of **HAMZA** contractors for Electro Mechanical contracting, **HAMZA** Bros. Supplying Co. and **HAMZA** industry. **HAMZA** Industry was established in 2007 and started the production in 2009.

HAMZA industry co. is an extension of **HAMZA** group chain towards a complete solution provider of plumbing and electromechanical services. HAMZA AS drainage system and HAMZA TS (HDPE) systems are the main unique and advanced products of **HAMZA**. They are designed and produced to deliver a real added engineering value to the Egyptian market. With their innovative engineering, via production technologies, they enhance the capabilities of the Egyptian piping market for both water and gas applications.



V i s i o n

HAMZA Industry was established in 6th of October city on an area of 80.000 square meters under licenses from WAVIN Germany. The philosophy of Hamza industry is to achieve international quality standards starting from the product design till the packing. In order to achieve real international quality standards, a license from a leading international German institutes expert was established.

The chain of **HAMZA** Industry was forced to be internationally competitive through the following constraints.



International High End Quality Vision

01 Technological Licensing and Interantional Collaboration

02 Innovative Product Design

03 New Generation Material PE 100 RC

04 Advanced Technological Facilities and Equipment

05 After sales Service and Technical Support

06 R&D and Continous Improvement

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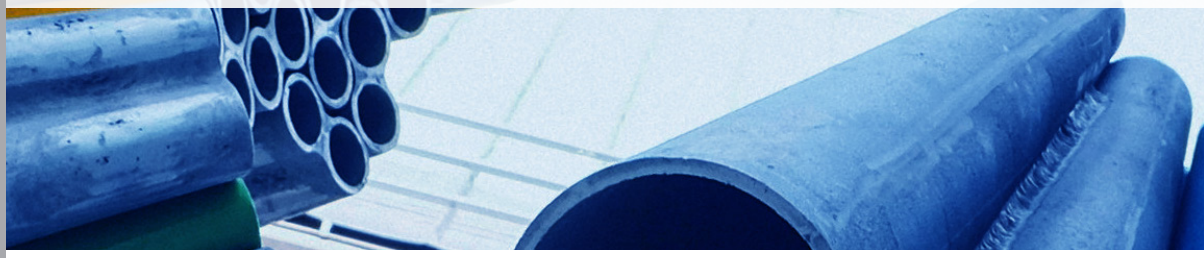


Technological Licensing and Interantional Collaboration

Technological Licensing and Interantional Collaboration



HAMZA has a wide range of international cooperation in the field of plumbing, sanitary, and sewage applications. **HAMZA** is the sole agent for many European leading companies in Egypt. **HAMZA** collaborated with many leading companies, technical experts, and international reputable institutions in its products design, technological licensing, quality control, assurance, certification, and distribution. In order to ensure highest quality levels and standards fulfilment, **HAMZA** went through a very long journey of international certification. These certifications included not only the final product, but also processing of its production and management facilities.



HAMZA agreed with **WAVIN** Germany and Netherlands on atechnical licenses agreement to support **HAMZA** in their product design, factory design, row materials and machines selection to match the European standards.

HAMZA GAS pipes of PE piping system are BSI certified in Great Britain.

HAMZA got the iso Certification from TUV instiuteture iso 45001 , 9001 and 14001.

HAMZA also certified all its products with all the related testing from the **National Research Center** in EGYPT.



Additional attention on UV resistance certification of **HAMZA** produce was successfully acquired through a collaboration with the Egyptian Plastic Technology Center.

HAMZA collaborated with PWC to implement its corporate governance manual and ensure its proper implementation.

HAMZA is using SAP ERP system in its management and production. Many development projects are being conducted on the automation and integration between the production machines and the ERP system In order to meet the digital transformation. and the industry 4.0 new trends.

F E A T U R E S

Easy to install

As comfortable as PE pipes

HAMZA TS can be installed as easy as traditional PE pipes. Due to its high flexibility, **HAMZA TS** (32 to 63 mm outer diameter) can be coiled. In the trench pipeline direction can easily be changed by simply bending the pipe (bending radius at 20° C: 30 x outer diameter).

Welding in the trench is no problem at all. **HAMZA TS** does not require special embedding material (fine sand around the pipe), which is **an economic advantage.**

S U M M A R Y

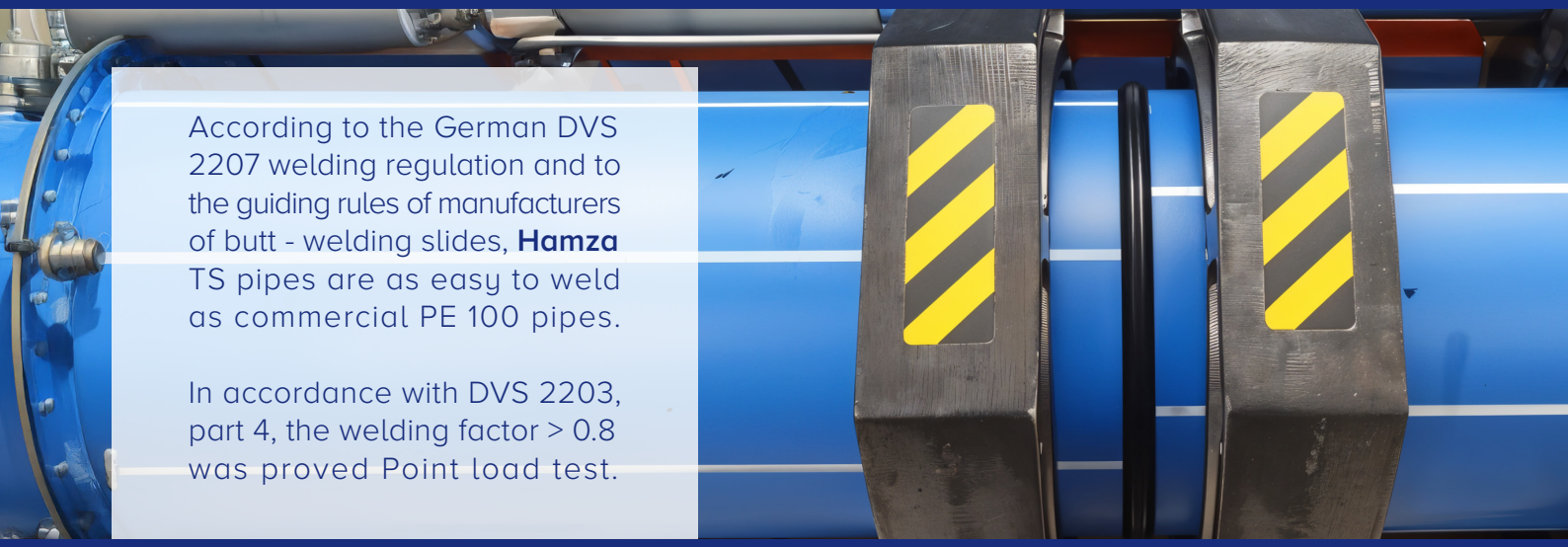
According to the correlation between **FNCT** and point loaded pressure pipes a service - life of **at least**

100 • YEARS •

Can be expected when the **Hamza** TS pipe is buried.
Without sand - embedding.



Easy to weld/Butt Welding



According to the German DVS 2207 welding regulation and to the guiding rules of manufacturers of butt - welding slides, **Hamza** TS pipes are as easy to weld as commercial PE 100 pipes.

In accordance with DVS 2203, part 4, the welding factor > 0.8 was proved Point load test.





ELECTRIC WELDING

HAMZA TS pipes can be welded with either PE 80 or PE 100 fittings. Since the **HAMZA** TS pipe surface is as hard as that of traditional PE 100 pipes, rotationpeeling devices are recommended for preparation of the weld. Working with **HAMZA** TS is just as comfortable and economic as with traditional PE 100 pipes. As the protection layers are integrated they need not be peeled off before welding.

HAMZA TS pipes are compatible to PE 100 fittings of all major fitting manufacturers.

