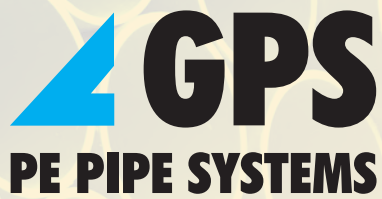




Gas

The complete handbook
for PE pipe systems

Our vision and values



GPS PE Pipe Systems are a market leading range of high-performance fluid handling solutions, that provide the safe delivery of gas and clean drinking water to homes and businesses across the world.

MANUFACTURING
IN THE UK

**BESPOKE
SERVICES**
FOR COMPLEX
PROJECTS
















CLOSE
COLLABORATION
WITH
**UK UTILITY
COMPANIES**



The GPS PE Pipe range forms part of the leading Aliaxis portfolio of sustainable pipework systems for water, gas and energy. We are experts in fluid management solutions, leading our industry in a way that anticipates the rapidly evolving needs of our customers, ensuring peace of mind for future generations.



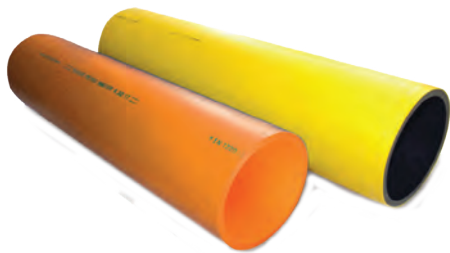
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Complete polyethylene pipe solutions

GAS Applications



At the forefront of polyethylene pipe development for more than 60 years, GPS PE Pipe Systems offers a complete project support from initial system design through to completion.

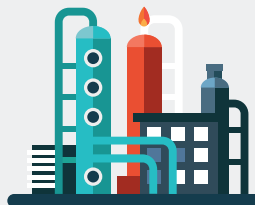
Adopting a truly collaborative approach, GPS works with the entire supply chain to deliver a bespoke solution which best meet the needs of each individual scheme. From specification advice, through to delivering tailored training packages and on-site support during installation, the GPS team is with you through every step of the process.

More than just a manufacturer, GPS has an unrivalled reputation for forming long-lasting partnerships with its customers based on its service offering and unique added value propositions. This customer-led approach, combined with quality engineered product ranges, has made it the market leader it is today.

FEATURES

- Co-extruded yellow or orange outer layer with black core
- Available in standard SDRs 11/13.6/17.6/21 (*Other SDRs are available on request*)
- Standard coil diameters available in sizes up to 180mm
- Standard coil lengths of 50m, and 100m (*Other lengths are available on request*)
- Standard stick lengths 6m and 12m (*Other lengths are available on request*)
- Compatible with GPS' existing portfolio of fittings
- Compliant with GIS/PL2

APPLICATIONS



GPS Gas pipe offering is designed for gas distribution in Gas Mains and Service networks.

The pipes are approved for **Low Pressure (LP)**, **Medium Pressure (MP)** and **Intermediate Pressure (IP)** gas supplies.



BENEFITS

- **Superior resistance** to Slow Crack Growth (SCG) in larger diameters
- **Low friction** and high flow rate
- Suitable for **various installation techniques**
- **Cost savings** in transportation and installation
- Excellent **lifetime cost savings**
- **Security** of continual and flexible supply to customers
- **Reduction** in carbon footprint

APPROVALS



Kitemarked to:

GIS/ PL2-2 for PE80 Yellow and Excel Yellow (KM 512487)	GIS/ PL2-2 for PE80 Yellow and Excel Yellow (KM 512487)
GIS/PL2-8 for Excel Orange (KM 632128)	GIS/PL2-4 for Frialen fittings (KM 609533)
GIS/PL2-6 for Puppé fittings (KM 512489)	EN1555



Health, Safety, Quality & ENVIRONMENT

HEALTH & SAFETY

At GPS PE Pipe Systems, we are committed to ensuring that health and safety is at the very top of our agenda in all of our activities. We look both within and beyond our immediate environment to ensure that we contribute to the highest possible standards of health and safety for all our stakeholders.

Our Commitment

- **Active support and participation** in the creation of a positive health and safety culture at all levels within the Company, particularly at Senior Management level
- **Maintain safe and healthy working places** and systems of work and to protect all employees and others, including the public in so far as they come into contact with foreseeable work hazards
- **Provide and maintain a safe and healthy working environment** for all employees with adequate facilities and arrangements for their welfare
- **Provide all employees with the information, instruction, training and supervision that they require** to work safely and efficiently, and methods to assure employees understand and retain the knowledge
- **Develop safety awareness amongst all employees** and, as a result of this, create individual responsibility for health and safety at all levels
- **Provide a safe environment for all visitors to the Company's premises**, bearing in mind that these visitors may not necessarily be attuned to certain aspects of the Company's environment
- **Control effectively the activity of all outside contractors when on the Company's premises.** It is the intention of the Company that, apart from routine supervision and control of contractors, this aim will be achieved in part by demanding copies of the contractors' Safety Policies at the Tender stage, where appropriate
- **Encourage full and effective two-way involvement and consultation** on health and safety matters at all levels in the Company by utilising the management structure of the Company and the committees/forums already existing
- **Ensure that this Policy is used as a practical working document** and that its contents are publicised fully
- **Review the details of this Policy on an annual basis** and/or in line with regulatory and legislative changes
- **Establish and publish specific, additional annual health and safety objectives** which are realistic and measurable
- **Develop an organisation which specifies the health and safety accountability** of Directors, Managers, Supervisors and Employees

USER GUIDELINES

GPS polyethylene products have been installed and used safely in large volumes over many years. However, good working practice is vital to ensure safety; our products should be handled and processed in accordance with the British Plastics Federation guidelines*.

All PE80 and PE100 pipe systems contain trace quantities of process residues and may also contain other materials such as pigments, antioxidants and UV stabilisers. Chemically unreactive, PE is regarded as being biologically inert, though some pipe materials contain low levels of additives which may be toxic.

GPS polyethylene products have been installed and used safely in large volumes over many years.

INGESTION



Ingestion of PE should be avoided. Some pipe materials may contain additives which are harmful if swallowed. Materials specified contain pigments which may be hazardous if ingested in large quantities.

INHALATION



PE does not release harmful fumes at ambient temperature. The threshold limit value for PE dust is 10mg/m³ (8-hour time-weighted average in the working environment), but the generation of such levels when working with PE pipe and/or fittings is extremely unlikely.

PHYSICAL CONTACT



PE is not considered to be a skin irritant. Where PE dust is generated by cutting or machining pipe or fittings, powder particles of PE dust may cause eye irritation by abrasion.

* (www.bpf.co.uk)

FIRE CHARACTERISTICS



When PE is heated in air, melting will occur at 120- 135°C and decomposition will commence at approximately 300°C. Above this temperature PE will pyrolyse oxidatively to produce carbon dioxide, carbon monoxide, water and various hydrocarbons. These gases may ignite and provide heat which may accelerate the pyrolysis of more PE in the vicinity.

In burning, molten droplets of material may be released which could ignite adjacent inflammable materials. Actual cooling conditions in a real fire will be influenced by many factors such as location and oxygen availability, which will determine the progress and combustion products of the fire.

Combustion of PE may release toxic materials. Avoid inhalation of smoke or fumes. Also, do not allow PE dust to accumulate, since there may be a risk in exceptional circumstances of dust explosion, and consider carefully the siting of potential heat sources such as electrical equipment.

In case of fire with PE Pipes, any fire extinguisher may be used. Powder extinguishers are very effective in quenching flames. Water sprays are especially effective in rapid cooling and damping down a fire, but are not recommended in the early stages of a fire since they may help to spread the flames. Other factors will also influence the selection of fire extinguishers eg. proximity of live electrical equipment. Please refer to specific classifications of firefighting extinguishers.

HANDLING OF MOLTEN MATERIAL



During the fusion welding of PE pipe and fittings molten PE is formed. If allowed to have contact with skin it will adhere strongly and cause severe burns. Such molten material has a high heat content and will remain hot for some time. Gloves should be worn where there is any risk of skin contact.

Small quantities of fumes may be given off by molten PE – these are more pronounced at higher temperatures and greater care must be taken where there is a risk of PE adhering to heated surfaces, such as heating plates used for welding. Ventilation must be provided to ensure safe working conditions.

QUALITY

GPS operates a quality assurance system in accordance with the requirements of BS EN ISO 9001. This is audited twice a year by BSI.



The quality assurance system imposes stringent standards of control throughout design, development and subsequent manufacturing and inspection processes. as shown on the photo below

Quality assurance
BS EN ISO 9001



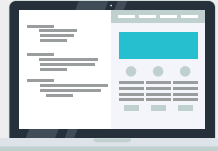
GPS were the first UK manufacturer to introduce yellow and orange gas pipes with a black core

DID YOU KNOW?

