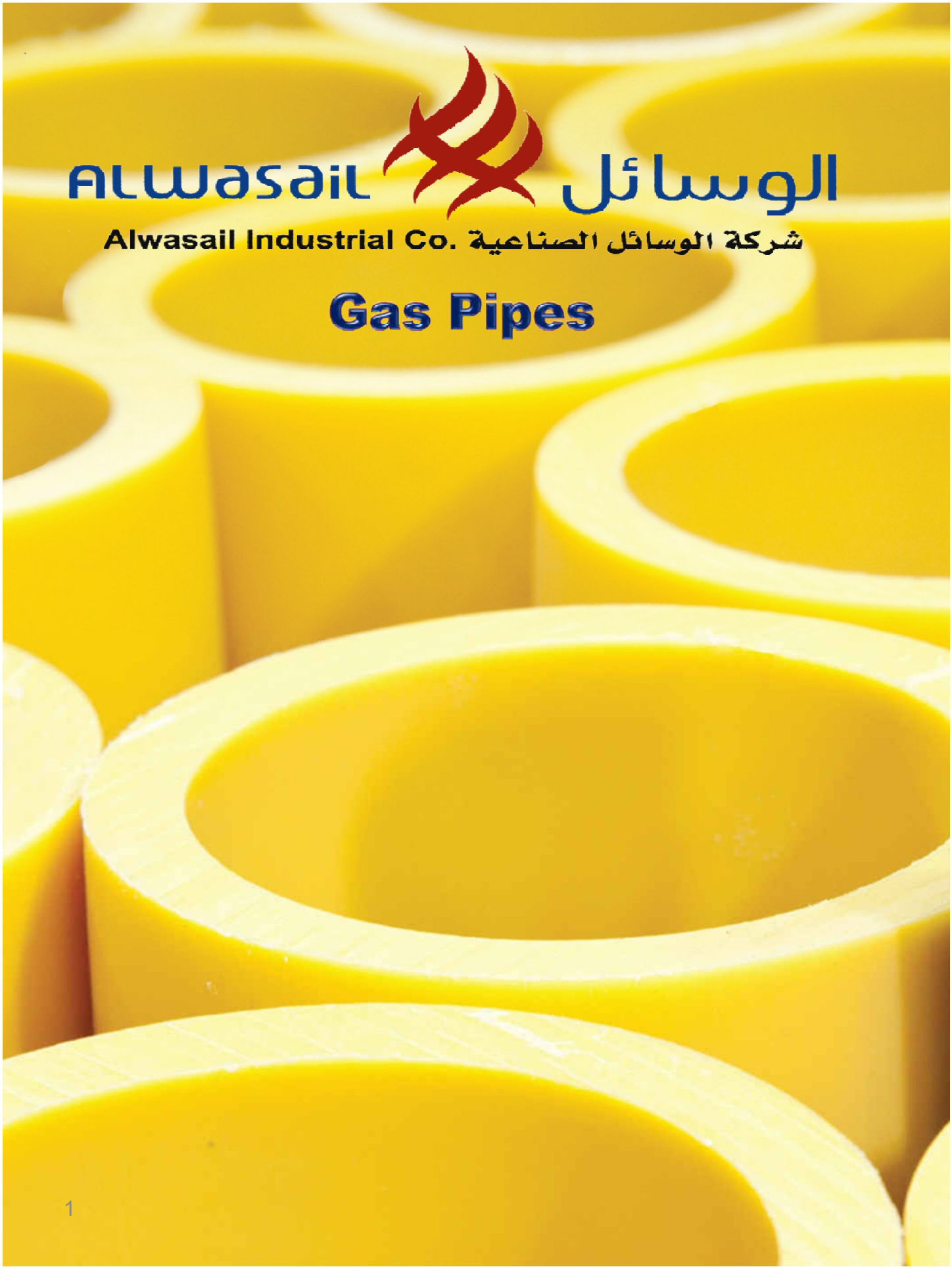
ALWASAIL الوسائل

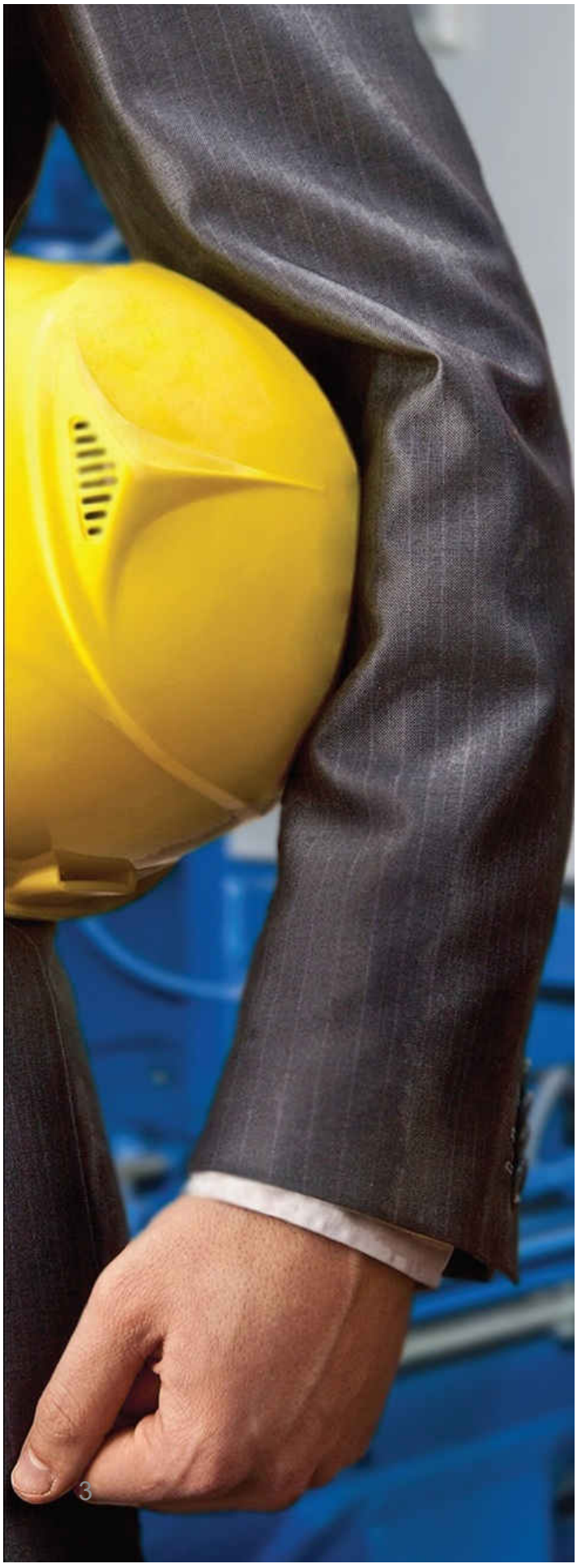
Alwasail Industrial Co. شركة الوسائل الصناعية

Gas Pipes



WELCOME TO OUR WORLD

- Alwasail is part of the world's largest manufacturer and supplier of high performance plastic pipes and offers the best and the most cost effective pipe systems for its customers.
- Alwasail specializes in polyethylene pipe systems for gas and water transportation in the utilities and industrial markets.
- Alwasail products find a broad range of applications in the industrial and utilities market on a worldwide scale.
- The water and gas distribution enterprises are important sectors for high integrity products where the maintenance of water quality and the safe transport of gaseous fuels are of paramount importance.
- Industrial applications include alternative energy installations in landfill gas systems to effluent transportation and mineral slurry.
- Products are widely used in pipeline installation, repair and maintenance.
- Many of the brands in the Alwasail portfolio have a long record of innovation in meeting the needs of the water and gas utilities.
- Being one of the foremost pioneers in polyethylene pipe systems, Alwasail is continually improving and updating its offer to meet the ever growing needs of the distribution engineer, ensuring they stay at the forefront of world gas and water distribution/treatment systems.
- +100 Production Lines with more than yearly capacity exceeding 100,000 Tons of HDPE pipes and fittings
- Alwasail Covering The Markets Of Saudi Arabia And The MENA Countries for Polyethylene Pipes



CUSTOMER FOCUS

The key to our success lies in the commitment to provide the highest quality service and support.