HAMZA TS

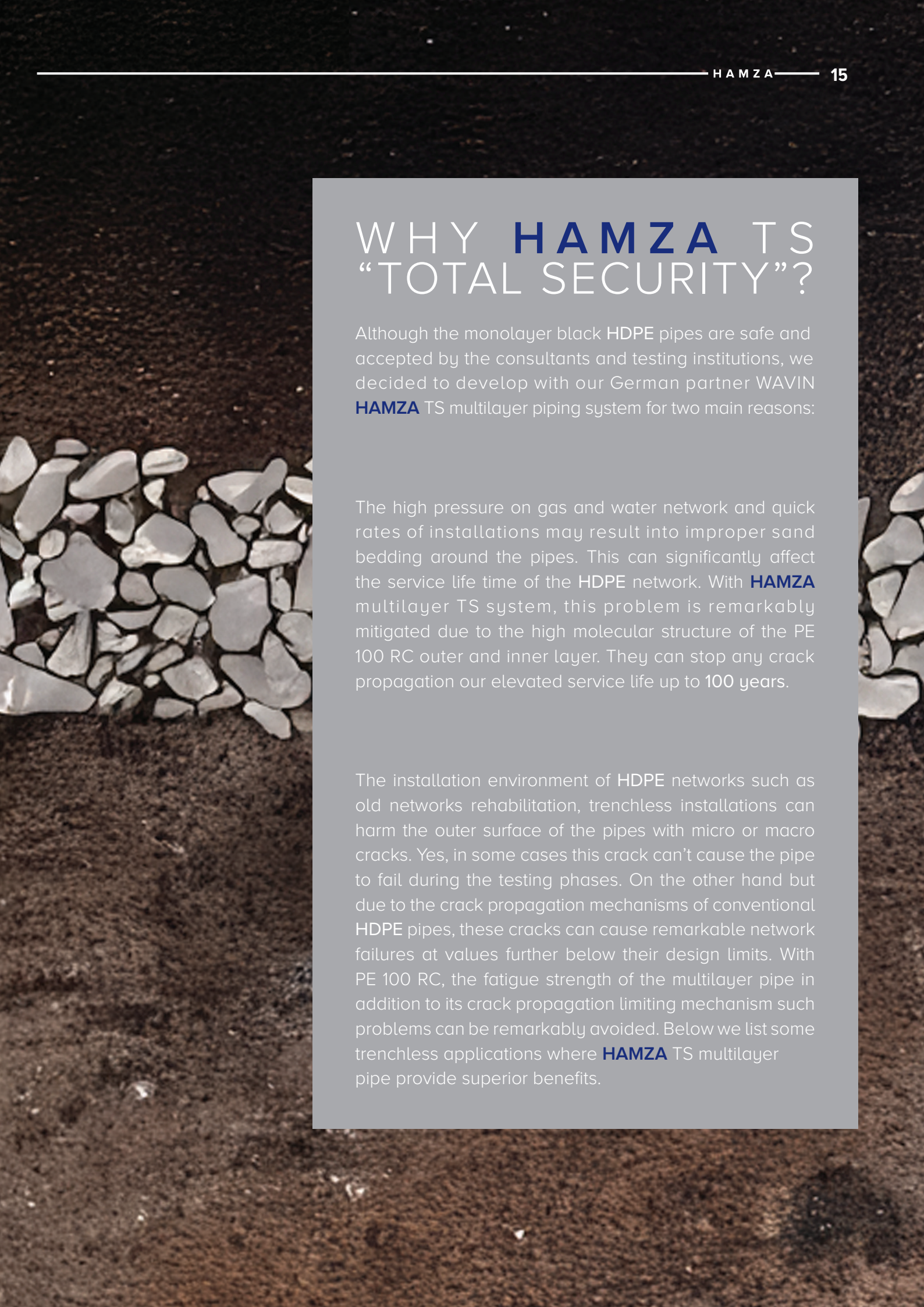
LONG LIFE BITE AND CRACK RESISTANCE

100 YEARS LIFE TIME



HAMZA TS multi layer pipe can withstand more than 8760 hour under the FNCT test where the **HDPE** pipes installation without sand embedding is 3300 hour for the FNCT test.

That's why **HAMZA** TS is totally secured and has life expectancy of more than 100 years for installations without sand embedding.



WHY **HAMZA** TS "TOTAL SECURITY"?

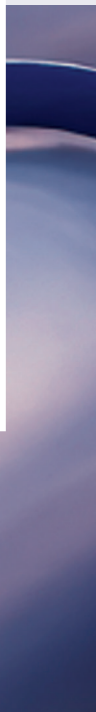
Although the monolayer black HDPE pipes are safe and accepted by the consultants and testing institutions, we decided to develop with our German partner WAVIN **HAMZA** TS multilayer piping system for two main reasons:

The high pressure on gas and water network and quick rates of installations may result into improper sand bedding around the pipes. This can significantly affect the service life time of the HDPE network. With **HAMZA** multilayer TS system, this problem is remarkably mitigated due to the high molecular structure of the PE 100 RC outer and inner layer. They can stop any crack propagation our elevated service life up to **100 years**.

The installation environment of HDPE networks such as old networks rehabilitation, trenchless installations can harm the outer surface of the pipes with micro or macro cracks. Yes, in some cases this crack can't cause the pipe to fail during the testing phases. On the other hand but due to the crack propagation mechanisms of conventional HDPE pipes, these cracks can cause remarkable network failures at values further below their design limits. With PE 100 RC, the fatigue strength of the multilayer pipe in addition to its crack propagation limiting mechanism such problems can be remarkably avoided. Below we list some trenchless applications where **HAMZA** TS multilayer pipe provide superior benefits.

Trenchless Technique	When is it Used?	How is it Done?
Horizontal Directional Drilling	This technique is used when the pipe path is difficult to access, and the tunneling techniques are more expensive. It is more suitable for small diameter pipes	Drilling a pilot bore using a drilling head Enlarging the bore if necessary using a reamer for soft soils or a hole opener for rocks. The pipe is pulled using pulling head, swivel, reamer and the drill rods at the exit point
Pilot Tube Micro Tunneling	Similar technique to the horizontal directional drilling, with higher directional accuracy.	Installing a pilot tube Enlarging the pilot tube to a little larger that the pipe outer diameter Pulling the pipe from the reception en, and the pilot tube is pulled back at the same time
Impact Moling	Simplest method, but only accessible for short distances p to 60 m and small diameter pipes up to 160 mm.	Excavation of two pits: launch and reception pits Positioning and aligning of the impact mole A bore head is created using the cone shaped reciprocating head The pipe is either fixed to the head or pushed later Most of the moles are not steerable, so a tracking system is needed to stay within the required alignment
MOLE PLOUGHING	Used in rural areasfor small diameters with shallow depths up to 2 m	A traction unit creates a temporary trench, and pull the plough with a cable winch continuously The pipe is installed on the bottom of the narrow trench. Diameters up to 90 mm can be installed directly through a continuous coil on the traction unit. The soil closes over the narrow opening behind the plough. Few extra manual finishing is needed Soil compaction if necessary
Pipe Bursting	Used to replace an old clay, steel, or plastic pipes	A bursting head is pushed within the old pipe The new pipe is pulled by the bursting head










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Other Applications

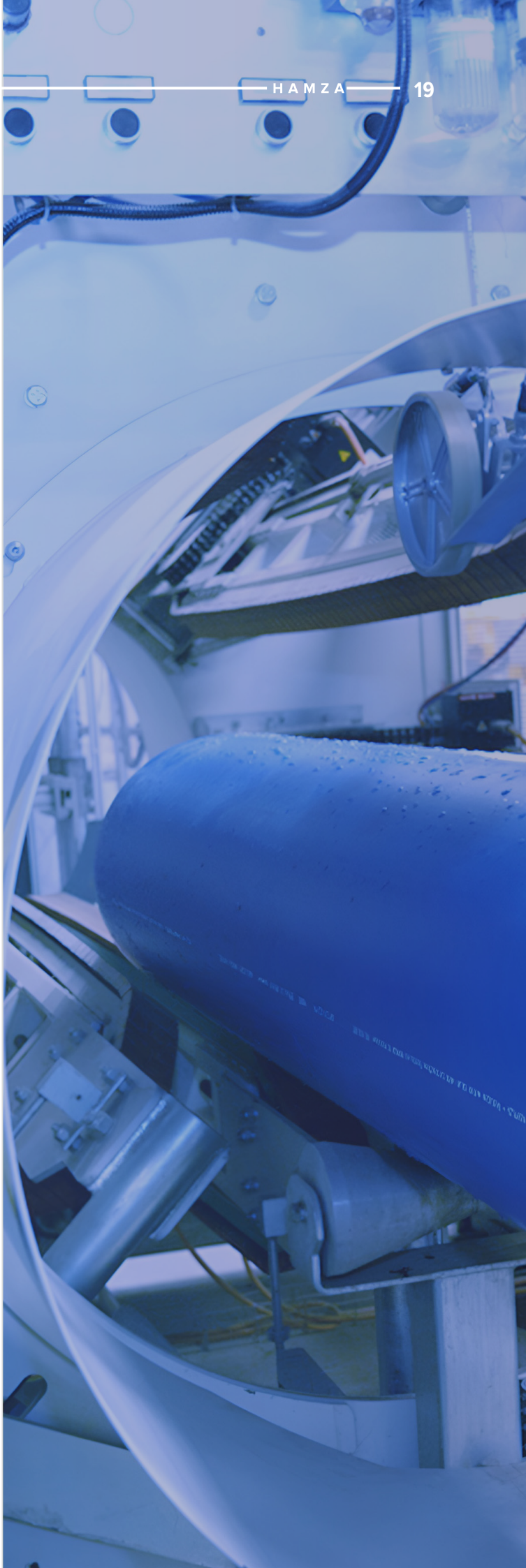
Chilled Water Transmission



HAMZA TS pipe provides superior value in chilled water in comparison to mild steel and conventional **HDPE** pipes due to:

- Lower cost of installation, ease of use and flexibility.
- Higher temperature differences and chemical resistance
- Smoother inner surface with elevated corrosion resistance
- Minimizing the environmental impact of installation
- Higher energy savings due to lower thermal transmission coefficient

Plastic Ductwork Systems



HAMZA TS duct works are durable and non-corrosive. With **HAMZA** TS prefabricated fittings, and other injected fittings, better value engineering can be delivered where higher quality and lower costs can be met.

HAMZA TS ductwork is suitable for underground and above ground applications.
It is also suitable for industrial, agricultural, and civil applications for water and gas mediums.

.....Geothermal and Energy Exchange.....



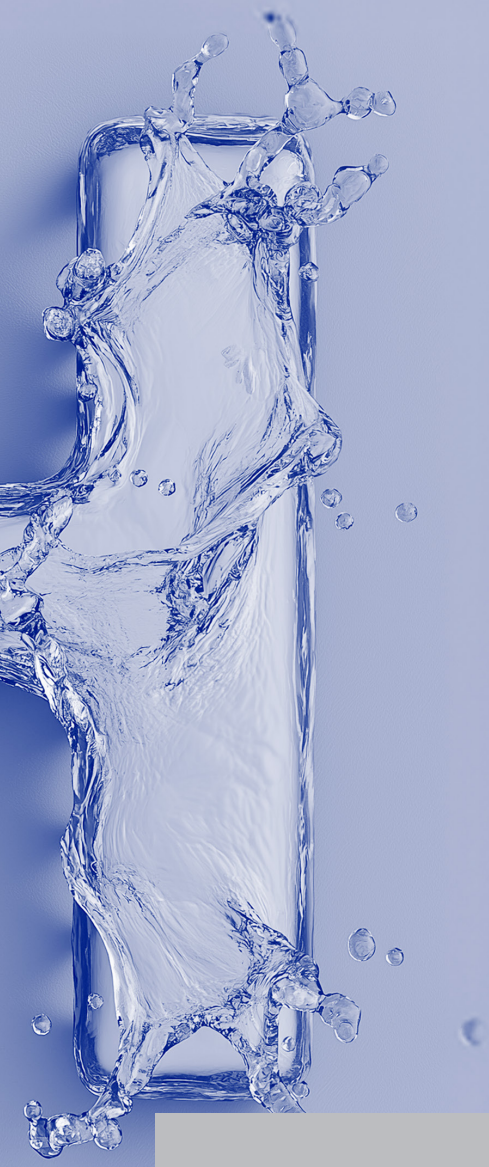
HAMZA TS is a clean energy transfer medium for heating and cooling district and industrial application. They can also be buried safely underground with elevated life time spans up to 100 years. Thanks to **HAMZA** TS PE100 RC material engineering and technology where crack initiation and propagation are highly reduced.