GPS began supplying
Polyethylene pipes
into the gas sector
in 1973



**PRODUCTS ARE
SUBJECTED TO
A RANGE OF
DIMENSIONAL,
MECHANICAL AND
DESTRUCTIVE TESTS**
carried out on a sample
basis in accordance with
the requirements of GPS
Product Quality Plans



**UPON AGREEMENT,
THESE QUALITY
PLANS CAN
BE AMENDED**
to incorporate specific
customer inspection
and test requirements



**DETAILED
RECORDS**
are kept of
dimensional and
performance tests
for each production
batch



01224567 1890002

**EACH BATCH IS GIVEN A UNIQUE
IDENTIFICATION NUMBER**
that is reproduced on every fitting and pipe



This enables traceability to be
maintained from raw material
to finished products and for
the provision of certificates of
conformity, if required.



GAS STANDARDS

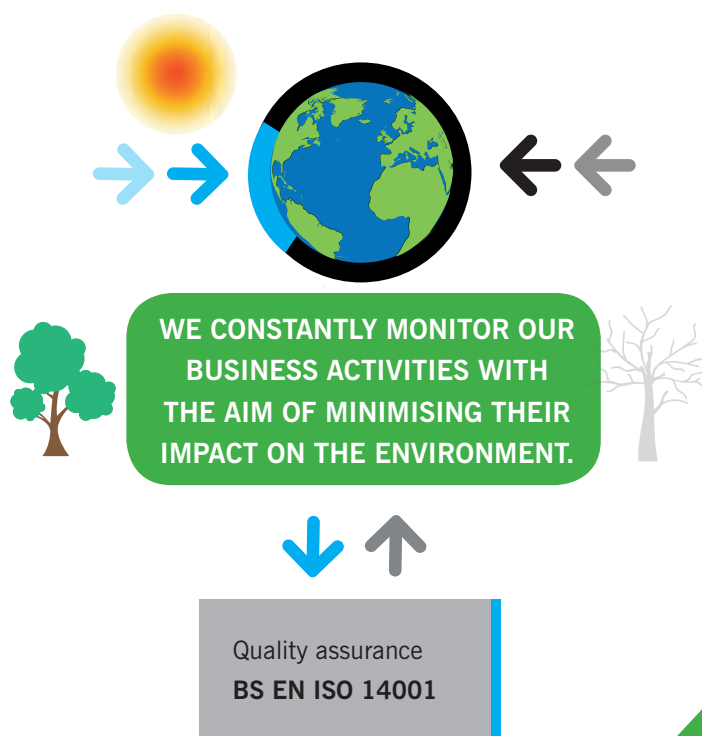
Standard/Approval	Title	Applicable to GPS Products
GIS/PL2	Specification for polyethylene pipe and fittings for natural gas and suitable manufactured gas	
– Part 1	General and polyethylene compounds for use in polyethylene pipe and fittings	Raw materials
– Part 2	Pipes for use at pressures up to 5.5 bar	Yellow PE80, yellow/black co-extruded PE80 and yellow/black co-extruded PE100 up to 800mm
– Part 4	Fusion fittings with integral heating elements	Yellow PE80 and black PE100 electrofusion fittings black PE100 electrofusion fittings
– Part 6	Spigot end fittings for electrofusion and/or Butt Fusion purposes	Yellow PE80, black PE100, yellow/black PE100 and orange PE100 spigot fittings
– Part 8	Pipes for use at pressure up to 7 bar	Orange PE100 pipes up to 630mm
GIS/PL3	Specification for self anchoring mechanical fittings/joints for polyethylene(PE) pipe for natural gas and suitable manufactured gas	Stub flanges and SlimFlange
ISO 4437	Plastic piping systems for the supply of gaseous fuels - Polyethylene (PE)	Yellow PE80, yellow/black co-extruded PE80, orange PE100
BS ISO 8085-1	Polyethylene fittings for use with PE pipes for supply of gaseous fuels	Electrofusion fittings
BS ISO 8085-2	Polyethylene fittings for use with PE pipes for supply of gaseous fuels	Spigot fittings and electrofusion fittings
BS ISO 8085-3	Elastomeric seals – Material requirements for pipe joint seals used in water and drainage applications. Thermoplastic elastomers.	Seals and flange gaskets
BS EN 682	Elastomeric seals – materials for seals used in pipes and fittings carrying gas and hydrocarbon fluids	Seals and flange gaskets
BS EN I 555	Plastic piping systems for supply of gaseous fuels – polyethylene (PE)	All yellow PE80 and black PE100 pipes and fittings up to and including 630mm
GIS/F2	Mains sealing plugs and service connection fittings for use at pressures not greater than 2 bar	Purge saddles

ENVIRONMENT

GPS operates an environmental management system in accordance with the requirements of BS EN ISO 14001. The system is audited twice a year by the BSI.

GPS continually monitors its business activities with the aim of minimising their impact on the environment. A number of on-going waste minimisation projects have been implemented in areas such as energy usage, product packaging and landfill waste.

A continual improvement culture is promoted within the company by setting environmental targets and objectives that are regularly monitored and reviewed.



Quality assurance
BS EN ISO 14001

Polyethylene pipe design

AND INSTALLATION

PRESSURE RATINGS

The pipe PN must always be at least equal to the maximum steady state pressure of the system, and the pipe must be structurally adequate for the given burial conditions.

Various ISO/CEN working groups have considered the design factors that should be used to determine the maximum operating pressures of polyethylene gas systems. ISO/DIS 12162 classifies types of polyethylene, by the minimum required strength (MRS). This is the value of the lower prediction limit of the 50 year hoop stress in MPa obtained by extrapolation of data from stress rupture tests.

In the UK MDPE is classified as MRS 8 and HPPE is classified as MRS10, but these two types of polyethylene are referred to as PE80 and PE100. Maximum working pressures for polyethylene pipes are determined by the application of safety factors to these MRS values in accordance with UK Gas Industry Standards.

Maximum continuous operating pressures for GPS standard polyethylene pipes at 20°C are given in the table below.

PRESSURE TESTING

Pressure testing should comply with the following:

IGE TD3 Edition 5. This standard is applicable for Natural Gas and Liquefied petroleum gas (LPG).

This standard covers pipelines operating at MOP not exceeding 10bar (Natural Gas). For LPG, this Standard limit MOP to 2bar. In addition to this, installations must comply with The Gas Safety (Installations and Use) Regulations 1998.

DID YOU KNOW?

Pressure testing should comply with the following:
IGE TD3 Edition 5.



BURYING PIPE

Gas mains and service pipes should be designed and installed in accordance with the requirements of the Pipelines Safety Regulations 1996 (PSR). PSR does not specify how deep mains and services should be laid.

However, the Regulations are supported by HSE guidance 'A guide to the Pipelines Safety Regulations 1996' and there is also a Health & Safety Commission [HSC] Approved Code of Practice and Guidance 'Design, construction and installation of gas service pipes'.

These publications refer to the Institution of Gas Engineers' guidance 'IGE/TD/3 Distribution Mains' and 'IGE/TD/4: Gas services' which specify the minimum depth of cover which gas mains and services should be laid in order to minimise the risk of accidental third party damage.

MAXIMUM CONTINUOUS OPERATING PRESSURES AT 20° FOR STANDARD PE PIPES

Pipe Size/OD	SDR 11		SDR13.6	SDR17.6	SDR 21
	PE80 YELLOW	Excel (PE100) ORANGE	PE80 YELLOW	PE80 YELLOW	EXCEL (PE100) YELLOW
16mm	5.5	-	-	-	-
20mm	5.5	-	-	-	-
25mm	5.5	-	-	-	-
32mm	5.5	-	-	-	-
40mm	5.5	-	-	-	-
55mm	5.5	-	-	-	-
63mm	5.5	-	4.0	-	-
75mm	5.5	7.0	4.0	-	-
90mm	5.5	7.0	-	3.0	-
125mm	5.5	7.0	-	3.0	-
140mm	5.5	7.0	-	3.0	-
180mm	4.7	7.0	-	3.0	-
250mm	-	7.0	-	-	2.0
280mm	-	7.0	-	-	2.0
315mm	-	7.0	-	-	2.0
355mm	-	7.0	-	-	2.0
400mm	-	7.0	-	-	2.0
450mm	-	7.0	-	-	2.0
500mm	-	7.0	-	-	2.0
560mm	-	7.0	-	-	2.0
630mm	-	7.0	-	-	2.0
710mm	-	-	-	-	2.0
800mm	-	-	-	-	2.0

GPS can usually offer SDRs other than those shown in the table, e.g. for close fit lining applications.
 UK gas operating pressures have historically been limited to 7 bar for PE100 pipe - this is a result of the UK rating system for charges on pipelines at higher pressure.
 PE80 (MDPE) gas pipe pressures must be further de-rated for temperatures below 0°C.
 The values in the above table do not address any other safety-related issues associated with pipeline design.

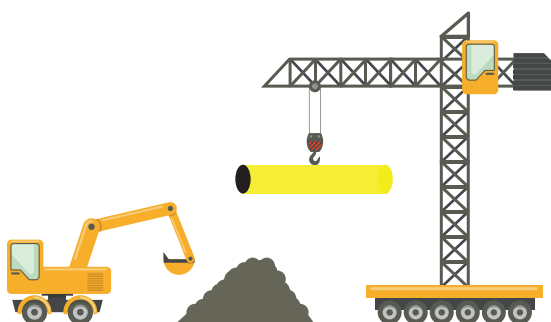
Finefill and pipe surround – Cohesive or granular materials which are free from sharp stones shall be used for the pipe surround.