We are a team of highly motivated and experienced individuals.

We place the utmost importance on meeting the needs of our customers, constantly evolving our extensive product portfolio to meet the ever changing demands of the water and gas utilities, industrial and foreign markets.

QUALITY

Alwasail is a result-driven business – its people, products and service.

Designed, manufactured and supplied under EN ISO 9001:2000 accredited Quality Management Systems, Alwasail products comply with relevant national, European and international product standards

MATERIAL PROPERTIES & COMPATIBILITY .

Alwasail manufactures polyethylene systems in both PE80 and PE100. The numbers relate to the MRS (Minimum Required Strength) values of the material.

PE 80

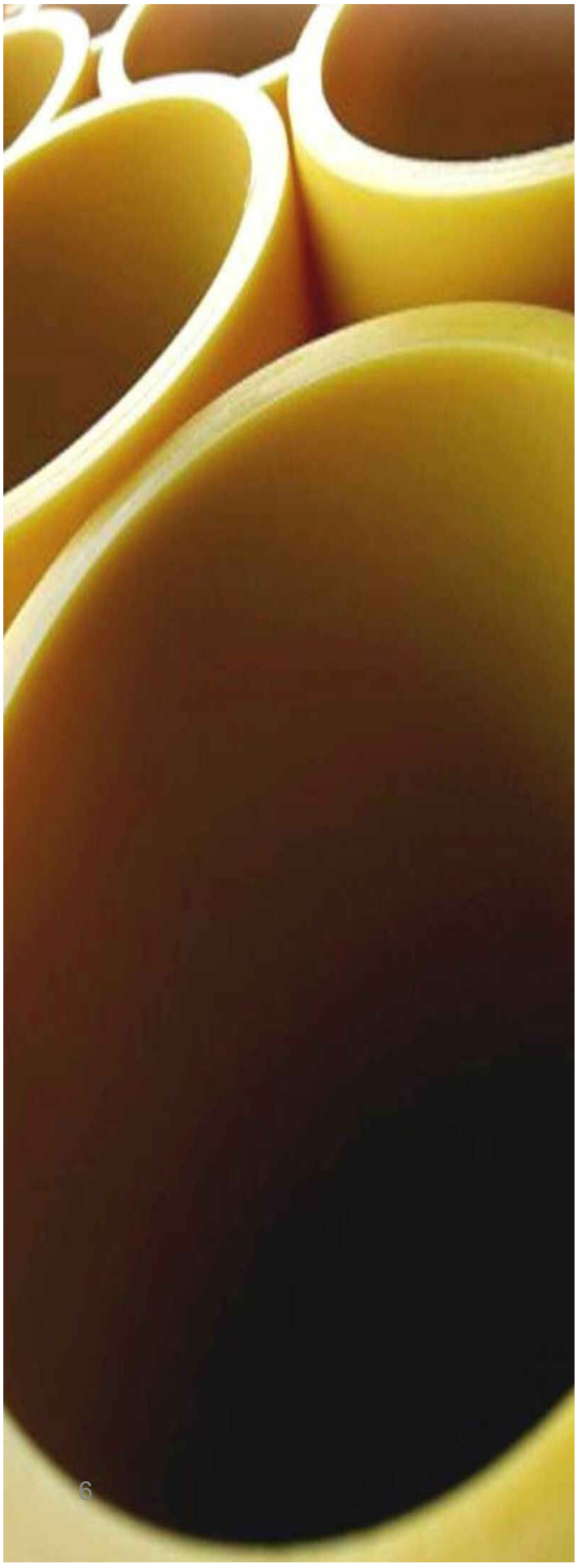
This is a term used to denote the polyethylene material which has been widely used for gas, water and industrial applications for many years. The terms MDPE and HDPE were commonly used for this material.

PE 100

This is a term used to denote high performance polyethylene, and PE100 pipes are sold by Alwasail under the brand name. PE100 is a higher density material than PE80 and demonstrates exceptional resistance to rapid crack propagation as well as to long-term stress cracking..
Moreover, the higher performance permits thinner pipe walls than PE80 for the same operating pressure.
It therefore uses less polymer and provides for a larger bore and increased flow capacity for a given nominal pipe size. This can result in significant cost savings at certain sizes and pressure ratings.

PROPERTIES AND METHOD OF TESTING OF MATERIALS AND THEIR COMPATIBILITY

Melt flow rate tester	ISO 1133
Density tester	ISO1183
Carbon Black Dispersion Tester	ISO18553
Carbon black content tester	ISO6964
Internal hydrostatic pressure	ISO1167
Universal testing machine Tensile test (elongation at break strain at break)	ISO 6269
Accelerated weathering testing machine	ISO 4892
Heat reversion tester	ISO 2505



EXPANSION AND CONTRACTION

The average coefficients of linear thermal expansion between 20°C and 60°C for PE80 (MDPE) (1.3x10- 4°C-1) and PE100 (1.5x10-4°C1) are approximately ten times greater than for metal. Allowance must be made for this when designing polyethylene pipeline installations where significant temperature variation is expected (eg. above ground).

In above ground installations the natural flexibility of the pipe, coupled with judicious sitting of anchor and support brackets, will conveniently accommodate expansion and contraction at changes of direction, etc. In installations where fully end-load bearing joints are used, the compressive or tensile forces set up in the pipeline due to constraint of thermal movement will not detract from long-term performance, but the effect of these forces on pipe support, ancillary equipment and so on, must be considered and allowance must be made.

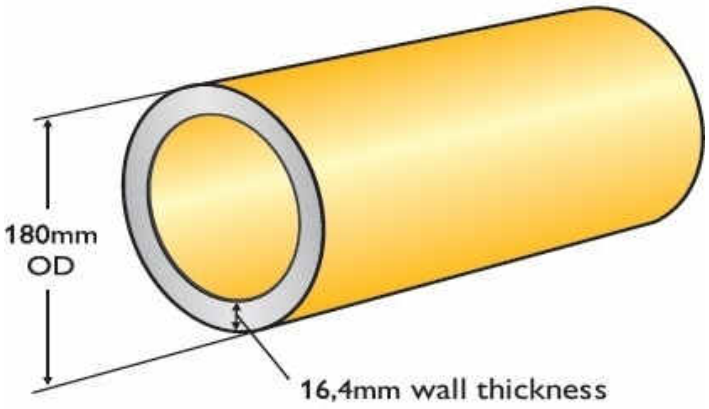
STANDARD DIMENSIONAL RATIO (SDR)