HAMZA TS is a superior product for geothermal and energy exchange applications.



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Innovative Product Design



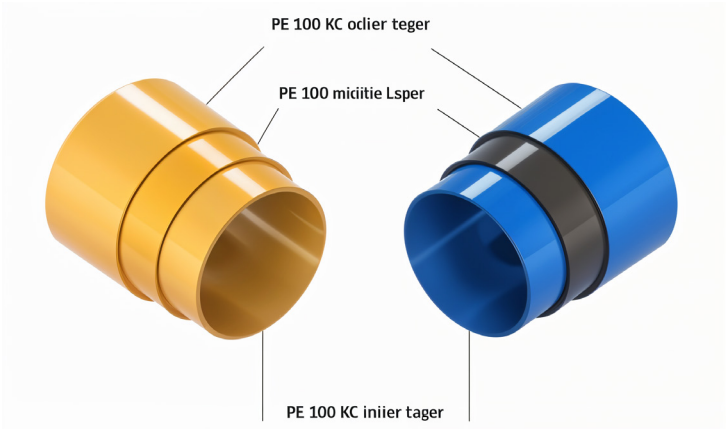
HAMZA is the only producer of multilayer **HDPE** pipes in Middle-est under license of **WAVIN**. This system delivers superior advantages compared to the conventional monolayer **HDPE** pipes. We list here the main design features of **HAMZA TS**:



2.1. HAMZA HDPE.....

HAMZA HDPE includes the conventional black PE pipes and also the multilayer HAMZA TS pipes which is the brand new to the markets. It requires special Extrusion machines with multiple extruders and specialized die heads. It also requires more specialized and advanced materials for extremely higher service life time way beyond the conventional **HDPE** pipes.

HAMZA used its long experience, field specialization, and international cooperation especially with German suppliers and consultants in the field to add new design benefits and solution to excel its systems among the other common used systems.



HAMZA product designs don't only meet the Egyptian standards and regulation, but also German standards. This enabled **HAMZA TS** to be internationally certified from international reputable institutes such as the British standards institute "BSI" DIN Certico, and OHSAS 18001.

HAMZA products are also installed in many projects in Germany which some of them requires advanced specific requirements.

HAMZA products are also being used interchangeably with European systems in many countries as Germany, North Africa, India, Iraq, Philippines, Saudi Arabia, and many others.



2.2. Hamza TS Benefits

HAMZA TS is a co-extruded three-layers pipe with inner and outer protection layers made of the innovative, extremely robust plastic RC 100, and a middle layer made of PE 100.

The different layers are **PE 100** based and coextruded together from the same die head with zero possibilities of delaminating or separation.

Long service life even with outside damages (< 20 % standard wall thickness)

Due to the material characteristics of RC 100 (inner and outer layers amount to 25 % of total wall thickness each) **HAMZA** TS offers increased security and a longer service life compared to traditional PE pipes, even when it comes to extreme loads as a result of notches, grooves and point loads.

Elevated pressure resistance compared to monolayer **HDPE** at the same thicknesses.

PE 100 RC is an advanced PE with ultimate crack initiation and propagation resistance. It helps to prevent the pipe from damage over the service life of 100 years due to any installation damages or cracks.

It is designed for any soil installations with any sharp edges or rocks without the need for sand bedding around the pipes.

It has different versions for supply water, sewage, and Gas applications.

Elevated resistance to point loads and pipes loading with notches or cracks over long service life.

Optimal creep and fatigue resistance.

Excellent welding characteristics using butt welding, or electro fusion.

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Advanced Technological Facilities and Equipment

Advanced Technological Facilities and Equipment

In order to achieve **HAMZA**'s International high end quality vision, advanced technological facilities and equipments was a must meet criteria for **HAMZA** Industry. WAVIN-Germany License insured guidance to the most advanced suppliers.

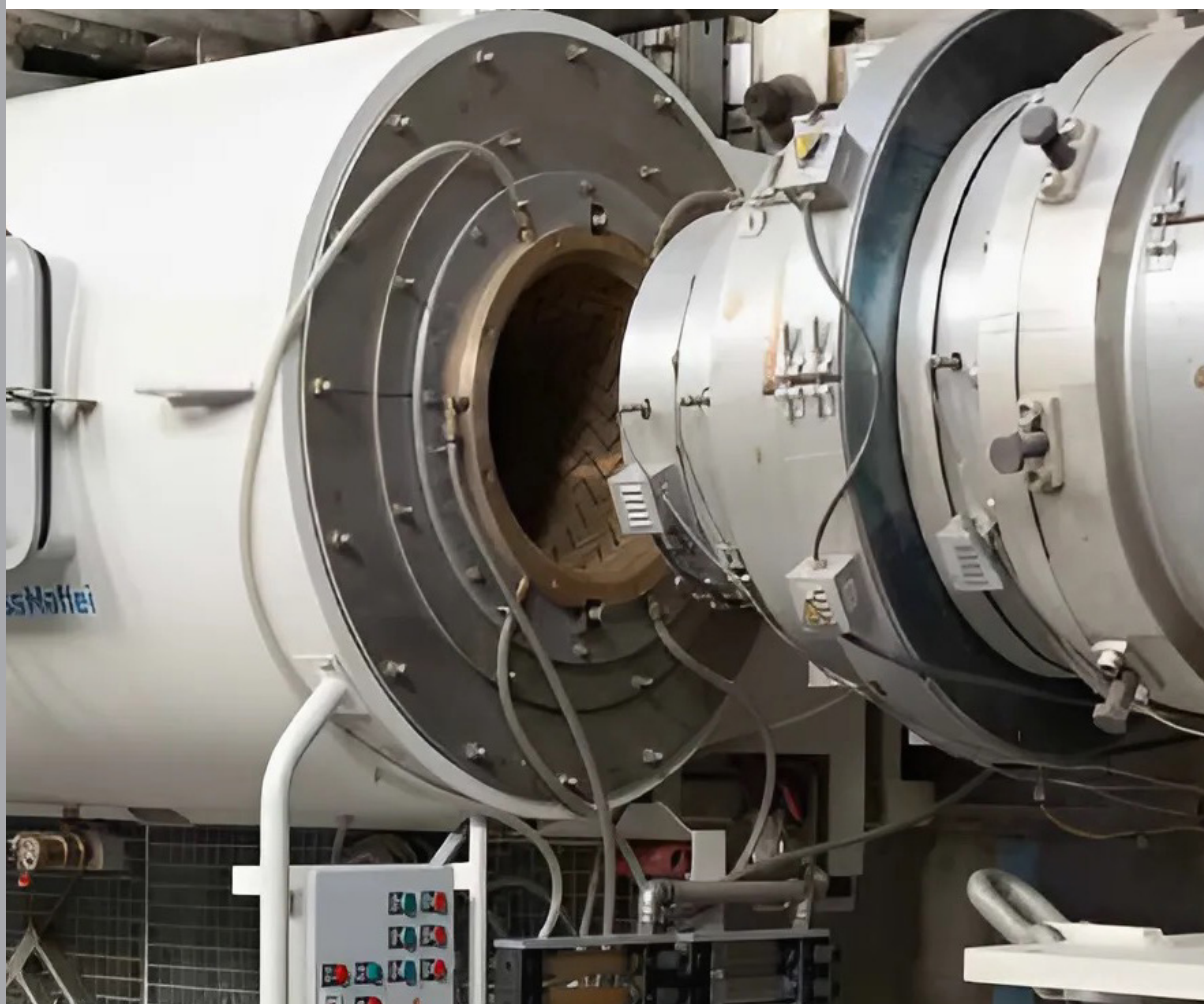
HAMZA management has heavily invested in the selection of the international leading facilities and equipment from Germany, Netherlands, Austria, Denmark, France, and USA.

HAMZA introduced new technologies to the Egyptian market in the extrusion lines of multilayer HDPE pipes. Special production lines were especially designed for HAMZA PE, TS, and Gas pipes.

HAMZA's range includes all possible pressure ratings and dimensions from 32 to 800 mm. Here we list few of **HAMZA** TS and HDPE advanced production and quality Control Technologies.

3.1. Advanced Co - Extrusion Technology

HAMZA Introduced advanced Co Extrusion technologies with its partner in Germany and Netherlands to the Egyptian market. In order to produce multilayer PE 100 and PE 100 RC pipes, advanced Co extruders, and die heads are used to for a homogenous materials.



3.2. Raw Materials feeding and Handling System



A complete automated material handling and feeding system is used to avoid human interference errors and achieve hygienic floor environment.

We use a gravimetric system for the control of the material feeding instead volumetric system.

3.3. Automated Ultrasonic Online Quality Control Technology

An automated ultrasonic with feedback control is used to test every inch of the produced pipes wall thickness , diameter OD ,Ovality and pipe meter weight.
Thanks to the ultrasonic testing technology,

Hamza is the only supplier in Egypt who can deliver a detailed report from the machine of each inch of its produced pipes. These reports can provide detailed information about the pipe thickness, outer diameter and the ovality, and the ovality of the continuous production per production patch.

3.4. Quality Control / Assurance

HAMZA has a high end complete testing facilities from the first class German and Danish quality control lab. equipment. Proudly, we can implement all the testing procedures done by leading international testing institutions in house.
This enabled us to be internationally certified and meet very advanced material testing.