Backfill and sub base materials

Excavated materials but excluding unsuitable materials (typically organic, perishable, hazardous, frozen, combustible or highly plastic are not suitable and should not be used) may be suitable for use as sub base materials if stored correctly.

Note: Foam concretes and mortars which flow freely can be used as reinstatement materials up to base level.

In GB reinstatement must be carried out in accordance with the Regulations and Codes of Practice issued in accordance with Section 71 of New Roads and Street Works Act (NRSWA).



STRUCTURAL DESIGN OF BURIED PE PIPES

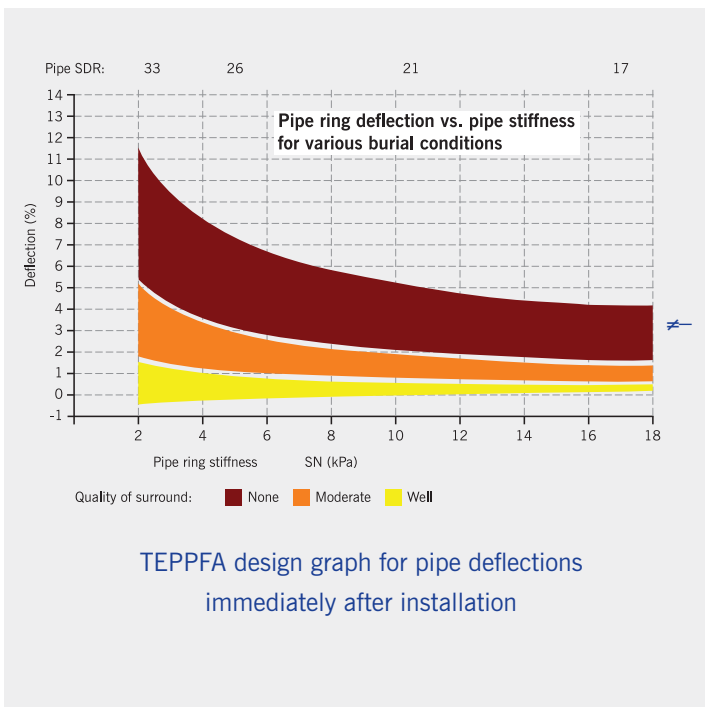
There is often a requirement to provide proof of design security for buried pipelines.

The UK method was developed before PE was used extensively as a pipe material, and does not properly allow for the composite PE pipe/soil system. Values for long term safety factors against buckling and the total ('combined') stress equations are now recognised to be overly conservative. The latest version of the BS reflects this.

The European Plastic Pipes and Fittings Association (TEPPFA) and the Association of Plastics Manufacturers in Europe (APME) have sponsored extensive field trials from which an empirically based graph has been developed to aid PE pipe structural design (see below).



The graph gives the short term vertical pipe deflections that will occur for various burial conditions (materials used, plus degree of care taken) and pipe stiffness (SDRs), with long term deflection values determined by adding prescribed amounts.



Long and short term pipe ring stiffness values are dependent upon the pipe's flexural modulus of elasticity, which is time, temperature and material dependent.

Assuming that the correct pressure rating of pipe is chosen for the specified duty, the total stress in the wall when the pipe is buried will always be less than the rated value (ref BS EN 1295-1:1997). The pipeline designer will simply need to decide how much deflection is acceptable in the particular circumstances (e.g. a higher value would be satisfactory in a field than under a road), and then select the PE pipe and type of surround accordingly. Note that long term deflections of up to 12.5% - 15% are completely safe for PE pipes.

Long and short term pipe ring stiffness values are dependent upon the pipe's flexural modulus of elasticity, which is time, temperature and material dependent.

There is currently no international consensus about the best values of modulus to use in every situation, but the following are generally considered appropriate at ambient temperature (20°C).

Type	Es (Short Term Modulus of Elasticity)	EI (Long Term Modulus of Elasticity)
PE80 (MDPE)	900 MPa	130 MPa
PE100 (HDPE)	1100 MPa	160 MPa

ENTRY TO STRUCTURES

Entries to structures are permitted where relevant and suitable fittings are installed.

It is not permitted to have exposed Polyethylene Pipes carrying gases that do not have suitable protection. Protection methods should follow advice provided in Work Procedure for Service Laying and Main Laying, i.e. T/PR/ML1-4.

All entries must comply with Gas Safety (Installations and Use) Regulations 1998.

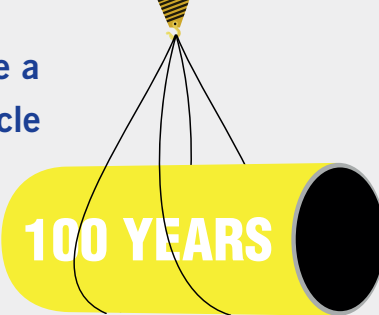
Seek further guidance from relevant local Gas Transporter.

EMBANKMENT INSTALLATION

Where pipes are to be installed above existing ground level and then covered, they should not be laid until the mound of made up ground has been built up and compacted to one metre above where the crown of the pipe is to be. A trench should then be cut into the mound and the pipes laid in the conventional way.

DID YOU KNOW?

PE Pipes provide a minimum life cycle of 100 years

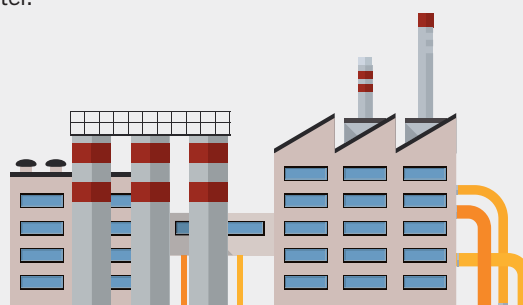


ABOVE-GROUND SUPPORTED INSTALLATION

For exposed supported above ground pipework, proper anchorage is essential. The structure and anchorages must resist or accommodate thermal stresses or movement over the ambient temperature range to which the pipe system will be subjected. It is preferable that a polyethylene pipe is installed at or near the maximum operating temperature such that pipes are thermally expanded whereby at that point clamps or supports can be bolted into position thus restraining the pipe from further movement. As the pipeline cools, tensile stresses are developed and the pipeline will remain straight between supports. If the pipeline then warms to its original installation temperature, it returns to its installation condition and sag between pipe supports is minimised. Supported polyethylene pipe systems may also be designed using the traditional methods, employing 'flexible arms' and 'expansion loops'. For further information, please refer to BS EN 806 part 4 Annex B.

SUPPORT

Recommendations for maximum support spacing are given in the table below. They are based on a mid-span deflection of 6.5mm when the pipe is full of gas and assume a long term flexural modulus of 200MPa at an ambient temperature of 20°C. Pipe clips used for anchorage and support should have flat, non-abrasive contact faces, or be lined with rubber sheeting, and should not be over-tightened. The width of support brackets and hangers should normally be either 100mm or half the nominal pipe bore diameter, whichever is the greater.



Above ground pipework maximum support spacing (metres)

Pipe	SDR 11	SDR 17.6	SDR 21	SDR 26
20mm	0.6	N/A	N/A	N/A
25mm	0.7	N/A	N/A	N/A
32mm	0.9	N/A	N/A	N/A
63mm	1.1	N/A	N/A	N/A
90mm	1.3	1.2	N/A	N/A
110mm	1.5	1.3	N/A	N/A
125mm	1.6	1.4	N/A	N/A
160mm	1.8	1.6	1.6	1.5
180mm	1.9	1.7	1.7	1.6
200mm	2.0	1.8	1.8	1.7
225mm	2.1	1.9	1.9	1.8
250mm	2.2	2.0	2.0	1.9
280mm	2.3	2.1	2.1	2.0
315mm	2.5	2.3	2.2	2.1
355mm	2.6	2.4	2.3	2.2
400mm	2.8	2.5	2.4	2.3
450mm	2.9	2.7	2.6	2.5
500mm	3.1	2.8	2.7	2.6
560mm	3.3	3.0	2.9	2.8
630mm	3.5	3.2	3.1	2.9
710mm	N/A	3.4	3.3	3.1
800mm	N/A	3.6	3.5	3.3

Note: Figures given are for horizontal support spacings; and may be doubled for vertical support spacings.

POLYETHYLENE PIPE FOR GAS

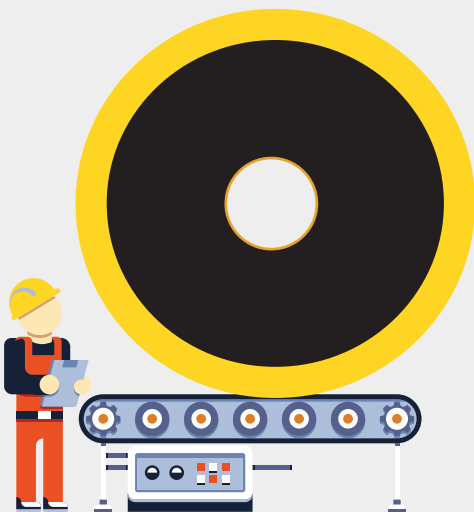
GPS Gas pipe offering is designed for gas distribution in Gas Mains and Service networks. The pipes are approved for Low Pressure (LP), Medium Pressure (MP) and Intermediate Pressure (IP) gas supplies.