$$SDR = \frac{\text{NOMINAL (MINIMUM) OUTSIDE DIAMETER}}{\text{MINIMUM WALL THICKNESS}}$$

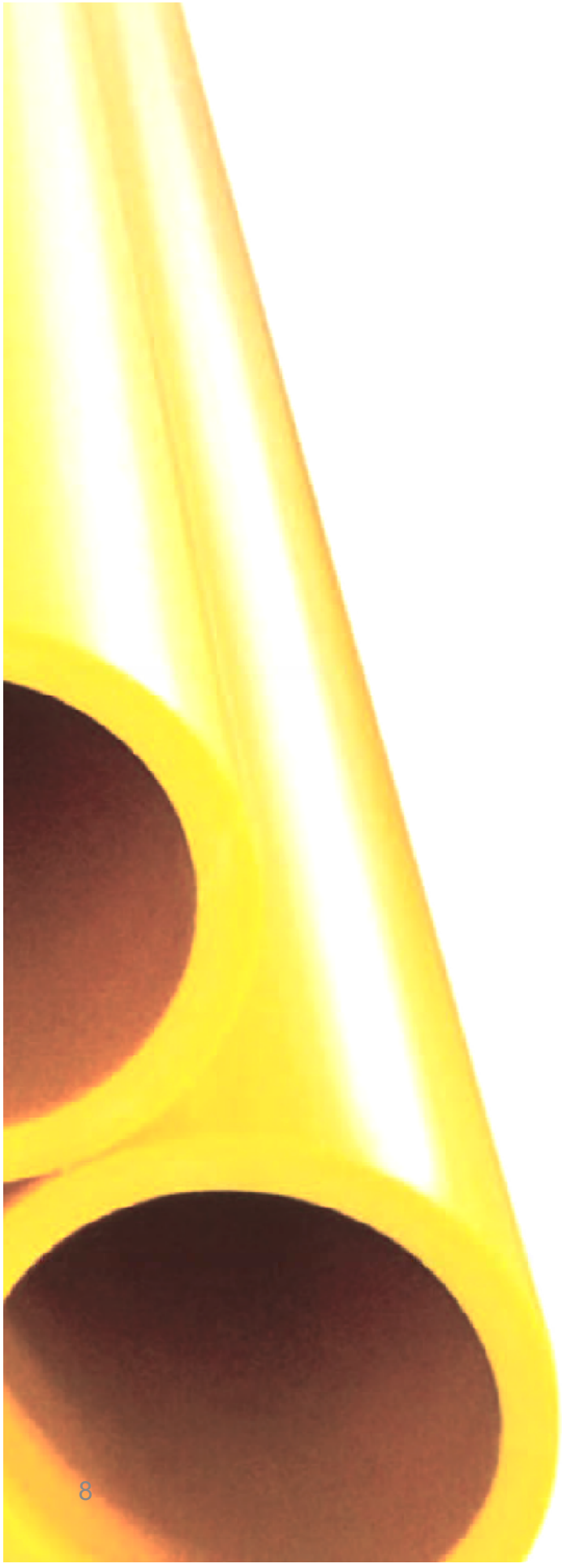
One of the items of information contained on both pipe and fittings is the standard dimensional ratio.

EXAMPLE: $SDR11 = \frac{180}{16.4}$

In all but the smallest sizes of PE pipe (<25mm) the ratio between wall thickness and outside diameter remains constant for a given pressure rating of the pipe.



This relationship, called the standard dimensional ratio of SDR, can be expressed as an equation:



PIPE BENDING RADIUS FOR PE

The minimum bend radius for Alwasail PE pipes is 15 times the pipe OD under optimum conditions (ie.warm ambient temperature and thickwall/low SDR pipe) A more typical safe bending radius for SDR11 andSDR17 pipes is 25 times, increasing to 35 times the pipe OD in very cold weather. For thin-walledSDR26 and SDR33 pipes, these values should be increased by 50% .

Electrofusion or mechanical joints and fittings should not normally be incorporated in sections of pipework which are to be bent. Instead a formed bend or elbow should be welded into the pipeline in order to prevent excessive stress.

In the case of pipe supplied in coils or drums, the above bend radius values apply only if pipe is bent in the same direction as it was previously coiled.

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the compressive or tensile forces set up in the pipeline due to constraint of thermal movement will not detract from long-term performance,
but the effect of these forces on pipe support, ancillary equipment and so on, must be considered and allowance must be made.

The potential for thermal movement is a particular issue where a (fully end-load bearing) PE system is connected to any non end-load bearing mechanically jointed system. It is essential that such transitions are securely anchored, to obviate the risk of any joints in the mechanically jointed system separating.

It is also prudent to allow a newly installed pipeline time to conform to ambient temperature before end .

JOINTING PE TO PE BY FUSION PE PIPES OF DIFFERENT SDRS

BUTT-WELDING

Butt-welding should only be used for jointing pipes of the same SDR value.

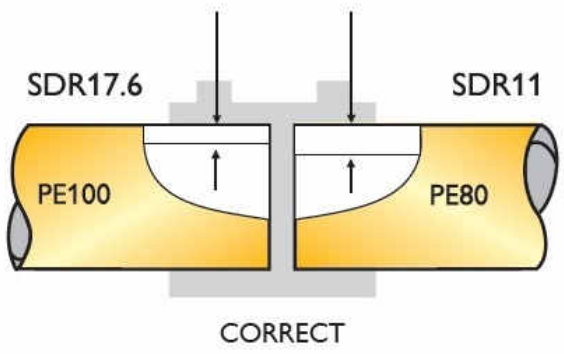
ELECTROFUSION

Electrofusion fittings are able to weld pipes having different wall thicknesses (SDRs). Care should be taken to ensure that the pressure rating is equal to or greater than that of the pipe. SDR applications are marked on individual fittings. However, for the more unusual SDRs, specific advice should be sought from our Technical Support Department.

JOINTING DIFFERENT TYPES OF PE

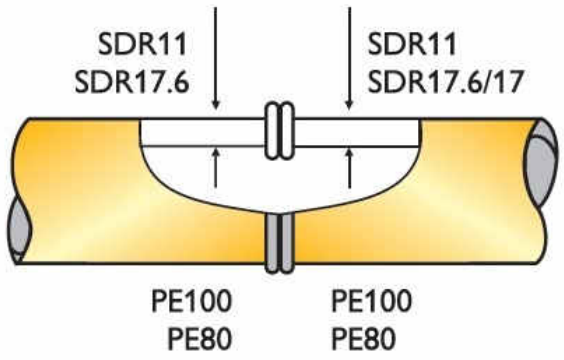
Similarly different grades of PE can be joined together in like fashion. Butt-welding different pipe materials – for example, PE80 to PE100 – is not recommended on site..

MATERIAL AND SDR COMPATIBILITY SUMMARY



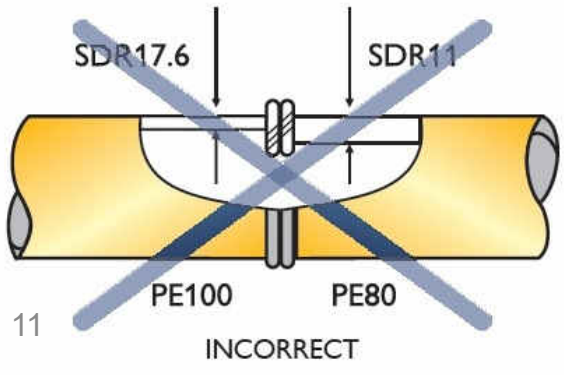
Dissimilar materials and dissimilar wall thicknesses can be jointed by electrofusion.