HAMZA Lab conducts a wide range of testing on each batch of the raw materials and the final product as per the standards requirements. We can summarize the main important testing procedures as follows:

	Raw Materials	Final Product
Visual inspection, Dimensions, fits, tolerance, weight		●
Melt Flow Index	●	
Density	●	●
Moisture Content	●	
Tensile Strength / Elongation		●
Dry Oven		●
Hydrostatic Presure under cold and hot water Conditions		●
Hydrostatic Pressure with Notch		●
Impact Test		●
OIT (Thermal Stability Test)	●	●


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400
8.295
0
0.800

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After Sales Service & Technical Support

After Sales Service &Technical Support

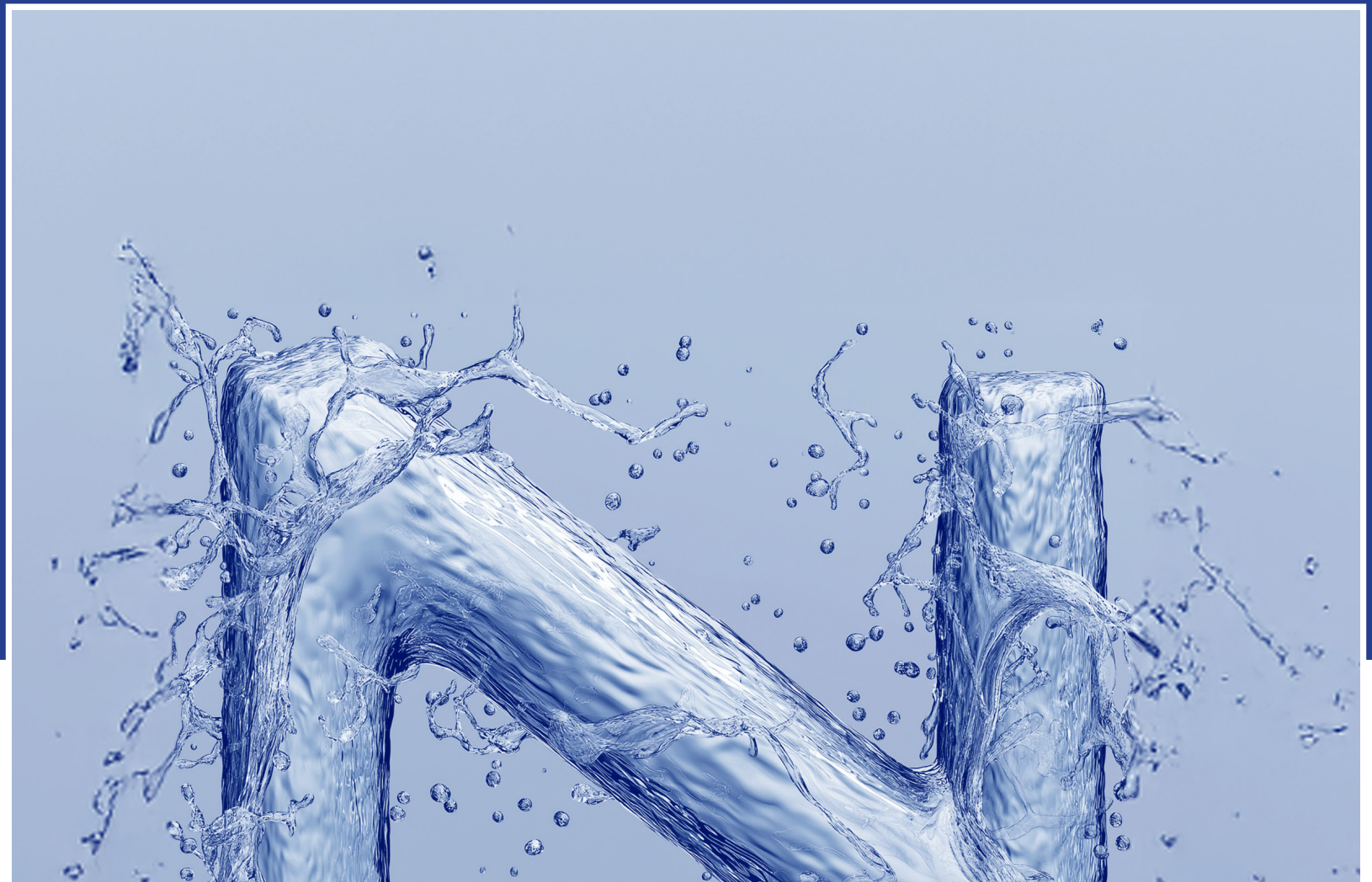
Despite our high end quality standards, we committed ourselves with a very challenging pricing philosophy to deliver our high quality standards at competitive prices. We could reach different market segments with our products, as everyone appreciate quality standards, can afford them through our solutions.

Hamza dedicated all its distribution and customer service to fulfill all the requirements of after sales services and technical support. High quality innovative products require high quality after sales services and technical support. **Hamza** is alwaysavailable for any technical advices through its team, or through its partners. WE support construction companies in their design, implementation, and testing's phases.

We support the plumbers and installers with all the technical guidance and training needed. We support the end users, as we guarantee any Hamza product installed. We commit ourselves to solve any problem, and provide any assistance needed even if the problem comes due to installation mistakes.



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R&D & Continuous Improvement

...R&D & Continuous Improvement...





HAMZA invests in its research and development to keep their products up to date, and introduce new products on a usual basis based upon the market needs.

HAMZA collaborates with research institutions and market experts to always verify its products and services up to date.

HAMZA's R&D and continuous improvements are working on a daily basis to introduce new products, enhance the performance of its system. They are also ready to cooperate with any project specific needs, and source any technological solutions to solve a problem or tackle any challenge.

They are also in contact with many international experts, and technology suppliers.

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Why is **HAMZA** TS total secure?

Why is **HAMZA** TS total secure?

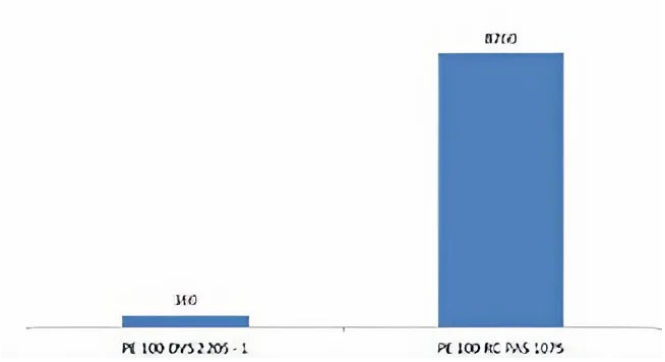
HAMZA TS has ultimate performance against point loads caused by stones, sharp edges, or any soil contaminations.

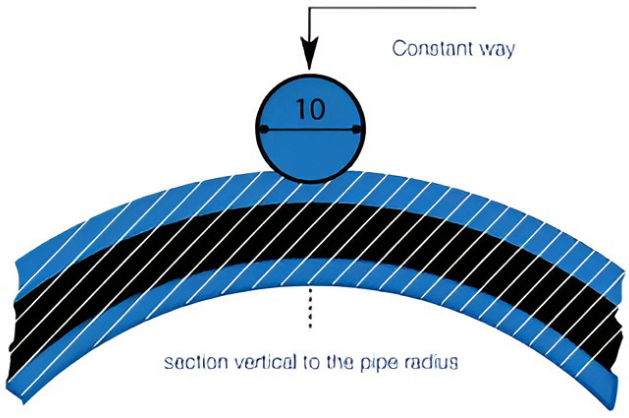
The crack initiation is remarkably lower than the conventional **HDPE** pipes.

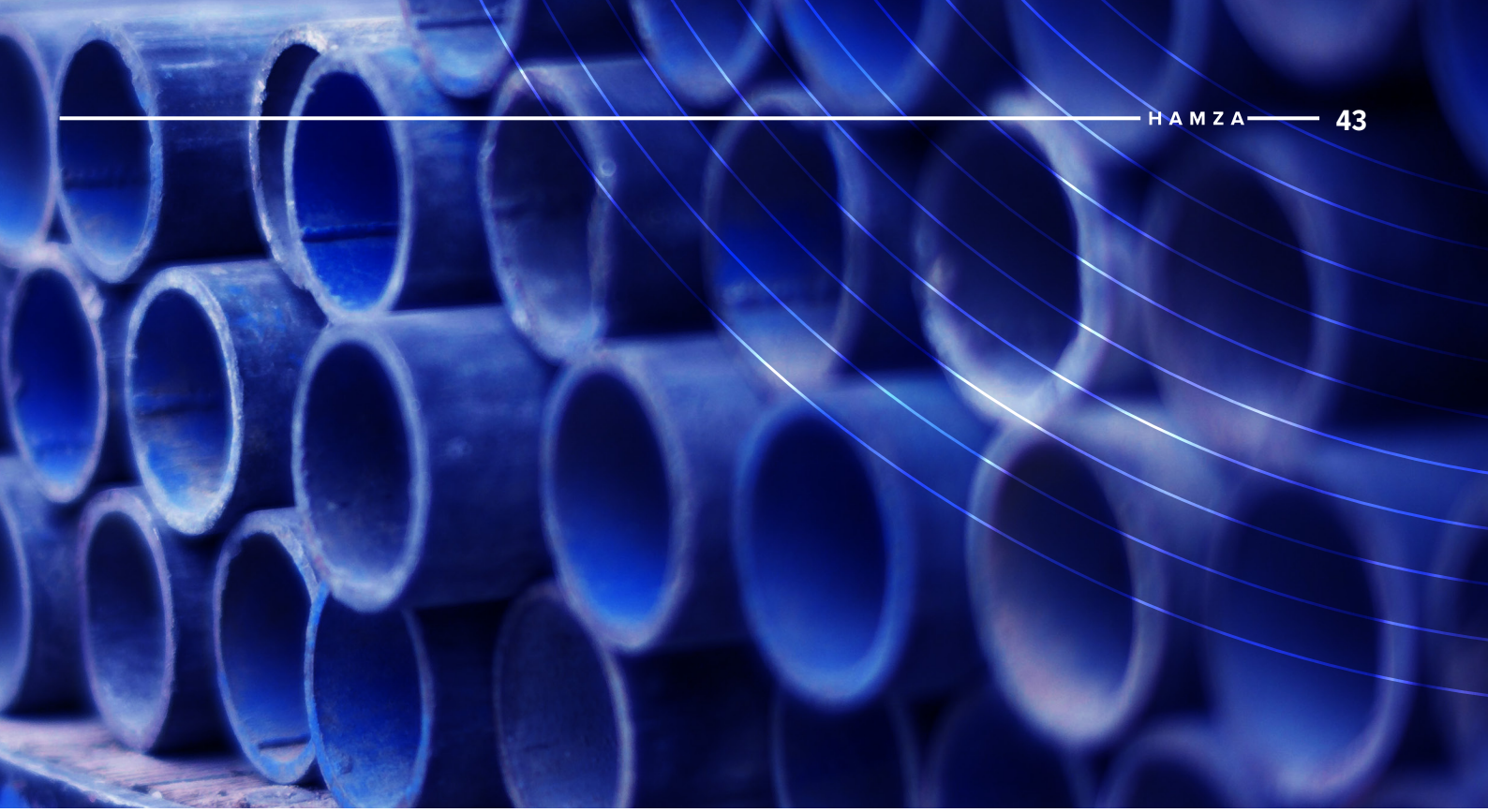
Thanks to the external and internal layers of **HAMZA** TS from PE 100 RC with XSC 50 additives. IT delays the crack initiation to more than double values under hardness tests. Further aggressive testing is conducted where an initial crack is intentionally made to the pipe and the point load is applied for elevated long periods of time. The pipe is then exposed to stresses and strains.