FEATURES & BENEFITS

- GIS/PL2 approved
- Compatible with GPS existing portfolio of fittings
- Available in SDRs 11/13.6/17.6/21
(Other SDRs available on request)
- Standard stick lengths 6m and 12m
(Other lengths available on request)
- Standard coil lengths 50m and 100m
(Other lengths available on request)

DID YOU KNOW?

GPS were the first UK manufacturer to produce gas pipes at 800mm diameter



BENEFITS

SUITABLE FOR **VARIOUS INSTALLATION TECHNIQUES**

EXCELLENT LIFETIME COST SAVINGS

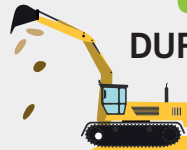


LONGER LENGTHS
REDUCE RISK OF LEAKS

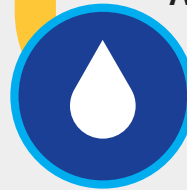


COST SAVINGS

DURING INSTALLATION



LOW FRICTION
AND **HIGH FLOW RATE**

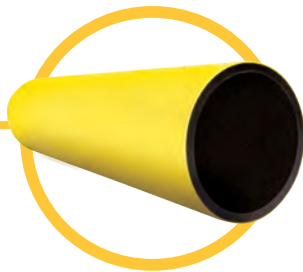


FLEXIBLE

MATERIAL PROPERTIES

SUPERIOR CRACK RESISTANT PROPERTIES
IN LARGER DIAMETERS





PE80 YELLOW PIPE

- Compliant with GIS/PL2-2
- Available from 16mm to 63mm – PE80 solid yellow
- Available from 75mm and above – PE80 co-extruded yellow
- Available in SDR 11, 13.6 and 17.6
- Suitable for up to 5.5 bar pressurised gas supply



Compliant with
GIS/PL2-2

EXCEL YELLOW PIPE

- Compliant with GIS/PL2-2
- Available from 250mm to 800mm – All sizes co-extruded PE80 yellow outer with a PE100RC black core
- Available in SDR 21
- Suitable for 2 bar pressurised gas supply



Compliant with
GIS/PL2-2



EXCEL ORANGE PIPE

- Compliant with GIS/PL2-8
- Available from 63mm to 630mm – All sizes PE100 solid orange
- Available in SDR 11
- Suitable for 7 bar pressurised gas supply



Compliant with
GIS/PL2-8

PIPE HANDLING & STORAGE


Although relatively lightweight, polyethylene pipe products should be treated with a similar level of caution as for heavier metallic pipe products.


Whilst polyethylene is a robust and resilient material, care should be taken not to cause excessive scuffing or gouging of the surface. Surface damage may occur during handling, storage and installation, but providing the depth of any score is no greater than 10% of the wall thickness, then the service performance of the pipe or fitting will not be affected.

USEFUL SOURCES OF INFORMATION

The Health & Safety Executive (HSE) provides information and guidance on its website (hse.gov.uk) which is relevant to the handling and storage of pipes and fittings, including but not limited to:

GS6	LOLER	PUWER	HSG150
Avoiding danger from overhead power lines	Lifting Operations and Lifting Equipment Regulations	Provision and Use of Work Equipment Regulations	Health and safety in construction





DELIVERIES

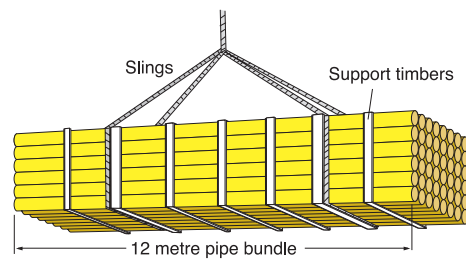
The key stakeholders within the UK plastic pipe industry have created a best practice document entitled "Recommended Guidelines for the Safe Delivery and Unloading of Polyethylene Pipes" which provides a risk-based framework to assist with the safe handling of plastic pipe products.

This document has been commended by the HSE, please click here to download the document.



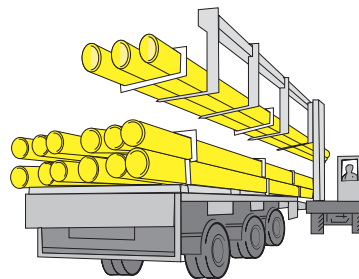
SIX PIPE HANDLING STEPS

- 1 Pipes should be stored on flat, firm ground, able to withstand the weight of the materials and lifting apparatus
- 2 When pipes are loaded and unloaded, allow for some bending deflection – lifting points should be evenly spaced
- 3 Where slings are used, they should be wide, and made of a suitable non-metallic material (e.g. nylon or polypropylene), and not metal slings, hooks or chains



Good lifting practice

- 4 Standard six-metre bundles may be handled by a forklift, but longer lengths should be moved by a side-loader with a minimum of four supporting forks or by a crane with a spreader beam

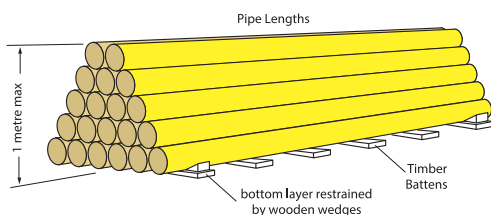
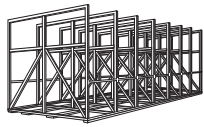


Handling of long lengths

- 5 Exercise special care when handling pipes in wet or frosty conditions in case they have become slippery
- 6 Pipes should never be thrown or dropped from any height, including from delivery vehicles

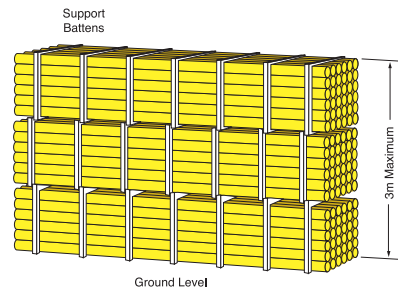
HOW TO STORE YOUR PIPES

- Where larger diameter coils are to be stored vertically, they must be secured in purpose built racking with protective matting positioned underneath
- Never drag or roll individual pipes or bundles
- Keep pipes well away from sharp objects
- Do not allow pipes to be exposed to sunlight or any heat source for prolonged periods
- The packaging (battens, shrink-wrap, pallets, strapping etc.) is designed to provide protection to the pipes and should be kept intact until they are ready for use
- Do not allow pipes to come into contact with lubricating or hydraulic oils, gasoline, solvents or other aggressive materials
- Pipe lengths stored individually should be stacked in a pyramid no more than one metre high, with the bottom layer laid on timber battens and fully restrained by wedges



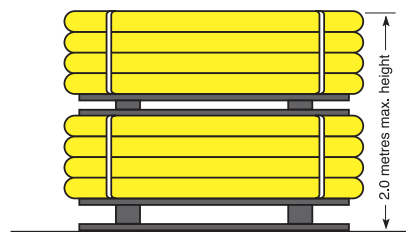
Storage of loose pipes

- Pipe bundles should be stored on level ground with the battens supported by timbers or concrete blocks, and stacked no more than three metres or three bundles high



Storage of bundles

- Coiled pipe should be stored flat, on firm level ground with wooden battens beneath the bottom coil, and should be stacked no more than two metres high



Storage of coils

- Batches of coils delivered on pallets should remain secured to the pallet and only be broken down at time of use.

COIL DISPENSING

SAFETY FIRST: Pipe held in coils is under tension and is strapped accordingly. Coils may be hazardous if released in the incorrect manner.



PLEASE READ THE FOLLOWING GUIDELINES BEFORE ATTEMPTING TO RELEASE COILS

↑
PIPES 63MM AND ABOVE

Pipes 63mm and above – with outer bands and additional strapping of individual layers

- Coils of pipe above 32mm should only be dispensed from the appropriate coil trailer
- Do not remove any bands until the pipe is required for use
- Carefully remove the outermost layer first, only releasing the length of pipe immediately required
- Successive layers can then be released by removing banding one layer at a time as the pipe is drawn from the coil

↓
PIPES 32MM AND BELOW

Pipes 32mm and below – in coils which are shrink-wrapped

- Do not remove the outer wrapping until the coil is almost fully unwound
- Take the free end of the pipe from the inside of the coil
- Take only sufficient pipe for immediate use from the coil

PIPELINE INSTALLATIONS USING NO-DIG TECHNIQUES

AVAILABLE PROCEDURES FOR PIPELINE INSTALLATIONS USING NO-DIG TECHNIQUES

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

Polyethylene great advantage in installation is not only its lightness and flexibility but also its toughness allowing a number of low impact installation processes to be considered.



These processes involve the minimum disruption and impact to the environment and often involve techniques such as “low-dig” and “no-dig”. Since the need for in-trench jointing is eliminated, the width of excavations can be minimised, resulting in reduced labour cost, less imported backfill and lower reinstatement costs.

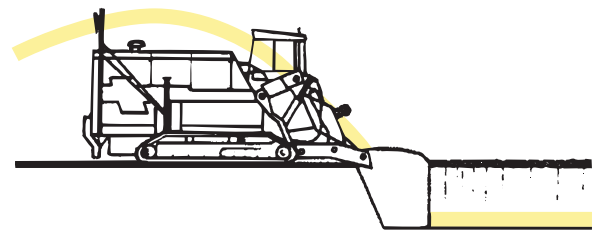
Some of these techniques are described below.