NB. The maximum working pressure should not exceed the lower value for the two pipes



Similar materials and/or wall thicknesses may be jointed by butt-fusion or electrofusion.

NB. SDR17 may be butt-fused to SDR17,6



Dissimilar wall thicknesses must not be jointed on-site using butt-fusion.

NB: PE80 should only be butt-fused to PE100 under closely controlled factory conditions.

PRESSURE TESTING – GAS

PNEUMATIC PRESSURE TESTING

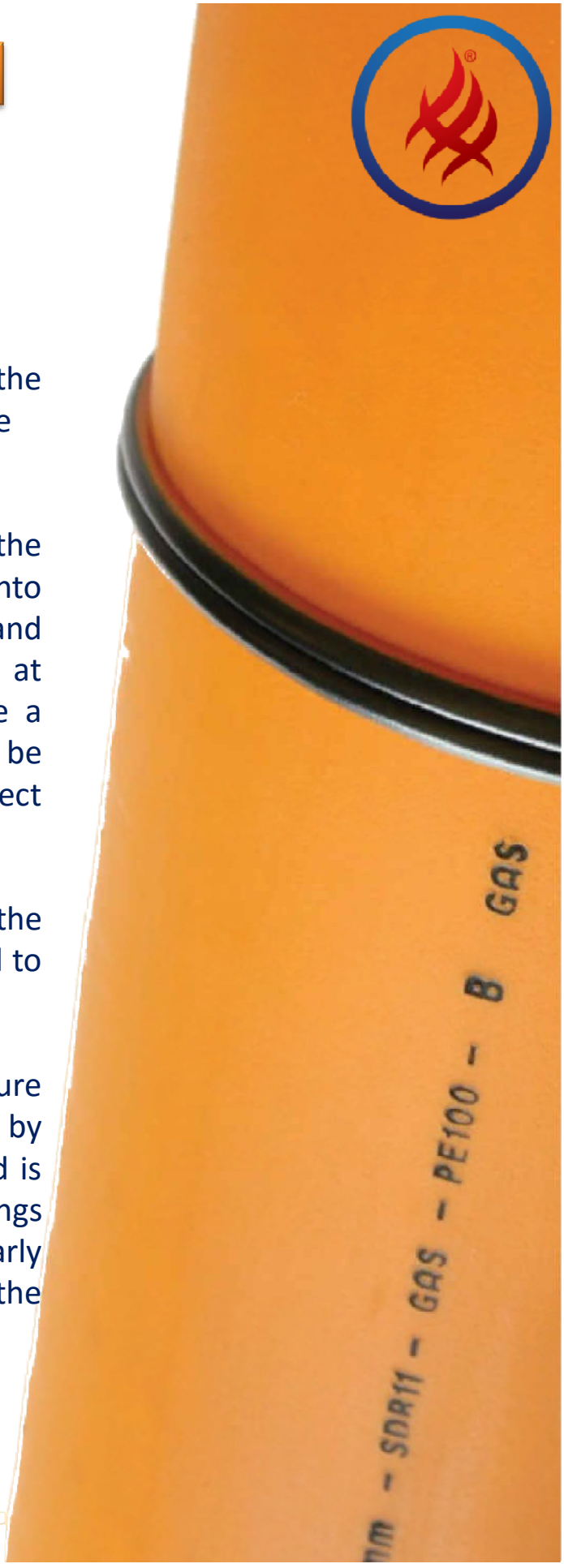
This is a leakage test that simulates the system at its maximum operating pressure under gas conditions.

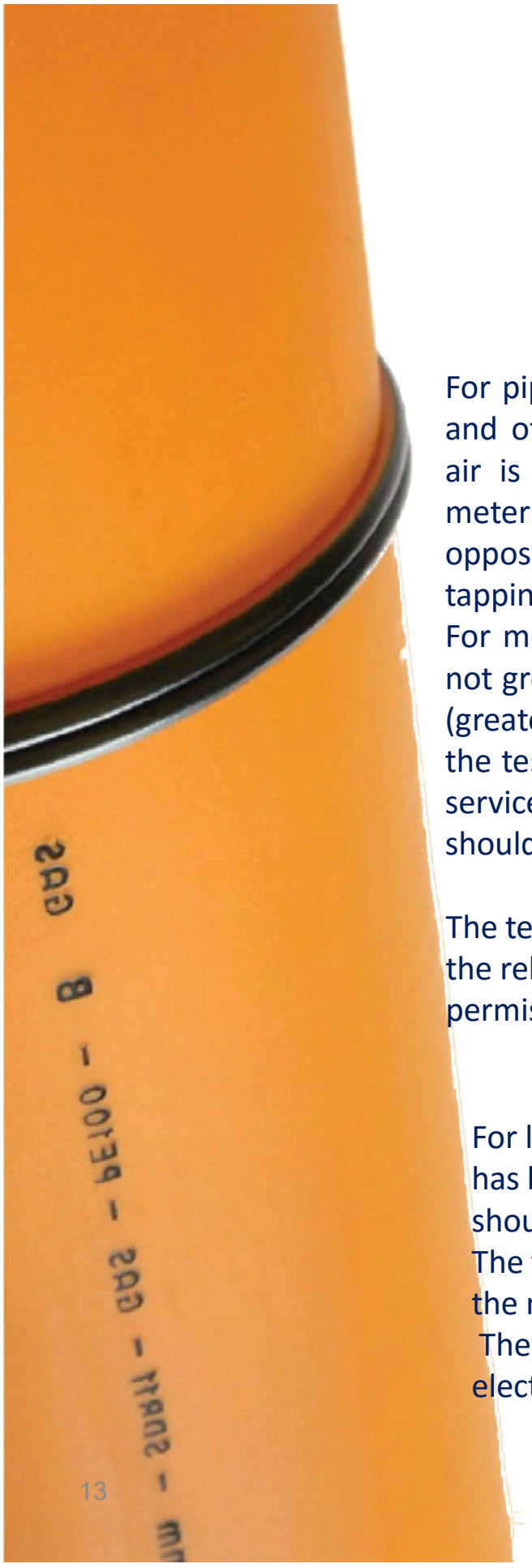
When conducting this type of test the barometric pressure must be taken into account. For pipes greater than 63mm stand pipes and gauges should be connected at the ends of the new main and include a pressure relief valve. Air should be introduced into the main until the correct test pressure is attained.

Before the start of the test period, the temperature of the air should be allowed to stabilize.

At the start of the test period a pressure reading should be taken followed by another reading at the end. If the period is long, it may be wise to take several readings during the test. In this way, any early indication of probable test failure avoids the need of running the full test period.

When completed, air should be vented in a controlled manner until the main is at atmospheric pressure.





For pipes of a diameter not greater than 63mm, and of low pressure (not greater than 75mbar), air is introduced into the service through the meter control valve, which is left open whilst the opposite end of the service, at the electrofusion tapping tee, is securely blanked of.
For medium pressure (greater than 75 mbar but not greater than 2bar) and intermediate pressure (greater than 2 bar, but not greater than 7 bar) the test is from the main to the inlet valve of the service governor,the pressure in the service should be increased to the relevant value.

The test period should be as recommended by the relevant governing body. No pressure loss is permissible.

For low pressure services, once a successful test has been completed, the meter control valve should be closed.
The test apparatus detached and the integrity of the meter control valve tested.
The pressure can then be released from the electrofusion tapping tee end.