The full notch creep test (FNCT as per ISO 16770) is considered the standard test method for slow crack growth in Polyethylene.

A notch specimen is exposed to tensile stress at high temperature (80 ° C). The required resistance to PE 100 and PE 100 RC are shown below.

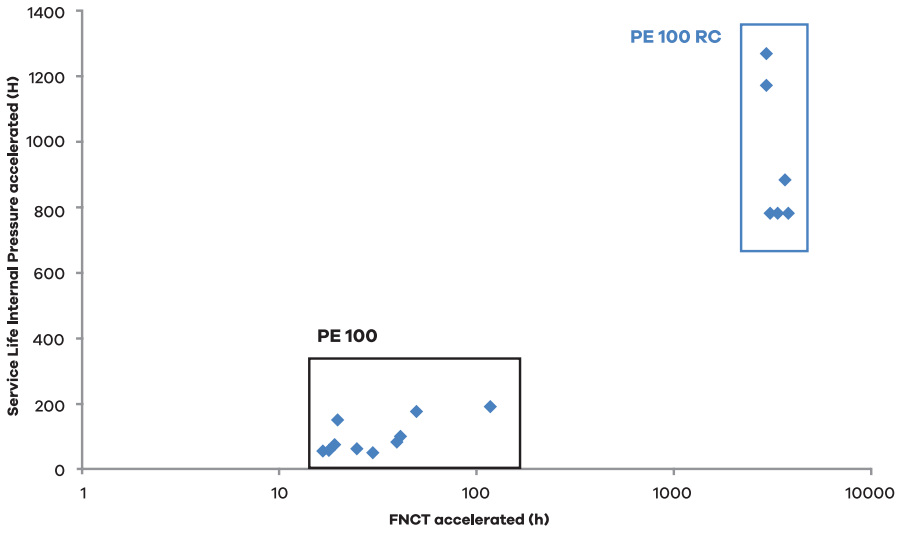






HAMZA TS could withstand the ultimate tensile strength of HDPE pipes for more than 7000 hours compared to 1050 hours for the HDPE conventional monolayer pipe.

The correlation between the full notch creep test and the point load tests, HAMZA TS pipes have life expectancy of 100 years for installation without sand embedding.



System	Application	Color	Material	OD RANGE (mm)	Delivery Form
HAMZA TS	Drinking Water Supply Networks	Blue: outer and inner layer Black: middle Layer	PE 100 RC with XSC 50 for outer and inner layer Middle Layer PE 100 RC	32:800	Straight pipes 12 m, and coils up to 63 mm
HAMZA PE	Drinking Water Supply Networks	Black with blue line marking	PE 100	32:800	Straight pipes 12 m, and coils up to 63 mm
HAMZA PE	Drainage and Sewage Networks	Black with dark red line marking	PE 100	32:800	Straight pipes 12 m, and coils up to 63 mm
HAMZA GAS	Gas Networks	Orange	PE 100 / PE 100 RC	32 :355	Straight pipes 12 m, and coils up to 63 mm
HAMZA GAS	Gas Networks	Yellow	PE 80	32 :355	Straight pipes 12 m, and coils up to 63 mm

COMPLAETE PRODUCT RANGE



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Prefabricated Fittings



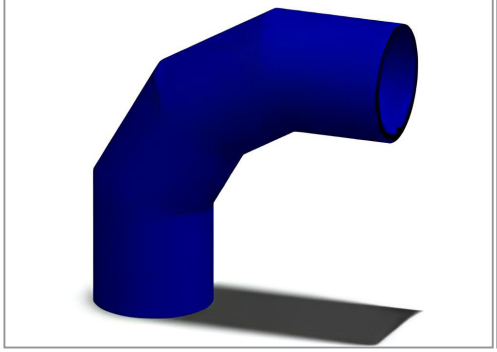
Prefabricated Fittings

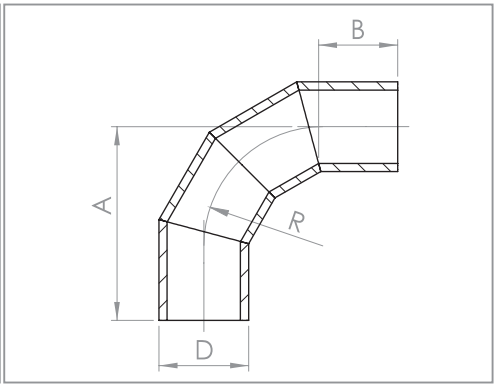
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90° Segmented BEND

Available in SDR 11 and SDR 17

D	A(mm)	B(mm)	R(mm)
90	235	100	135
110	265	100	165
125	338	150	188
140	360	150	210
160	390	150	240
200	450	150	300
225	488	150	338
250	625	250	375
280	670	300	420
315	777	300	477
355	833	300	533
400	900	300	600
450	975	300	675
500	1100	350	750
560	1190	350	840
630	1250	350	945

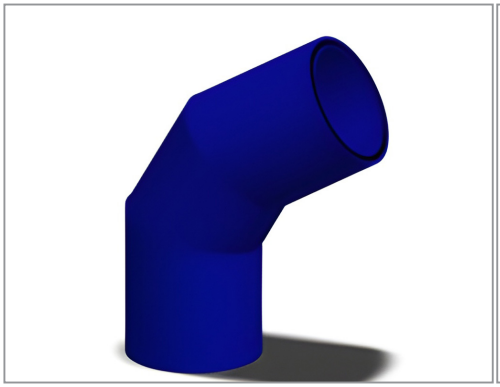


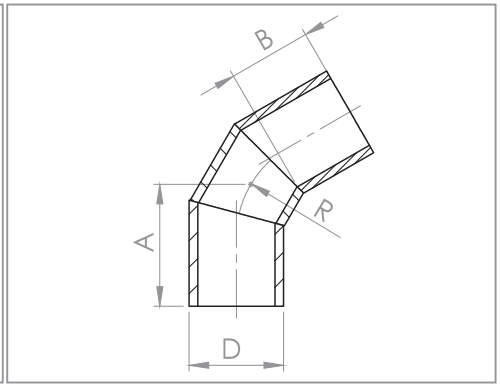


45° Segmented BEND

Available in SDR 11 and SDR 17

D	A(mm)	B(mm)	R(mm)
90	156	100	135
110	168	100	165
125	227	150	188
140	237	150	210
160	249	150	240
200	274	150	300
225	290	150	338
250	412	250	375
280	474	300	420
315	498	300	477
355	520	300	533
400	548	300	600
450	580	300	675
500	665	350	750
560	698	350	840
630	741	350	945

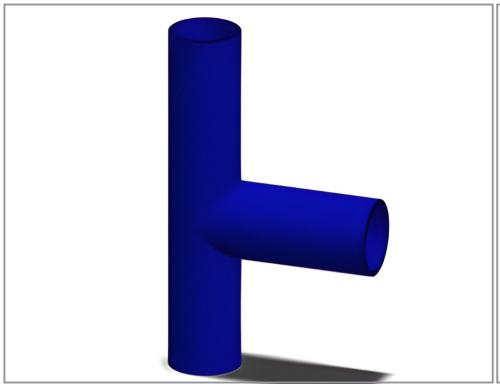


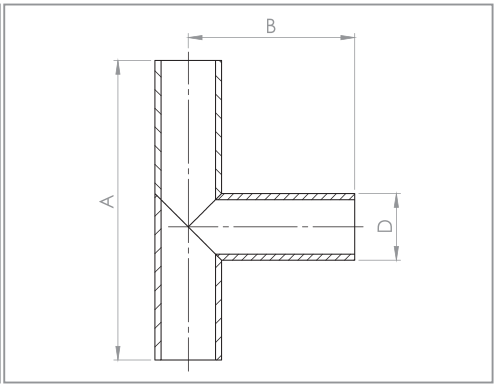


Equal TEE

Available in SDR 11 and SDR 17

D	A(mm)	B(mm)
90	400	200
110	500	250
125	500	250
140	500	500
160	600	500
200	650	500
225	650	550
250	700	650
280	700	650
315	800	700
355	800	700
400	1000	1100
450	1100	1100
500	1200	1200
560	1200	1200
630	1200	1200

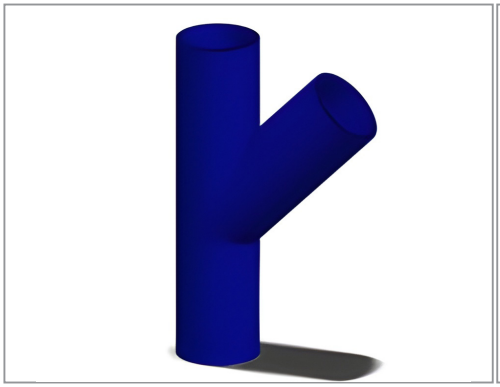


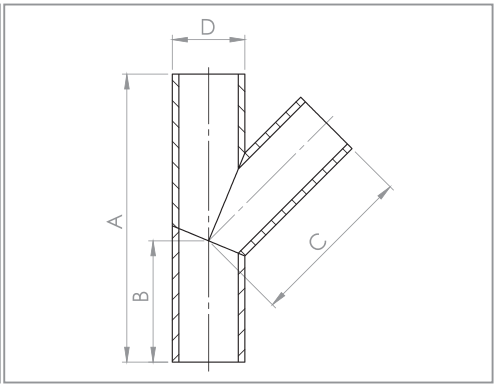


Fabricated 45° Y Junction

Available in SDR 11 and SDR 17, and other angles

D	A(mm)	B(mm)	R(mm)
90	700	270	430
110	700	270	430
125	750	300	450
140	780	300	480
160	850	330	520
200	960	370	590
225	1080	420	660
250	1150	450	710
280	1250	500	750
315	1350	530	820
355	1450	570	880
400	1550	600	950
450	1850	650	1200
500	2100	700	1400
560	2200	800	1400
630	2300	800	1500