CHAIN TRENCHING

Modified mechanical diggers with oblique profiled buckets are ideal provided that the spoil produced by the digging action is relatively fine. Chain excavators in particular will



break up the original ground finely and permit trench widths only 50 to 100mm greater than the PE pipe outside diameter.



MOLEPLOUGHING

This technique was originally developed for laying land drainage and adapted for installation of gas and water pipes in rural areas. It enables pipelines to be laid across rural landscapes with minimum disruption to agriculture, while the ground can also be reinstated virtually to prime condition. A new PE pipe string is literally ploughed into the ground to a prescribed depth and ground restore immediately to its original condition.

NO-DIG



Impact Moling illustration (courtesy of TT-UK Ltd)

IMPACT MOLING

Impact moling is highly economic in instances such as road crossing, where considerable savings can be made over traditional open-cut excavation methods. Traffic control systems are often unnecessary, for example, and the cost of excavation, backfill and reinstatement is virtually eliminated. With this installation method, excavation is only necessary at the starting and finishing locations of the pipeline – in order to accommodate the mole and its ancillary equipment. The impact mole drives a borehole between launch and reception pits, leaving the ground surface undisturbed.

PIPE BURSTING

Size-for size replacement or upsizing of existing iron pipelines can be achieved with significant savings by the pipe bursting method. With this technique an existing main is cracked open and the borehole simultaneously expanded by a mole. Modern pipe bursting moles, especially those with hydraulically expanding segments, can crack and open out an unserviceable pipeline, even if it has repair collars or concrete surrounds. Risk of damage to adjacent utility installations is minimised by using hydraulic moles, helping to maximise the cost advantages of using the existing “hole in the ground”.



SLIP-LINING / INSERTION

This is a rehabilitation and renovation technique in which a replacement PE pipe string of smaller size is inserted into an existing decommissioned pipeline.



Although rarely necessary, pressure grouting of the annular gap can enable the existing pipeline to be rehabilitated structurally, whilst also reinforcing the hoop strength of the new PE pipe.

Though some reduction in flow capacity is inevitable, this can be minimised by careful preparation and cleaning of the old pipe so that the largest possible diameter of new PE pipe can be inserted. In many instances an average

annular clearance of as little as 5% of the main's diameter- less still for sizes above 300mm – has proven adequate where pipelines are reasonably straight and of uniform bore. In pressure pipelines, the reduction in carrying capacity can be

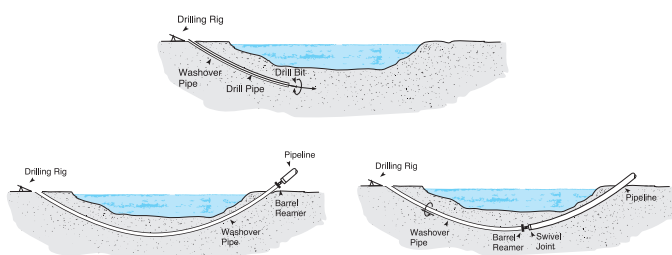
compensated for by an increase in internal pressure. In gravity applications any effect of bore reduction is minimised both by the exclusion of ground water entering the system and by the improved flow characteristics of PE.

TECHNIQUES



DIRECTIONAL DRILLING

This is a pipe installation technique that was originally developed for oil and gas wells, however it is now increasingly used for PE pipe. It allows pipelines to be installed under roads and rivers etc. with minimal excavation work. The technique involves drilling a hole under an obstacle and then pulling the pipeline back through an enlarged hole, from the far side.



CLOSE FIT INSERTION SYSTEMS

Close-fit rehabilitation systems offer two advantages. They never require grouting and, in most cases, even though there is a slight reduction in pipe diameter, the exceptional hydraulic smoothness of PE pipe actually enables flow capacity to be increased.

If the old main is structurally unsound, close-fit PE linings can be SD17.6 or SDR11, depending on ground cover and pressure requirements. For pipelines that are strong but leaking, PE lining thickness down to SDR33 or thinner should be considered. With a 100 year minimum life and exceptional gap-bridging performance, thin-walled PE linings provide a cost effective sealing membrane that is totally reliable.

Connecting PE to PE

ELECTROFUSION

PRINCIPLES OF ELECTROFUSION

Electrofusion fittings incorporate an electrical heating coil to which an Electrofusion Control Unit (ECU) supplies the electrical energy necessary to heat the coil. When the coil is energised the material adjacent to it melts and forms an expanding pool which comes into contact with the surface of the pipe. The continued introduction of heat energy causes the pipe surface also to melt and a mixing of pipe melt and fitting melt takes place; this is vital to produce a good weld. Following the termination of the heat cycle, the fitting and pipe are left to cool and the melted material solidifies to form a sound joint.

Preparation and assembly procedures are similar for all electrofusion systems. Some fittings require the fusion time to be entered into the ECU manually and are therefore described as manual. Some fittings incorporate auto-recognition aids and the ECUs are therefore described as automatic. Some of our fittings are Barcode read only and can only be read by an ECU that has Barcode read facility. All of our standard fittings require a 39.5V supply. Please be aware that the Barcode read only fittings are variable voltage and are determined by the ECU box via the Barcode read facility.

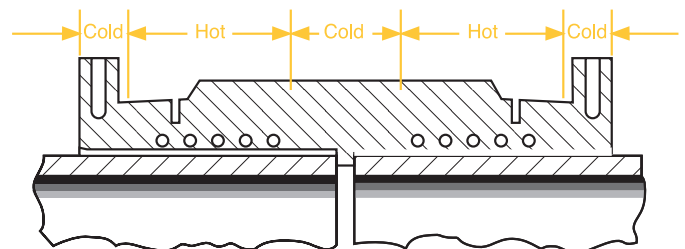
Hot and cold zones sometimes called melt and freeze zones, are formed after energising the coil. The length of these zones is particularly important. Each zone ensures that fusion is controlled to a precise length of the socket of the fitting and

that the melt pressure is also controlled throughout the entire jointing process. The precisely controlled pitch and positioning of the coil in relation to the inner surface of the socket ensures uniform heat distribution.

ELECTROFUSION CONTROL UNITS (ECUS)

Electrofusion Control Units are designed to operate from an electrical mains or field generator supply having an output of 110V and a rating of generally 3.5 to 7.5kVA for 39.5V. Frialen XL fittings require a specialist ECU box that is 3 phase (Please contact Technical Support for further information).

All ECUs manufactured after 1st January 1996 for sale into Europe should comply with the Electro-Magnetic Compatibility Directive and be CE marked, also should comply with GIS ECG1.



DID YOU KNOW?

A correctly installed electrofusion coupler will last as long as the pipe – in excess of 100 years



BARCODES AND ECUS

ECUs can be supplied with the ability to read a bar code when connected to an electrofusion fitting. The machines have a bar code reading device that the operator uses to scan the data contained within the bar code. Once the bar code data has been entered, the ECU will usually display a description of the fitting and its size, which should be checked by the operator before proceeding with the electrofusion process.

The bar code system will automatically adjust the fusion time by small amounts to compensate for variations in ambient temperatures. ECUs should contain data logging facilities to ensure traceability of welding parameters. An output socket allows this information to be downloaded onto a computer database or printer to obtain a complete record of the joints that have been made.



ECUs are now available, that can confirm the presence of clamping during the fusion cycle and provide photographic evidence and joint location data, based on satellite navigation systems technology. Additional control over joint quality can be achieved using ECUs that will lock out the unit in the event of any discrepancy in the jointing procedure. To reinstate the unit to full operation, it will be necessary to seek authorisation before the unit can be unblocked and jointing continued.

TRACEABILITY BARCODES

Most electrofusion fittings are fitted with traceability barcodes that can be read by any ECU with a traceability option. This barcode contains specific information regarding the manufacture of the product such as: the name of the fitting manufacturer, the type of fitting, the size of the fitting, the production batch number, the manufacturing location, the product SDR rating, the product raw material, the material status, the material MRS and the material melt flow index.

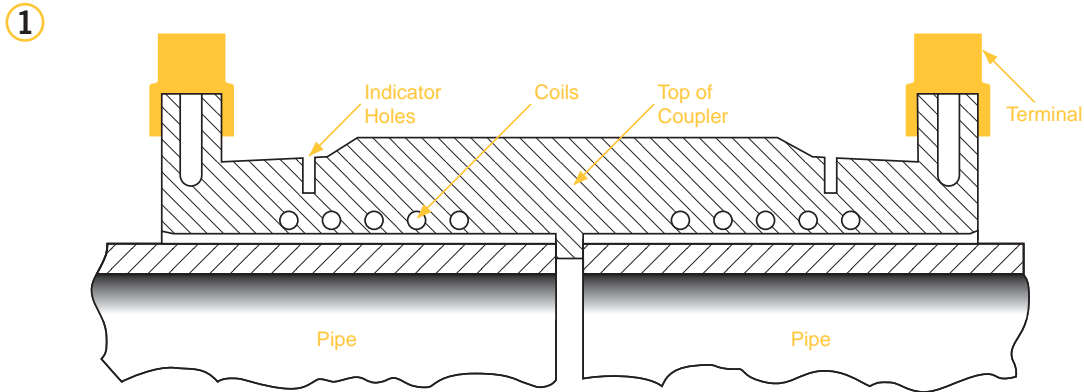


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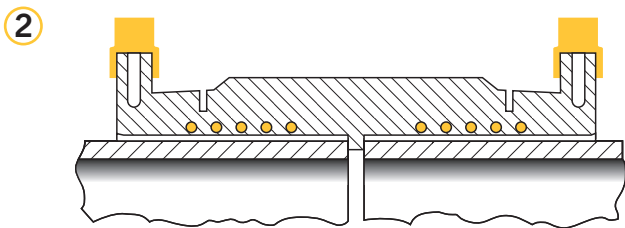
Please note all of our Frialen Electrofusion Fittings have 4.0mm pins. Some ECU's may require adapter pins to operate.