LEAKAGE DETECTION

The pipeline should be dosed with a suitable tracing agent and pressurized to 350 mbar.

The length of the pipe should then be checked using a suitable detection device. Once the leak(s) has/ have been located, the pipe should be repaired and all pressure tests repeated.

TEMPERATURE EFFECTS

Pressure changes with temperature and any calculations must consider this.

To reduce temperature variations as much as possible the pipe trench should be backfilled..

HANDLING AND STORAGE

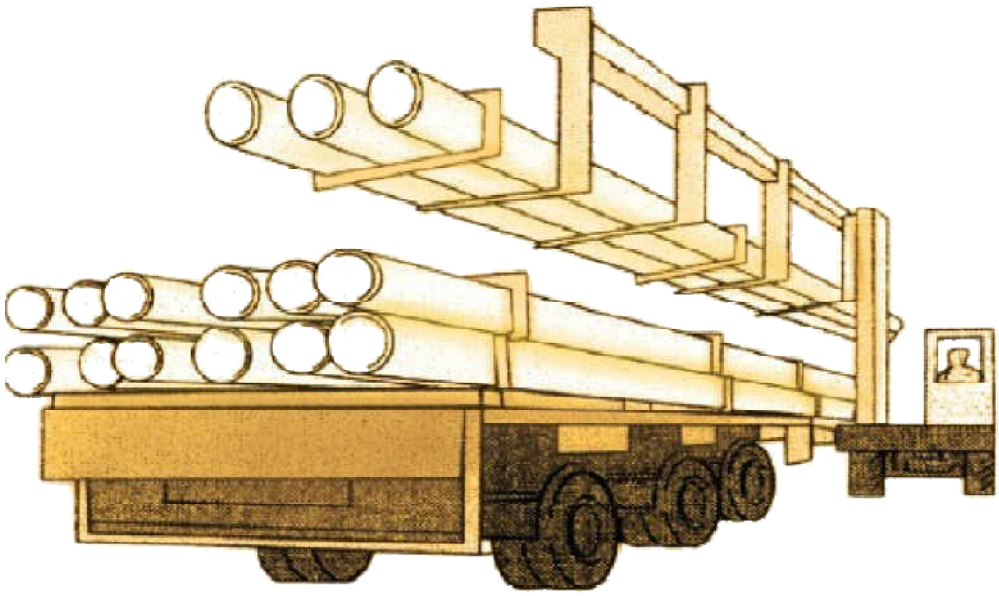
GENERAL HANDLING

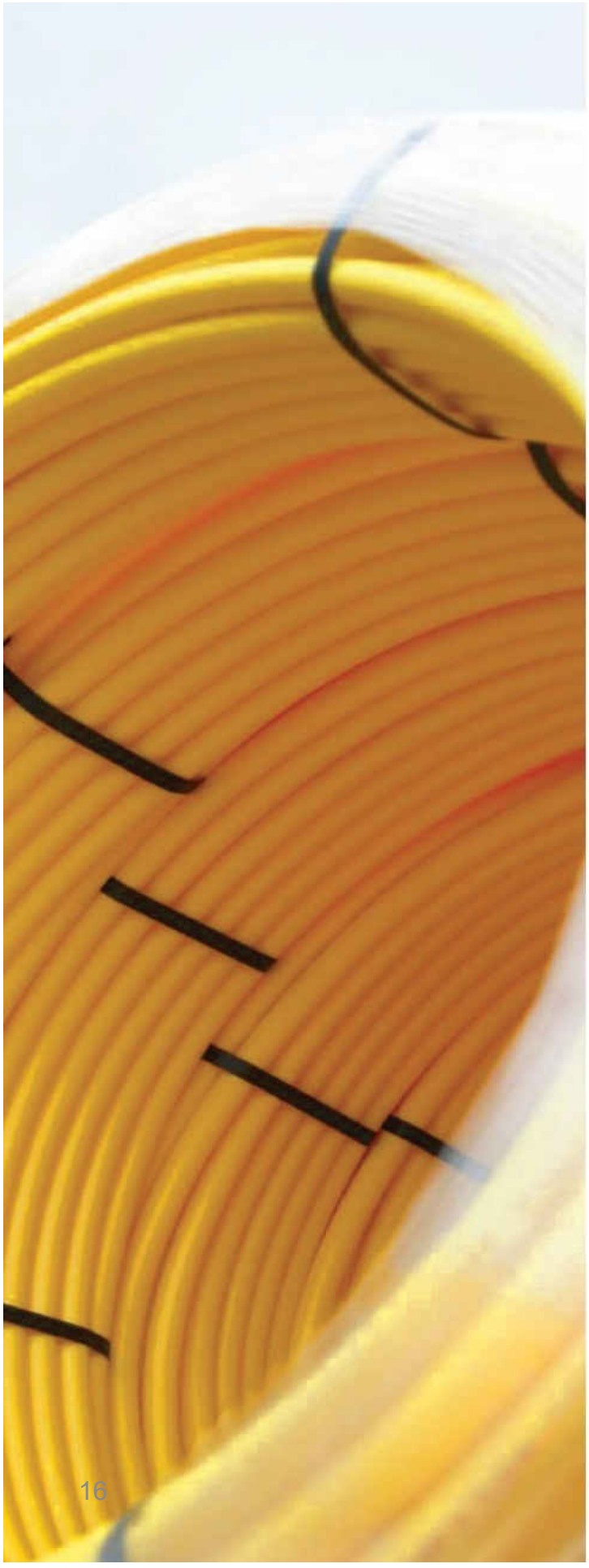
Polyethylene is a resilient material, lightweight and easy to handle. Nonetheless, care should be taken not to cause excessive scuffing or

LENGTHS AND BUNDLES

A flat-bed vehicle, free from sharp objects and projections should be used for transporting pipes. When lifting pipe bundles by crane, wideband slings should be used; do not use chains, hooks or hawsers. For lengths greater than six meters, load-spreading beams should be inserted at equal distances apart.

Allow for a certain amount of deflection or slight bending of pipe bundles when loading or unloading. Standard six meter bundles may be handled by forklift, but longer lengths should be moved by a side-loader with a minimum of four supporting forks or by a crane with a spread beam. Individual lengths should be handled similarly. Off-loading on site will be eased by skid timbers and rope slings.





HANDLING AND STORAGE

RELEASING COILS

Safety first: Pipe held in coils is under tension and is strapped accordingly. Coils may be hazardous if released in the incorrect manner – particularly if the end of the pipe is not kept restrained at all times. It is most important to read and understand the following guidelines before attempting to release coils.

Coils are secured by one of two methods depending on the pipe's diameter

OUTER BANDS WITH ADDITIONAL STRAPPINGOF INDIVIDUAL LAYERS.

Do not remove any of these bands until pipe is required for use. Remove them carefully, from the outermost layer first, so that only the length of pipe needed immediately is released.

Successive layers can be released by removing bundling as the pipe is drawn away from the coil.

Coils of pipe above 32mm diameters should only be dispensed in the field from proprietary trailers.

FITTINGS

Never use hooks to lift fittings. Make sure that the tines on forklift trucks are adequately covered. (eg. by scrap PE pipe offcuts).