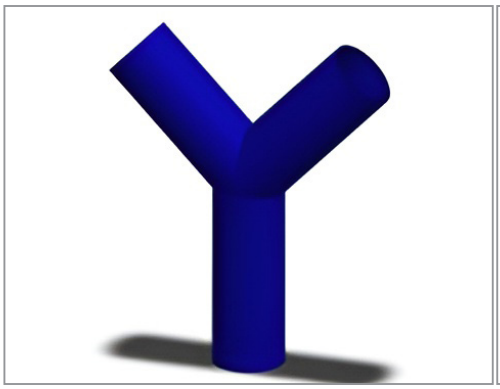
Fabricated Y True Junction

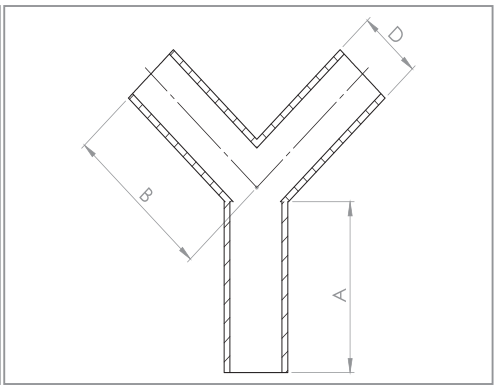
Available in SDR 11 and SDR 17

D	A(mm)	B(mm)
90	200	450
110	250	450
125	250	450
140	500	600
160	500	600
200	500	750
225	550	750
250	650	750
280	650	900
315	700	900
355	700	1050
400	1100	1180
450	1100	1300
500	1200	1400
560	1200	1400
630	1200	1400

NOTE

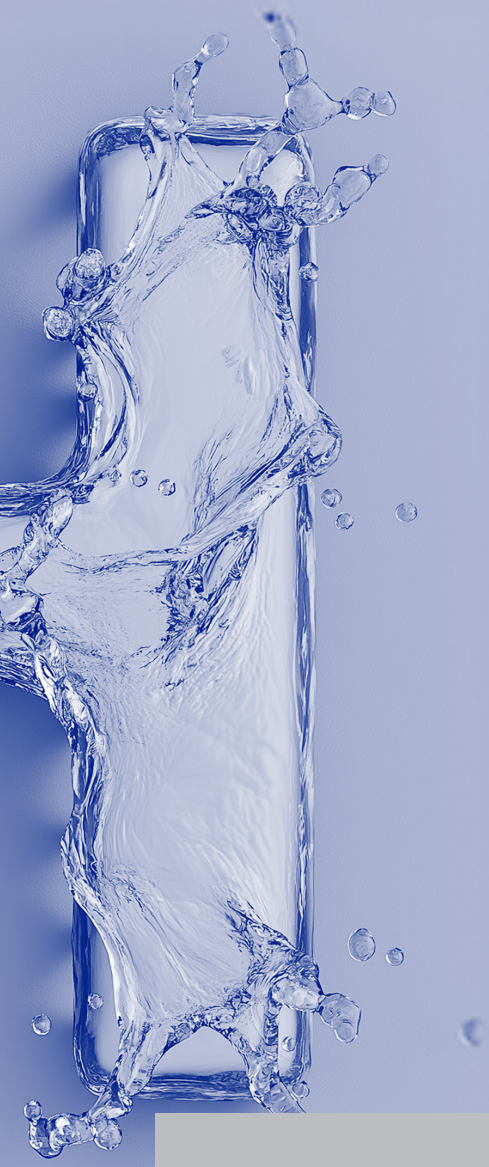
Injected fittings, flanges, and other shapes can be delivered based on order requirements





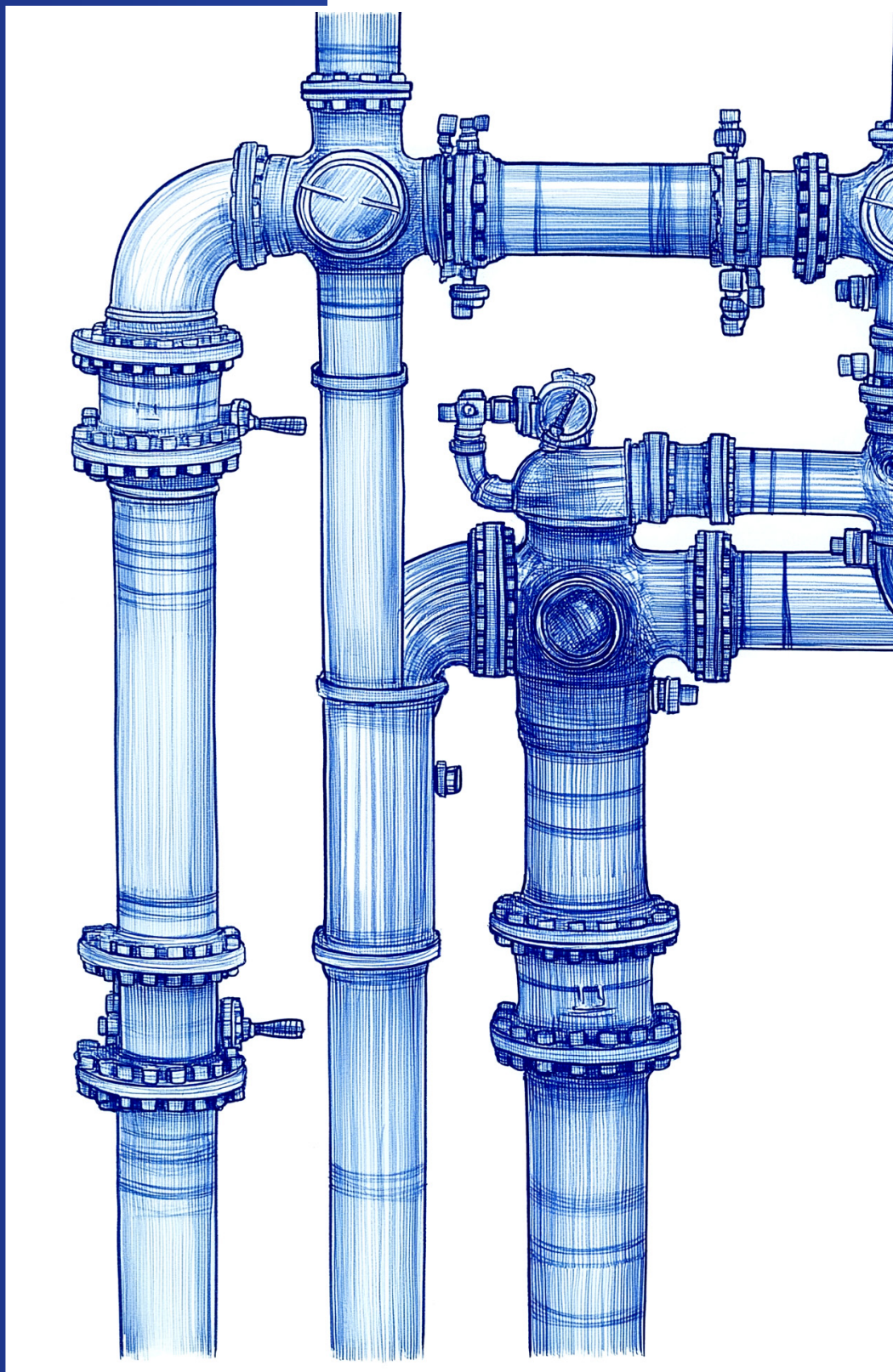
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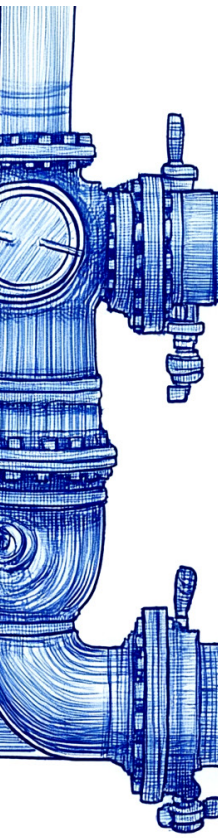


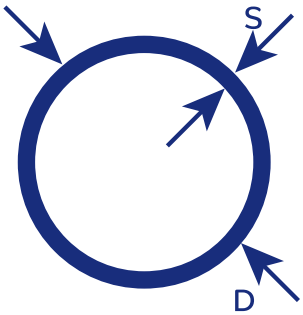


HAMZA TS Dimensions*

HAMZA TS Dimensions*





Size (OD)	SDR	Delivery form	Standard Dimension Ratio
32	11/17	Coils 50m length	
40			
50			
63			
90		Straight pipes 12m length	
110			
125			
140			
160			
180			
200			
225			
250			
280			
315			
355			
400			
450			
500			
560			
630			

SDR = D/S
D= (pipe outside diameter)
S=(pipe wall thickness)