ELECTROFUSION SEQUENCE

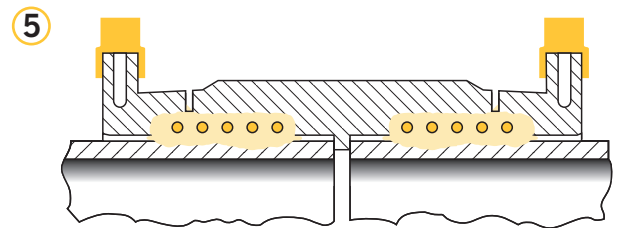
The sectional drawings show the jointing sequence from energising the coil until completion of fusion. The whole cycle is electronically monitored by the electrofusion control unit (ECU).



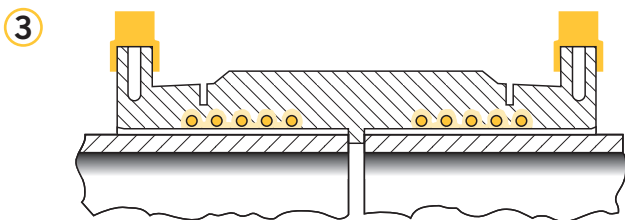
Pipe positioned in coupler prior to energising coil.



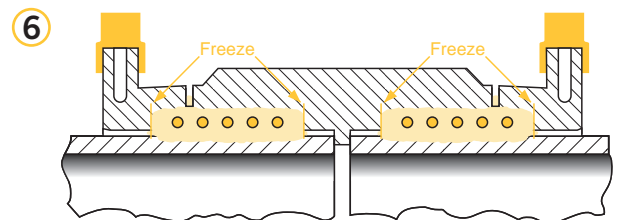
Coil energised.



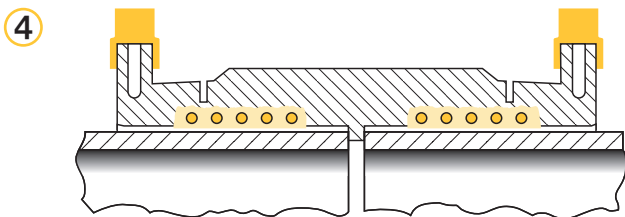
Heat transfers to pipe wall and pipe material starts to melt.



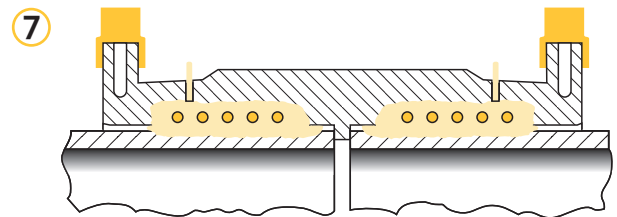
Material surrounding coils starts to melt.



Melt solidifies at the start of the cold zones, thereby sealing the melt zone. Further input of energy causes increase in melt pressure.



Area of melt extends leading to expansion towards pipe surface.



Melt pressure reaches optimum value at end of energising cycle. Emergence of the melt at the indicator holes shows that fusion is complete. *Please note: larger Dia. fittings have visual indicators that change colour to red when fused.*

PRE-JOINTING CHECKS

- Use equipment that is clean, in good condition and regularly maintained.
- A mechanical pipe preparation tool is recommended wherever possible.
- Ensure that the cutters/blades of mechanical scrapers are clean and in good condition.
- Check that you have somewhere clean and dry to place tools and equipment during the electrofusion process, and enough access to the work area.

Do not pressurise the system until the joints have cooled to ambient temperature.

DO'S

- **DO WORK SAFELY**
- Do understand the principals of electrofusion (refer to pipe manufacturers details if necessary).
- Do use a shelter and ground sheet, (a suitable anti-slip surface) in both dry and wet conditions to minimise contamination. Use end protection to pipes, (plugs or caps) to eliminate draughts.
- Do always use appropriate clamps for the true alignment, restraining and re-rounding of all pipes, both sticks and coils.
- Do ensure control box voltage is compatible with fitting.
- Do ensure pipe and fittings to be jointed are compatible with each other.
- Do cut pipe ends square for all electrofusion socket fittings.
- Do keep prepared pipe and/or spigot surfaces and fittings clean.
- Do assemble joint and fuse immediately following preparing the pipe.
- Do check that the fusion time displayed by the ECU matches the fusion time on the fitting when manually input. In the case of Barcode read fittings ensure description matches the fitting.

- Do ensure correct fusion and cooling times are observed and adhered to.
- Do always input the correct operator code and job code to allow for full traceability with Electrofusion Control Units with data retrieval facilities.
- Do mark finished joints with a joint number/data.
- Do ensure that the fusion indicators have risen or changed colour, if there is no apparent movement of one or both of the indicators, the joint should be cut out and a new joint made.
- Do ensure that when jointing tapping tees the fitting is correctly positioned on the pipe before fusion. Following the required quality inspections and pressure testing of the welded saddle fitting, the pipe can then be tapped through.
- Do always enter your I.D. details should the ECU request it. Enter your operator and job code to allow full traceability.
- Do always ensure you mark/sign the completed joint with the number issued from the ECU, along with the date if given. This is imperative for full traceability.

DONT'S

- Do not start any electrofusion joint unless it can be completed without interruption.
- Under no circumstances shall an attempt be made to carry out a second fusion cycle on any fitting.
- Do not use dirty or contaminated fittings.
- Do not use fittings from split or torn bags, all fittings should remain bagged until immediately prior to use.
- Do not ever touch prepared fusion/jointing surfaces.
- Do not allow prepared fusion/jointing surfaces to become wet or damp.
- Do not remove clamps from fitting until cooling time has elapsed.
- Do not remove integral cutter from the stack/saddle (contamination risk).

Joining Procedures for

BUTT FUSION

GENERAL

Butt Fusion is a joining method which allows on-site joining of pipes 90mm and above. It is a thermofusion 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 homogeneous fusion takes place.

The resultant joint is fully resistant to end thrust and has identical performance under pressure to the pipe.

This method of joining requires an electrically heated plate to raise the temperature of the pipe ends to the required fusion temperature. It is used for both PE80 and PE100 grades of material for pipes of size 90mm and above of the same Standard Dimension Ratio (SDR).

Automatic Butt Fusion machines are to be preferred, however particularly when joining the larger pipe sizes, semi-automatic machines with full data retrieval may be considered.

- Traditionally for manual machines a data plate, coloured yellow for gas have been permanently attached to the machine indicating the necessary fusion parameters.
- Automatic machines have the joining data programmed with respect to the pipe material and pressure rating to be joined.

The UK Gas Industry recommends to use only fully automated Butt Fusion equipment. See *the tables on page 50 for Butt Fusion joining parameters for gas applications.*



When joining gas pipes using Butt Fusion techniques, the heater plate temperatures are the same for both PE80 and PE100 - 233°C +/-5°C (GIS PL2).

DID YOU KNOW?

Butt Fusion provides the greatest joint integrity of any joining method



TRAINING COURSES

It is essential that installers of polyethylene pipe systems have received thorough training. Training leading to nationally recognised qualifications can be completed at a number of organisations.

BUTT FUSION JOINTING PRINCIPLES

Butt Fusion machines can be capable of welding moulded fittings directly onto pipe but not in all circumstances as it can depend on the design and make of the equipment. GPS offers two ranges of fittings to provide the greatest flexibility.

Spigot Fittings

These unpupped fittings are long enough to be gripped for Butt Fusion in some types of machines.

Pupped Fittings

Pupped fittings are fabricated in our factory by butt-fusing lengths of pipe (pups) to each leg of a spigot fitting. The pup can be gripped by clamps of site Butt Fusion machines.

GPS standard pupped fittings have a 0.5m length pup for sizes up to 400mm and a 1.0m length pup for sizes of 450mm and above.

Welding in Cold Weather

When Butt Fusion jointing at temperatures below -5°C, a space heater should be provided for the welding shelter to raise the local temperature above 0°C.