STORAGE

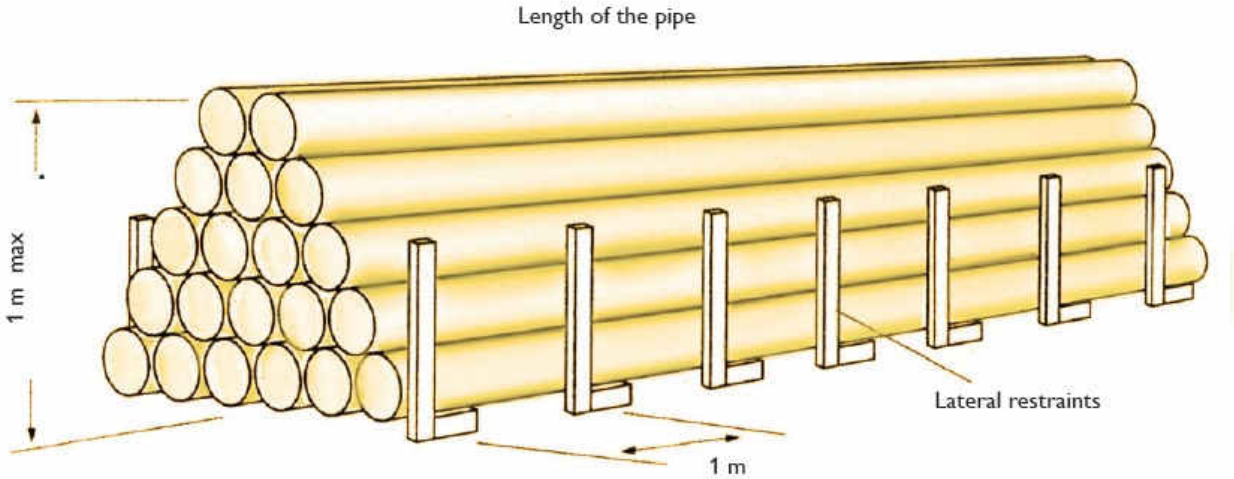
Badly stacked pallets, coils or bundles may slip or collapse, causing injury to personnel or damage to the pipe. Pipe-end caps, intended to prevent ingress of contamination, should be kept in place during storage.

LENGTHS

Pipe lengths stored individually should be stacked in a pyramid not higher than one meter with the bottom layer fully restrained by wedges. Where possible, the bottom layer of pipes should be laid on timber battens at e-meter centers. On site, pipes may be laid out individually in strings. Where appropriate, protective barriers should be placed with adequate warning signs and lamps.

BUNDLES

Bundled packs of pipe should be stored on clear, level ground, with the battens supported from the outside by timbers or concrete blocks. For safety, bundled packs should not be stacked more than three meters high.



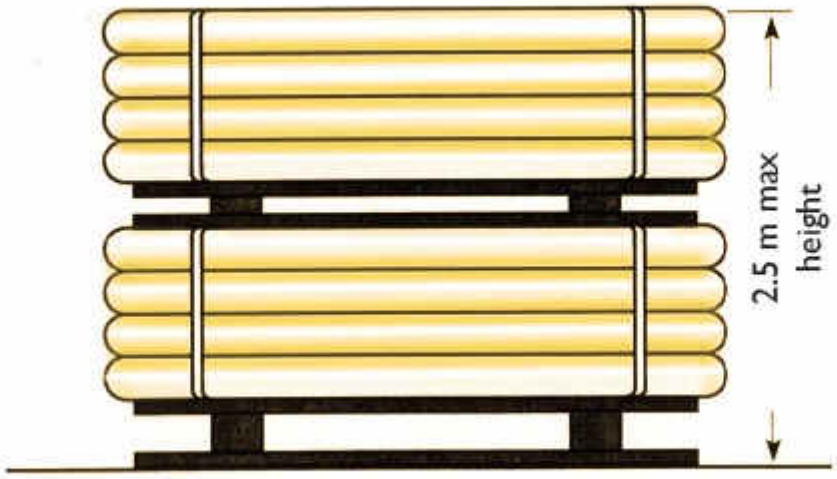
Storage of loose pipes

COILS

POLYETHYLENE GAS PIPES

Coiled pipe should be stored flat, especially during periods of warm weather, and on firm level ground which has suitable protection for the bottom coil.

Where space is limited and coils are to be stacked, the height of stacked coils should be such that the stack is stable and the uppermost coil can be safely handled.

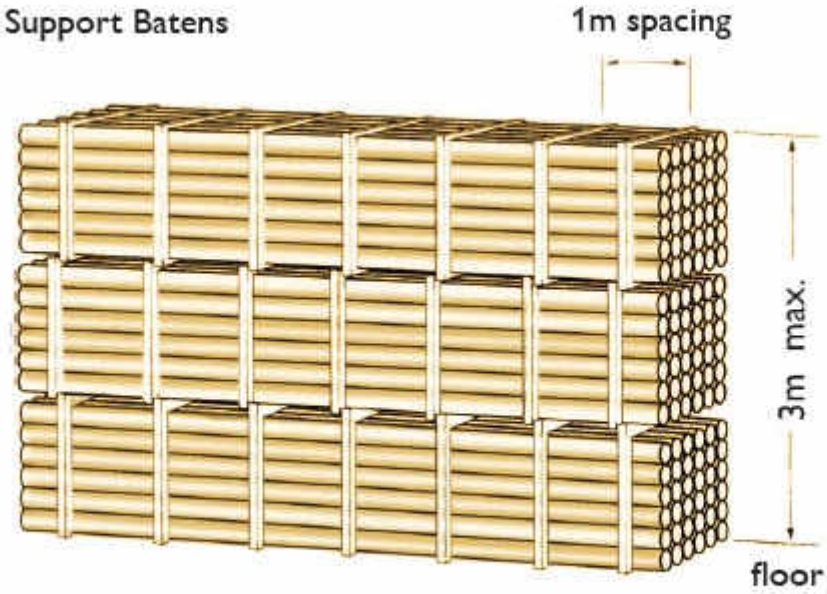


Storage of coils

FITTINGS

Electrofusion fittings should be stored under cover in dry conditions, preferably on racking.

They should be kept in their boxes or packaging until ready for use. Butt fusion and spigotted fittings may be stored outdoors, as long as they are protected against damage and prolonged direct sunlight.
Electrofusion fittings should be retained in their plastic bags until used.



Storage of bundles

Procedures And Techniques For Pipeline Installation

Polyethylene pipe systems from Alwasail industrial are designed to make installation quicker, easier and more cost-effective. Installation is as much a part of the costing equation as ease of maintenance and the cost of the pipe system itself.

PE's great advantage in installation is its lightness and flexibility, coupled with its durability and totally secure jointing methods. For all modern pipelining techniques, whether in rehabilitation work or the construction of new pipeline above or below ground level, PE80 and PE systems from Alwasail usually provide the simplest, most economic solution. Indeed, rehabilitation techniques have been developed which rely completely on polyethylene's properties.

A major advantage of PE is that pipe lengths can be butt-fused or electrofusion jointed to form a continuous string of pipe and there is rarely need for thrust blocks. Together with the material's inherent flexibility, this makes polyethylene ideally suited to a full range of new and innovative installation techniques.