* Dimensions up to 800 and other SDRs can be delivered

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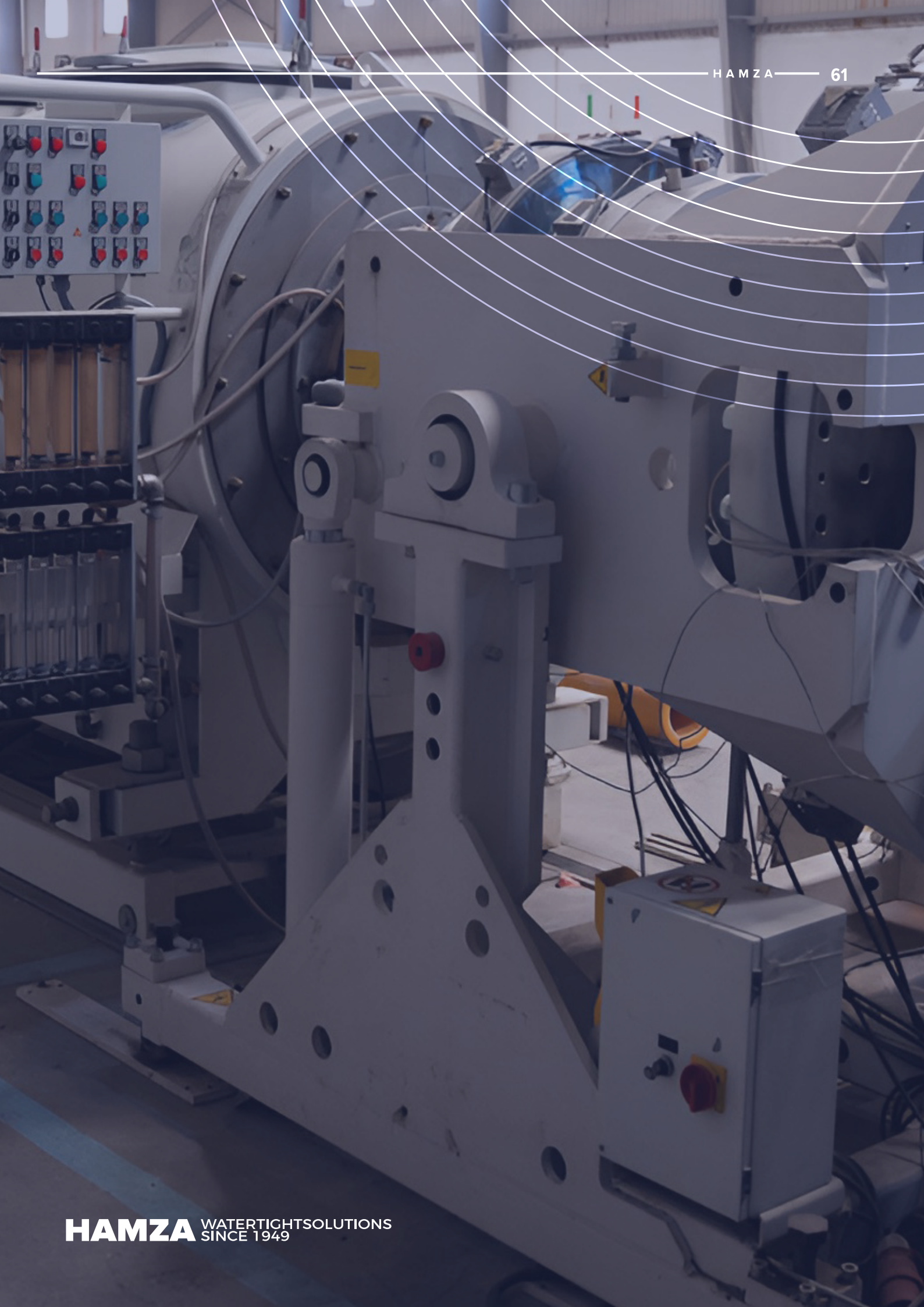




Maxmim Allowable Operating Pressure - PE 100 RC

Maxmim Allowable operating Pressure - PE 100

Temp °C	Min Life (yr)	Design Factor	PN 4 SDR41	PN 6.3 SDR26	PN 8 SDR21	PN 10 SDR17	PN 12.5 SDR13.6	PN 16 SDR11	PN 20 SDR9	PN 25 SDR7.4
20	100	1.0	40	64	80	100	127	160	200	250
25	100	1.1	36	58	73	91	115	145	182	227
30	100	1.1	36	58	73	91	115	145	182	227
35	50	1.2	33	53	67	83	106	133	167	208
40	50	1.2	33	53	67	83	106	133	167	208
45	35	1.3	31	49	62	77	99	123	154	192
50	22	1.4	29	46	57	71	91	114	143	179
55	15	1.4	29	46	57	71	91	114	143	179
60	7	1.5	27	43	53	67	85	107	133	167
80	1	2.0	20	32	40	50	63	80	100	125



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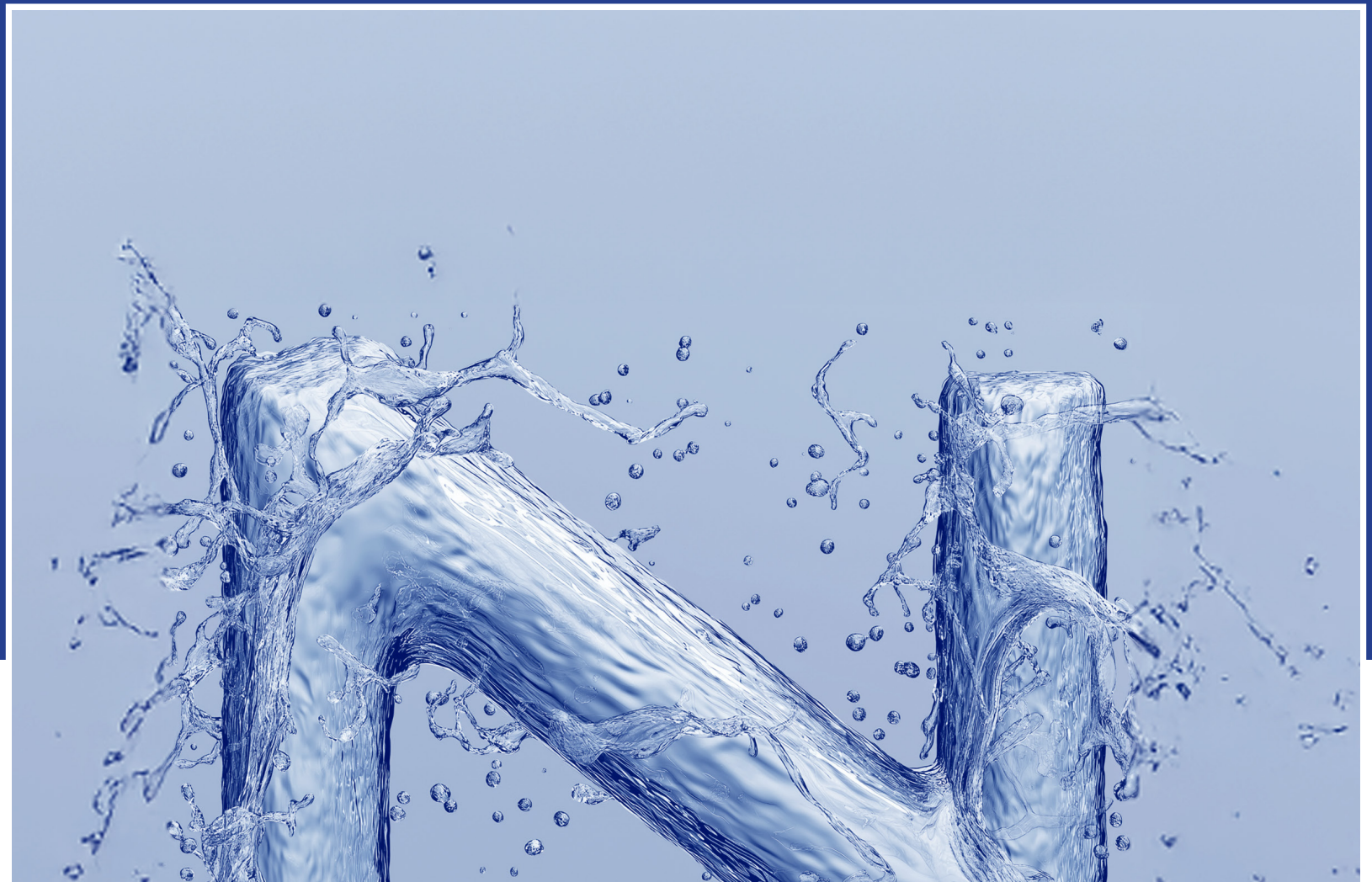


HDPE Pipes Pressure Rating and Standard Dimensional Ratio

O.D		PN 3.2 bar			PN 5 bar			PN 6 bar			PN 8 bar		
		SDR 51			SDR 33			SDR 26			SDR 21		
		Thickness		Weight	Thickness		Weight	Thickness		Weight	Thickness		Weight
min.	max.	min.	max.	kg/m	min.	max.	kg/m	min.	max.	kg/m	min.	max.	kg/m
16	16.3												
20	20.3												
25	25.3												
32	32.3												
40	40.4							1.8	2.2	0.23	1.9	2.3	0.24
50	50.5				1.8	2.2	0.29	2	2.5	0.31	2.4	2.9	0.37
63	63.6				1.938	2.3	0.40	2.5	3	0.49	3	3.6	0.58
75	75.7	1.8	2.2	0.44	2.3	2.8	0.55	2.9	3.4	0.68	3.6	4.2	0.83
90	90.9	2	2.2	0.53	2.8	3.2	0.79	3.5	4.1	0.98	4.3	5	1.18
110	111	2.2	2.7	0.79	3.4	4	1.17	4.2	4.9	1.43	5.3	6.1	1.77
125	126.2	2.5	3	1.00	3.8	4.4	1.51	4.8	5.5	1.84	6	6.9	2.27
140	141.3	2.8	3.2	1.25	4.3	5	1.88	5.4	6.2	2.32	6.7	7.7	2.83
160	161.5	3.2	3.7	1.63	4.9	5.6	2.42	6.2	7.1	3.04	7.7	8.7	3.72
180	181.7	3.6	4.1	2.05	5.5	6.3	3.07	6.9	7.8	3.79	8.6	9.7	4.67
200	201.8	3.9	4.5	2.46	6.2	7.1	3.84	7.7	8.7	4.69	9.6	10.8	5.78
225	227.1	4.4	5.1	3.12	6.9	7.8	4.77	8.6	9.7	5.89	10.8	12.1	7.30
250	252.3	4.9	5.6	3.83	7.7	8.7	5.92	9.6	10.8	7.30	11.9	13.3	8.93
280	282.6	5.5	6.4	4.83	8.6	9.7	7.40	10.7	12	9.10	13.4	15	11.30
315	317.9	6.2	7.1	6.12	9.7	10.9	9.37	12.1	13.6	11.60	15	16.8	14.20
355	358.2	7	8	7.73	10.9	12	11.80	13.6	15	14.60	16.9	18.8	18.00
400	403.6	7.8	8.8	9.82	12.3	13.6	15.10	15.3	17.1	18.60	19.1	21.3	22.90
450	453.8	8.8	9.9	12.30	13.8	15.4	19.00	17.2	19.2	23.50	21.5	23.9	28.90
500	504	9.8	11	15.20	15.3	17.2	23.40	19.1	21.3	28.90	23.9	26.5	35.70
560	564.3	11	12.4	19.10	17.2	19.2	29.40	21.4	23.8	36.20	26.7	29.6	44.70
630	634.6	12.3	13.9	24.00	19.3	21.6	37.10	24.1	26.8	45.90	30	33.3	56.40