EQUIPMENT

- Generator to supply the heater plate, trimmer and hydraulic pump
- Butt Fusion machine fitted with the correct size clamp shells, trimmer, heater plate, hydraulic pump and timer
- Pipe support rollers
- Welding tent
- External/internal de-beading tool
- Bead gauge
- Cleaning material, lint-free cotton cloth or paper towel
- Digital thermometer with surface probe to check heater plate
- Pipe end caps

- Baseboard
- Pipe cutters
- Air temperature thermometer
- Indelible marker pen
- Timer



JOINTING METHOD PRE-JOINTING CHECKS

Before commencing a welding operation:

- Ensure that equipment used is clean, in good condition and regularly maintained
- Ensure that the correct jointing parameters for the machine type and pipe are known
- Check that the heater plate is clean and dry
- Check that the trimmer is clean and that the blades are not damaged and in the correct position for required pipe size
- Ensure clamp liners and securing screws are of the correct size
- Ensure that the generator is in good condition and has sufficient fuel
- A tent is available to provide shelter during welding and end caps are available.
- The pipes and/or fittings to be jointed are of the same size, SDR and material.

DUMMY WELDS

Even though washing of the heater plate may remove large deposits of dirt, very fine particles of dust may still remain on the heater plate. To remove such dust it is necessary to make a dummy joint at the start of each jointing session, whenever the plate has been allowed to cool below 180°C, or at a change of pipe size. Two dummy joints must be made if the pipe size is greater than 180mm.

A dummy joint can be made using pipe off-cuts of the same size, SDR and material as the pipe being installed however, it is not necessary to actually make a joint as the procedure can be discontinued after the full heat cycle has been completed. In the case of Automatic machines the abort button can be used to stop the process after the heat soak period has elapsed.



Butt Fusion machine prior to commencement of fusion process




PRE-JOINTING CHECKS

- Use equipment that is clean, in good condition and regularly maintained.
- Ensure the correct jointing parameters for the machine type and pipe are known.
- Check that the heater plate is clean and dry.
- Check that the trimmer is clean and that the blades are not damaged and in the correct position for the required pipe size.
- Ensure clamp liners and securing screws are of the correct size.
- Ensure the generator is in good condition and has sufficient fuel.

WELDING PROCEDURE

- 1 With the machine in the open position place the pipes in the clamps with the ends adjacent to the trimming tool and with the pipe markings aligned.
- 2 Align and level the components using external support rollers.
- 3 Tighten the pipe clamps to grip and re-round the pipes.
- 4 Cover the free ends of the pipes to prevent cooling of the plate by internal draughts.
- 5 Switch on the trimming tool and bring the clamps slowly together so that the pipe ends are moved against the trimming tool until continuous shavings are cut from each surface.
- 6 Keep the trimming tool turning whilst separating the clamps to avoid steps on the trimmed surfaces.
- 7 Remove the trimming tool taking care not to touch the trimmed pipe ends.
- 8 Remove loose shavings from the machine and pipe ends. Do not touch the prepared surfaces or place hands between the pipe ends.
- 9 Check that both surfaces are completely planed. If they are not then repeat the trimming process.
- 10 Bring the clamps together and check that there is no visible gap between the trimmed faces.
- 11 There should be no discernible mis-match on the outside diameter up to and including 180mm and less than 10% of the wall thickness for pipes greater than 180mm. If the mismatch is greater than these values then the pipe must be realigned and re-trimmed.
- 12 Automatic machines will measure the drag pressure and compensate for this but with the earlier manual machines, there was a need for this to be assessed accurately prior to making each fusion joint and added to the basic ram pressure values shown on the machine.
- 13 With the machine in the open position place the heater plate assembly on the machine, checking that it is up to the correct temperature.
- 14 The automatic Butt Fusion cycle can now be commenced whereupon the required interface pressure will be maintained until a uniform bead of the correct size is formed on each pipe.
- 15 After the initial bead up, the pressure in the hydraulic system will be reduced to between zero and the drag pressure, so as to control the bead growth during the heat soak time.
- 16 When the heat soak time is completed, the machine will automatically open and remove the heater plate before bringing the pipe ends together under the prescribed interface pressure.
- 17 The prescribed pressure must be maintained for the required minimum cooling time.
- 18 After this time the assembly can be removed from the machine but should not be handled excessively for the required period.

POST WELDING CHECKS

- 1 Examine the joint for cleanliness and uniformity and check that the bead width is within the specified limits. 
- 2 Remove the external bead and if required the internal bead using suitable debanding tools. 
- 3 The beads and joint should be numbered/coded using an indelible marker pen to correspond with the joint details entered into the butt fusion machine data retrieval system. 
- 4 The beads should be twisted at several positions and if a bead is seen to split at any point or deformities are present on the underside, then the joint should be cut out from the pipeline and remade. If a similar defect reoccurs, all further jointing should cease until the equipment has been thoroughly cleaned, examined and new trial joints made which are shown to be satisfactory.

DO'S

- **DO WORK SAFELY (If in doubt – always ask)**
- Do understand the principals of butt fusion (refer to pipe manufacturers/machine suppliers guidelines if necessary).
- Do always input correct operator code and job code to allow for full traceability with Automatic Butt Fusion machines.
- Do mark finished joint with joint number.
- Do use a shelter and ground sheet (a suitable anti-slip surface*), both in dry and wet conditions, to minimise contamination, and fit end protection to pipes, (plugs or caps) to eliminate draughts.
- Do ensure pipes are aligned correctly and supported on pipe rollers to minimise drag.

- Do position pipes in clamps with pipe markings aligned and to the top.
- Do perform dummy welds at the start of every welding session, when changing pipe size or if the heater plate has been allowed to cool (one dummy weld on pipe size 180mm and below and two on larger pipe sizes).
- Do ensure that when trimming, a continuous ribbon of material is produced from both pipe ends before commencing feathering operation.
- Do always use trimmer and heater plate stands provided.
- Do always remove swarf from underneath pipe ends and machine chassis following trimming.
- Do visually check that both pipe ends are completely trimmed.
- Do always check pipes for alignment and gaps around the entire circumference of the abutted pipes.
- Do always remove external bead from completed joint, inspect for slit defects/bead uniformity then bag and label with corresponding joint number for full traceability.

DONT'S

- Do not attempt to use equipment unless trained to do so.
- Do not attempt to weld pipes of different wall thickness.
- Do not touch trimmer blades when cleaning and especially when in motion, blades are very sharp and can cause serious injury.
- Do not touch heater plate (unless to clean when cold).
- Do not leave swarf inside pipe or on machine chassis.
- Do not introduce dirt onto trimmed pipe ends at any time, particularly when removing swarf.
- Do not remove pipes from machine until cooling time has elapsed.
- Do not attempt to install pipe until fully cooled.
- Do not attempt to operate the trimmer whilst it is out of the machine or attempt to by-pass the safety switch.
- Do not attempt to cut corners in any part of the welding cycle.

Connecting PE using a PE FLANGE

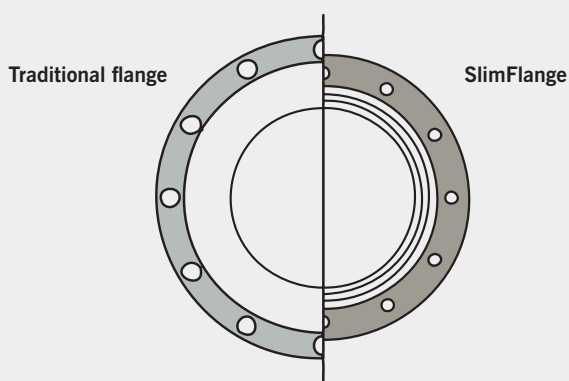
SlimFlange is a unique steel reinforced flange adaptor that allows bore-size-for-size jointing of a PE pipe to a metal flange.

SLIMFLANGE®

SlimFlange is a unique steel reinforced flange adaptor that allows bore size-for-size jointing of a PE pipe to a metal flange.

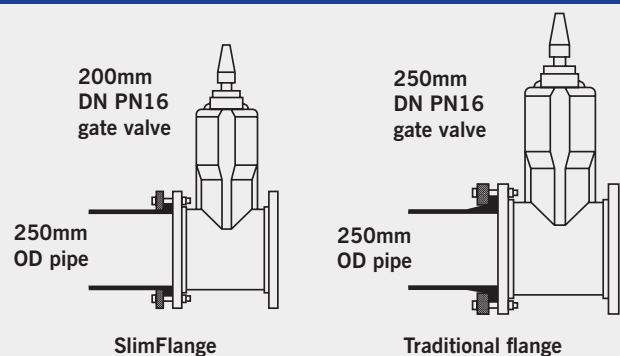
Compact, lightweight yet strong, it eliminates the usual need to upsize valves or other metal fittings, benefitting installers with the faster more effective installations.

UNIQUE SOLUTION



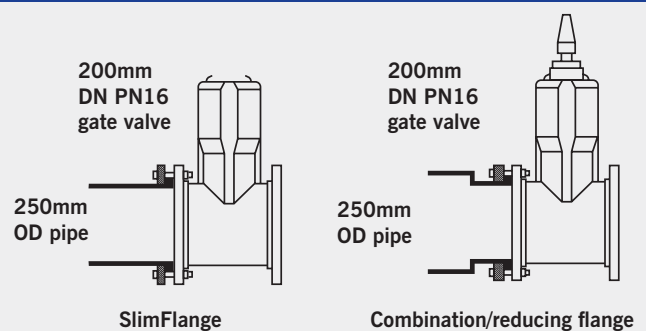
The SlimFlange has the same size bore as a traditional PE Flange, but has a smaller backing ring bolt circle diameter.