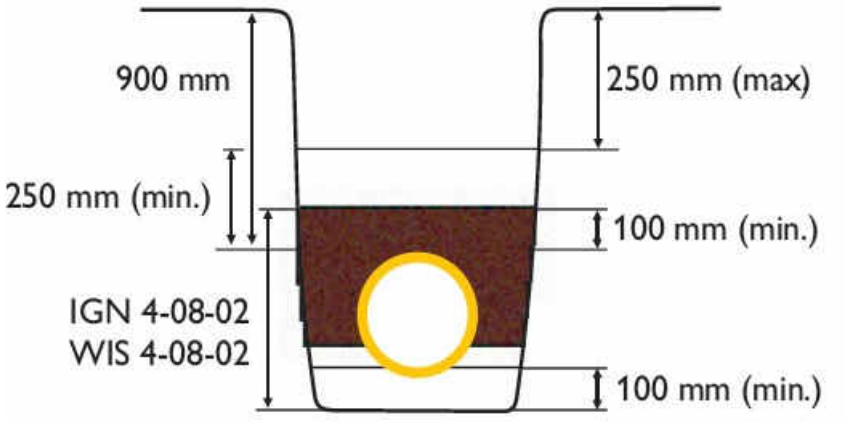
Conventionally Buried Pipelines

Considerable savings in the costs of imported backfill reinstatement and waste spoil disposal can be made if trench width is minimized. The dimensions of a trench line opening are normally governed by the pipe diameter, method of jointing and site conditions. Normal minimum depth of cover for mains should be 900mm from ground level to the crown of the pipe. Trench width should not normally be less than the outside diameter of the pipe plus 250mm to allow for adequate compaction of sidefill unless specialized narrow trenching techniques are use and/or specially free flowing and self-compacting side materials are employed.

Bar Coded Electrofusion Fittings

Technology is now available which eliminates the need to enter the fusion time manually. Special control units can be supplied with the ability to read a bar code where fixed to an electrofusion fitting. These machines have a "light pen" attached which the operator uses to input the data contained within the bar code. Bar code control units also have data logging facilities to ensure traceability of welding parameters. An output socket allows the downloading of this information onto a computer database or printer to obtain a complete record of the joints which have been made.

This information can be downloaded daily, or upon completion of the project. The units will store up to 200 operations. The ECU will display a description of the fitting which includes three digits to denote size and this should be read and checked by the operator before proceeding



BUTT-FUSION Jointing Principles

GENERAL

Butt-fusion is a jointing method which allows on-site jointing of pipes from 90mm to 100mm. It is process which involves the simultaneous heating of the ends of two components which are to be joined, until a melt state is attained at each contact surface.

The two surfaces are then brought together under controlled pressure for a specific fusion/cooling time and homogenous fusion takes place.

The resultant joint is fully resistant to end thrust and has identical performance under pressure to the pipe. This method of jointing requires an electrically heated plate to raise the temperature. It is used for both PE80 and PE100 grades of material for pipe of size 90mm and above of the same Standard Dimension Ratio (SDR).

Butt-fusion machines are available in manual, semi-automatic and fully automatic configurations. The machine sizes start at 90mm and can weld up to 1000mm OD pipe.

JOINTING METHOD

PRE-WELDING CHECKS

Before commencing a welding operation check that:

1.There is sufficient fuel for the generator to complete the joint and that it is functioning correctly before it is connected to the machine

2.The trimming tool and hydraulic pump are in working order

3.The heater plate is clean and residues from previous welds have been removed

4.A tent is available to provide shelter during welding

5.The machine is complete and undamaged

6.The pipes and/or fittings to be jointed are of the same size, SDR and material

7.The operator knows the correct welding parameters for the machine and pipe being welded

8.The heater plate is at the correct temperature. (Connect the heater plate to the power supply and retain it for at least 20 minutes inside the thermally insulated guard)

The heater plate may be washed when cold at the start of the jointing session, with copious quantities of clean water to remove dirt deposits. Only clean, lint free materials may be used to clean the plate. To remove grease and oily films the plate may be wiped with lint free material dampened by a suitable solvent.

Technical Characteristic Of Gas Pipes

GENERAL TABLE

WORKING PRESURE	4 BAR	10 BAR
PE 80	SDR 11	-
PE 100	SDR 17.6	SDR 11
MATERIAL SAVING	35%	-
GAIN IN CROSS-SECTRION	17%	-
GAIN IN CAPACITY	35%	-

GAS PIPES

MATERIAL: PE80
SAFETY FACTOR: C=2.0
STANDARD: EN 1555-2

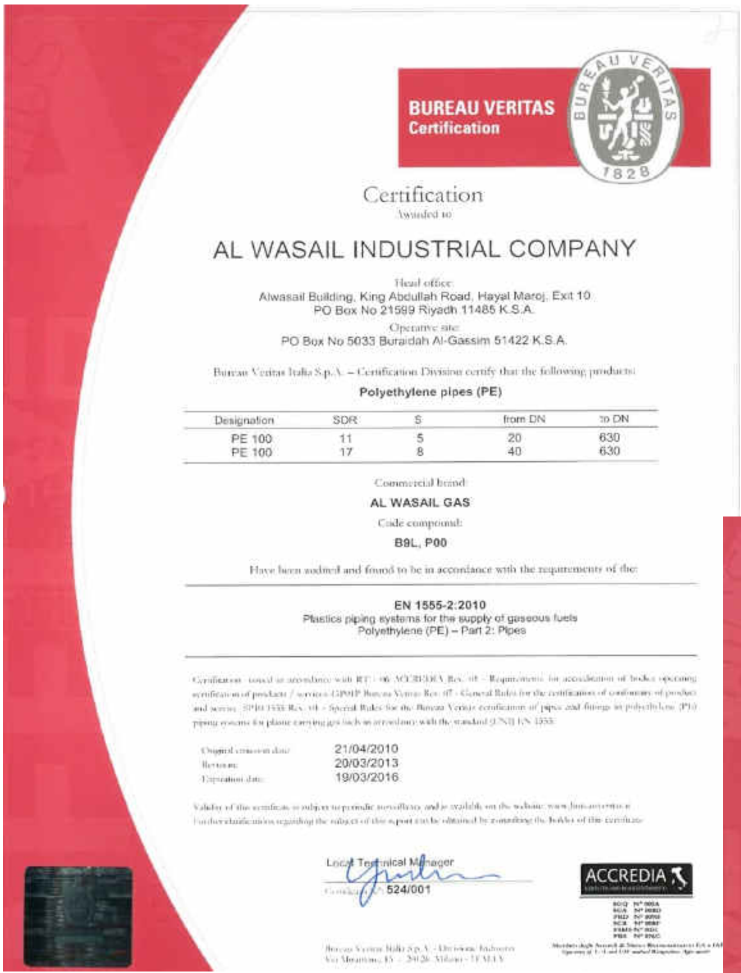
D (mm)	SDR 11 / PN 4 bar S 5	
	S (mm)	WEIGHT (kg/m)
16	-	-
20	2.3	0.120
25	2.3	0.150
32	2.9	0.272
40	3.7	0.430
50	4.6	0.666
63	5.8	1.05
75	6.8	1.47
90	8.2	2.12
110	10.0	3.14
125	11.4	4.08
140	12.7	5.08
160	14.6	6.67
180	16.4	8.42
200	18.2	10.4
225	20.5	13.1
250	22.7	16.2
280	25.4	20.3
315	28.6	25.6
355	32.2	32.5
400	36.3	41.3
450	40.9	52.3
500	45.4	64.5
560	50.8	80.8
630	57.2	102