O.D		PN 10 bar SDR17			PN 12.5 bar SDR 13.6			PN 16 bar SDR 11		
		Thickness		Weight	Thickness		Weight	Thickness		Weight
min.	max.	min.	max	kg/m	min.	max.	kg/m	min.	max.	kg/m
16	16.3							1.8	2.2	0.08
20	20.3				1.8	2.2	0.11	1.9	2.3	0.12
25	25.3	1.8	2.2	0.14	1.9	2.3	0.14	2.3	2.8	0.17
32	32.3	1.9	2.3	0.1	2.4	2.9	0.23	2.9	3.4	0.27
40	40.4	2.4	2.9	90.30	3	3.6	0.36	3.7	4.3	0.43
50	50.5	3	3.6	0.45	3.7	4.3	0.55	4.6	5.3	0.66
63	63.6	3.8	4.4	0.72	4.7	5.4	0.87	5.8	6.6	1.05
75	75.7	4.5	5.2	1.02	5.6	6.4	1.24	6.8	7.7	1.47
90	90.9	5.4	6.2	1.46	6.7	8.7	1.77	8.2	9.3	2.12
110	111	6.6	7.5	2.17	8.1	9.2	2.62	10	11.3	3.14
125	126.2	7.4	8.4	2.76	9.2	10.4	3.37	11.4	12.8	4.08
140	141.3	8.3	9.4	3.46	10.3	11.6	4.22	12.7	14.2	5.08
160	161.5	9.5	10.7	4.52	11.8	13.2	5.50	14.6	16.3	6.67
180	181.7	10.7	12	5.71	13.3	14.9	6.98	16.4	18.3	8.42
200	201.8	11.9	13.3	7.05	14.7	16.4	8.56	18.2	20.3	10.40
225	227.1	13.4	15	8.93	16.6	18.5	10.90	20.5	22.8	13.10
250	252.3	14.8	16.5	11.00	18.4	20.5	13.40	22.7	25.2	16.20
280	282.6	16.6	18.5	13.70	20.6	22.9	16.80	25.4	28.2	20.30
315	317.9	18.7	20.8	17.40	23.2	25.8	21.20	28.6	31.7	25.60
355	358.2	21.1	23.5	22.10	26.1	29	26.90	32.2	35.7	32.50
400	403.6	23.7	26.3	28.00	29.4	32.6	34.10	36.6	40.2	41.30
450	453.8	26.7	29.8	35.40	33.1	36.7	43.20	40.9	45.2	52.30
500	504	29.7	32.9	43.80	36.8	40.7	53.30	45.4	50.2	64.50
560	564.3	33.2	36.8	54.80	41.2	45.6	66.90	50.8	56.1	80.80
630	634.6	37.4	41.4	69.40	46.3	51.2	84.60	57.2	63.2	102.00

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Comparison Between PE80, PE100, and PE 100 RC

Comparison Between PE80, PE100, and PE 100 RC

	Unit	PE80	PE100	PE 100 RC
Min required strength (MRS)	Mpa	8	10	10
Density	g/cm3	0.94	0.94	0.94
Elongation at break	%	> 500	> 500	> 500
Resistance to point Load		No	No	Yes
Sand Embedding Requirements		Yes	Yes	No
FNCT test under point load life	hour	-	3300	> 8760

Imperial Nominal Bore	Metric Nominal Bore	Metric Actual O.D.
Mild & StainlessSteel	Mild & StainlessSteel	PPR or HDPE
1/2”	15mm	20mm
3/4”	20mm	25mm
1”	25mm	32mm
11/4”	32mm	40mm
11/2”	40mm	50mm
2”	50mm	63mm
21/2”	65mm	75mm
3”	80mm	90mm
4”	100mm	110mm
5”	125mm	125mm
6”	150mm	140/160mm
7”	175mm	160mm
8”	200mm	200mm
9”	225mm	225mm
10”	250mm	250mm
11”	275mm	280mm
12”	300mm	315mm
14”	350mm	355mm
16”	400mm	400mm
18”	450mm	450mm
20”	500mm	500mm
22”	550mm	560mm
24”	600mm	630mm

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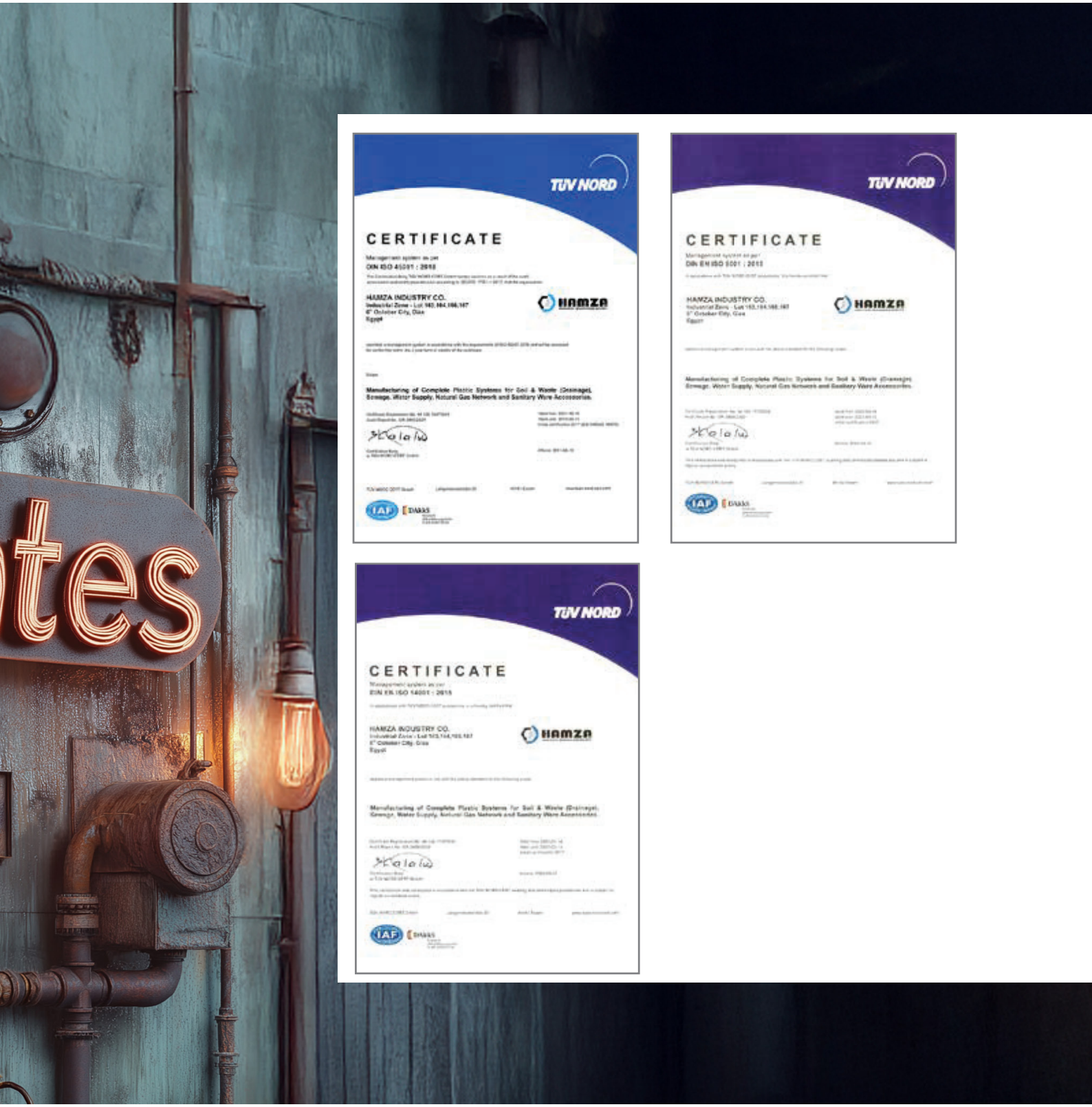


HDPE Certificates

HDPE Certificates.....



HAMZA WATERTIGHTSOLUTIONS SINCE 1949



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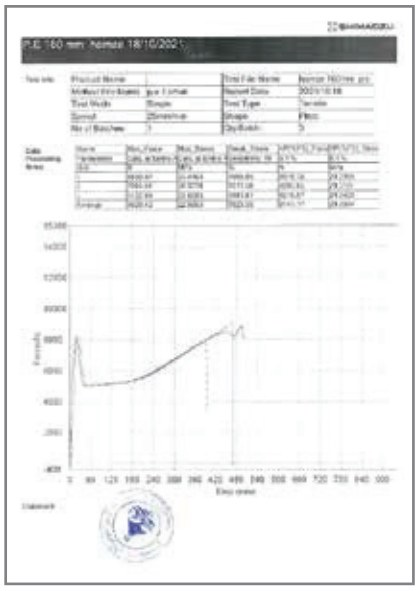






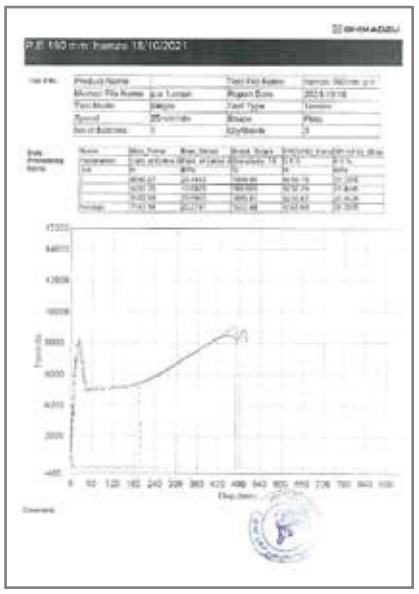














HAMZA TS

16865

62 Mohy El-Din Abo El Ezz St.
Dokki, Giza, Egypt

info@hamza.com.eg
www.hamza.com.eg

08/25

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