GAS PIPES

MATERAIL: PE100
SAFETY FACTOR: C=2.0
STANDARD: EN 1555-2

D (mm)	SDR 17.6/PN 4 BAR S 8.3		SDR 11/PN 10 BAR S 5	
	S (mm)	WEIGHT (kg/m)	S (mm)	WEIGHT (kg/m)
16	-	-	-	-
20	-	-	2.3	0.120
25	2.3	0.150	2.3	0.150
32	2.3	0.200	2.9	0.272
40	2.3	0.285	3.7	0.430
50	2.9	0.440	4.6	0.666
63	3.6	0.688	5.8	1.05
75	4.3	0.976	6.8	1.47
90	5.1	1.39	8.2	2.12
110	6.3	2.08	10.0	3.14
125	7.1	2.66	11.4	4.08
140	8.0	3.34	12.7	5.08
160	9.1	4.35	14.6	6.67
180	10.2	5.48	16.4	8.42
200	11.4	6.79	18.2	10.4
225	12.8	8.55	20.5	13.1
250	14.2	10.6	22.7	16.2
280	15.9	13.2	25.4	20.3
315	17.9	16.7	28.6	25.6
355	20.1	21.2	32.2	32.5
400	22.7	26.9	36.3	41.3
450	25.5	34.0	40.9	52.3
500	28.4	42.0	45.4	64.5
560	31.7	52.5	50.8	80.8
630	35.7	66.5	57.2	102

CERTIFICATES



BUREAU VERITAS
Certification

Certification
Awarded to

AL WASAIL INDUSTRIAL COMPANY

Head office:
Alwasail Building, King Abdullah Road, Hayal Maroj, Exit 10
PO Box No 21599 Riyadh 11485 K.S.A.
Operative site:
PO Box No 5033 Buraidah Al-Gassim 51422 K.S.A.

Bureau Veritas Italia S.p.A. – Certification Division certify that the following products:

Polyethylene pipes (PE)

Designation	SDR	S	from DN	to DN
PE 100	11	5	20	630
PE 100	17	8	40	630

Commercial brand:
AL WASAIL GAS
Code compound:
B9L, P00

Have been audited and found to be in accordance with the requirements of the:

EN 1555-2:2010
Plastics piping systems for the supply of gaseous fuels
Polyethylene (PE) – Part 2: Pipes

Original emission date: 21/04/2010
Revision: 20/03/2013
Expiration date: 19/03/2016

Local Technical Manager
Certificate N° 524/001

ACCREDIA

BUREAU VERITAS
Certification

Certificate of Conformity
Awarded to:

AL WASAIL INDUSTRIAL COMPANY

Head Office:
Alwasail Building, King Abdullah Road, Hayal Maroj, Exit 10
PO Box No 21599 Riyadh 11485 K.S.A.
Operative Site:
PO Box No 5033 Buraidah Al-Gassim 51422 K.S.A.

Bureau Veritas Italia S.p.A. certifies that the following products:

Polyethylene pipes (PE)

Designation	SDR	MOP	from DN	to DN
PE 100	11	10	20	630
PE 100	17	6.25	40	630
PE 80	11	8	20	250
PE 80	17	5	20	250

Commercial Brand:
AL WASAIL GAS
Code compound:
PE100: B9L, P00, B92H, E9
PE80: FG, E8, B41

Have been evaluated and found in accordance with the requirements of the standard:

EN 1555-2:2010
Plastics piping systems for the supply of gaseous fuels
Polyethylene (PE) – Part 2: Pipes

Certificate issued in conformity to RG-01-03 ACCREDIA Rev.00 and TQR-REG-02 Bureau Veritas Rev. 05 – Regulation for the certification of product / process / service.

Original Emission date: 21/04/2010
Current Emission date: 19/03/2016
Expiration date: 18/03/2019

The validity of this certificate is subject to a constant periodical surveillance and it can be checked on the following website: www.bureauveritas.it - Further clarifications regarding the scope of this certificate and the applicability of standard's requirements may be obtained by consulting the organisation.

(Eng. Francesco Sirera – Technical Director)

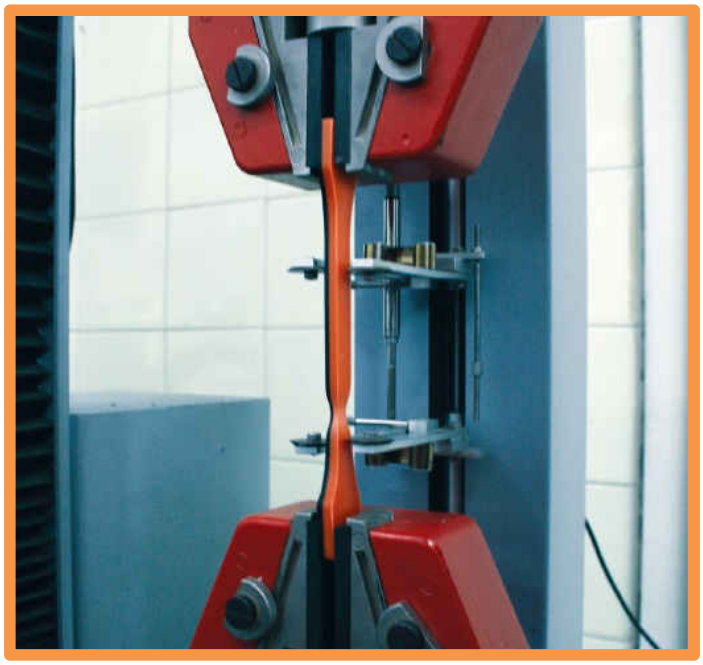
Certificate N° 524/001

ACCREDIA

Bureau Veritas Italia S.p.A. – Via Miramare, 15 – 20126 Milan (MI) – ITALY

LABORATORY TESTING

ELONGATION AT BREAK

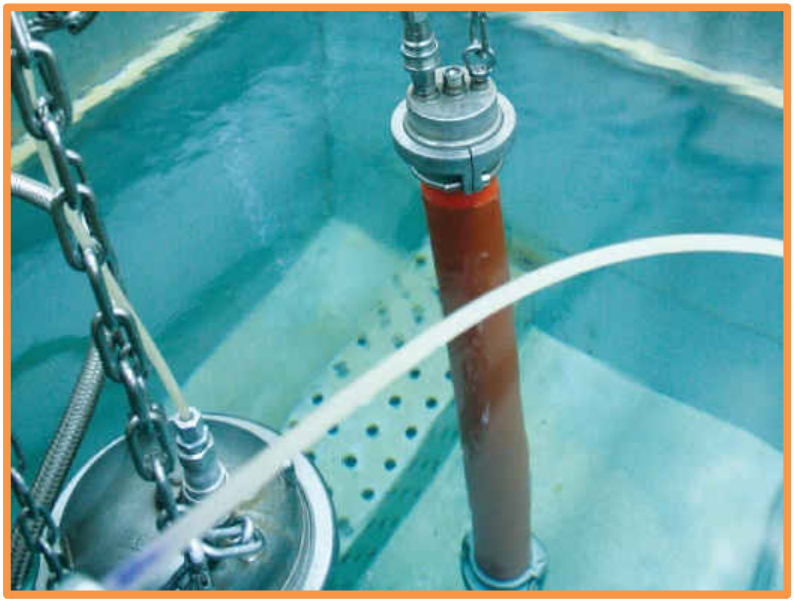


LONGITUDINAL REVERSION

MELT MASS-FLOW RATE

VOLATILE CONTENT

HYDROSTATIC STRENGTH AT 80º AND 20º C



DENSITY

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