NO UPSIZING



A 250mm SlimFlange connects 250mm OD (outside diameter) PE pipe directly to a 200mm DN PN16 valve. A traditional 250mm PE flange requires a 250mm ID (internal diameter) PN16 valve for bolting to match

NO SAFETY COMPROMISE



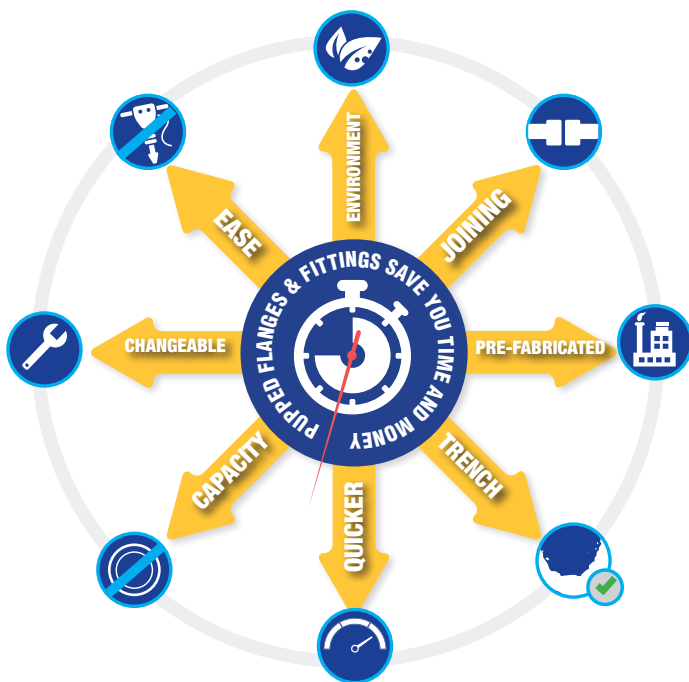
SlimFlange does not lead to loss of strength, unlike PE 'combination' flanges. Size-for-size capability is not achieved by temporary PE bore reduction, which weakens the fitting and increases the potential for blockage.

FEATURES

- No need for upsizing metal fittings, or for PE bore reduction
- Fully end load bearing fitting
- Reduced size and weight
- Loose backing ring for flexible installation

BENEFITS

- Cost savings from bore size-for-size connections
- Reduced installation costs
- Smooth bore to maintain full flow capacity
- Improved sealing performance against leaks



CONNECTING PE TO OTHER MATERIALS

When joining PE to other materials it is important to remember PE works on an outside diameter and the wall thickness will vary depending on the SDR.

Ensure the nominal bores are taken into consideration when sizing flange adaptors to make a connection.

Since PE are end-load bearing, precautions must be taken when a connection is made to pipe of another material.

To prevent pull-out of any non end-load bearing joints, the transition may need to be externally harnessed or anchored/ thrust blocked.

BOLTING

For PE diameters above 180mm, it is recommended that two operators work simultaneously on diametrically opposite bolts where possible.

To guarantee subsequent leak tightness, final torquing should be repeated after the assembly has been allowed to relax for an hour or so.

Evenness of tightening is as important as final torque values – see table below.

This table is suitable for SDR 11 & SDR 17.6 pipe made from PE100 or PE80.

Typical bolting torques for flanges (PE to PE or PE to metal flanges)

Standard Flanges				SlimFlanges or Special Flanges		
Nominal PE size (mm)	Nominal Iron size (mm)	Bolting	Torque (Nm) ±10%	Nominal Iron size (mm)	Bolting	Torque (Nm) ±10%
63	50	M16x4	35	-	-	-
90	80	M16x8	35	-	-	-
125	100	M16x8	35	-	-	-
180	150	M20x8	60	-	-	-
200	200	M20x12	80	-	-	-
225	200	M20x12	80	-	-	-
250	250	M24x12	100	200	M20x12	60
280	250	M24x12	100	-	-	-
315	300	M24x12	120	250	*M20x12	70
355	350	M24x16	150	300	M24x12	120
400	400	M27x16	200	350	M24x16	150
450	450	M27x20	250	400	M27x16	200
500	500	M30x20	300	450	M27x20	250
560	600	M33x20	350	500	M30x20	300
630	600	M33x20	400	500	M30x20	300
710	700	M33x24	400	600	M33x20	400
800	800	M36x24	450	700	M33x24	400
900	900	M36x28	450	800	M36x24	450
1000	1000	M39x28	500	900	M36x28	450
1200	1200	M54x32	550	1000	M39x28	500

*non standard bolt size

Product range

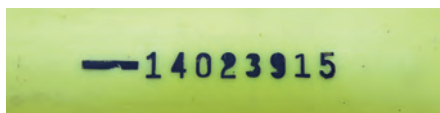
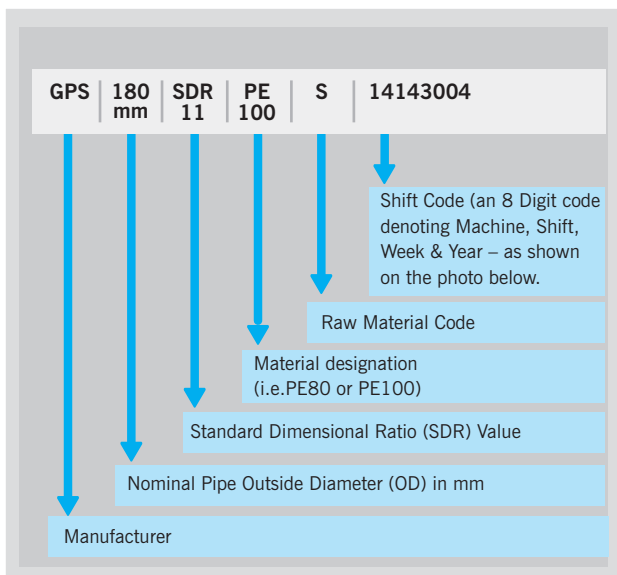
OVERVIEW

PRODUCT MARKING

All Pipes and fittings should be used in order of delivery and to assist stock location.

GPS PIPE MARKING

As a minimum requirement, the following Information is marked indelibly and linearly at intervals along the pipe:



Shift code for a PE100 pipe

GPS pipe is also marked with the name of any industry standard to which it conforms.

Gas pipe also carries reference to the bar rating of the pipe (usually after the OD) and is marked at three separate intervals within the coding with the word Gas for high visibility and identification purposes.







ELECTROFUSION FITTING MARKINGS

Where applicable, most fittings incorporate the following information on the outer surface, either moulded into the product or on the barcode label:

- Material Designation – PE100 or PE80
- Standard Dimensional Ratio (SDR) of Fitting
- SDR Fusion Range (maximum/minimum)
- Nominal Size (mm)
- Fusion Time (seconds)
- Cooling Time (minutes)
- Name and Trademark

Electrofusion fittings product labels also incorporate traceability barcodes to trace the relevant production records. These codes can be read by any ECU with a traceability option.

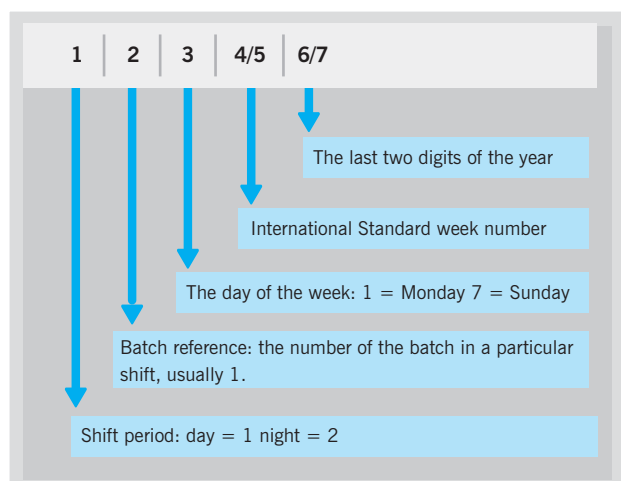


Product Range Overview	Description	Standards/ Approvals	Material	Size Range	Page
YELLOW PIPE 	MDPE pipe for up to 5.5 bar pressurised gas supply	GIS/PL2-2	Polyethylene	16mm - 180mm	32
	HDPE pipe for up to 2 bar pressurised gas supply		Polyethylene	250mm - 800mm	
EXCEL ORANGE PIPE 	HDPE pipe for up to 7 bar pressurised gas supply	GIS/PL2-8	Polyethylene	75mm - 630mm	38
ELECTROFUSION 	Electrofusion fittings with a bar coding system for rapid and convenient jointing	GIS/PL2-4, EN1555	Polyethylene	20mm - 800mm	42
SPIGOT FITTINGS 	Complete range of long spigot fittings suitable for electrofusion and Butt Fusion	EN1555	Polyethylene	32mm - 180mm	54
PUPPED FITTINGS 	Extended spigots suitable for electrofusion and Butt Fusion jointing	EN1555	Polyethylene	63mm - 800mm	60
ACCESSORIES 	Backing rings and gaskets suitable for gas applications	BS EN 682	NBR, GMS	63mm - 315mm	69

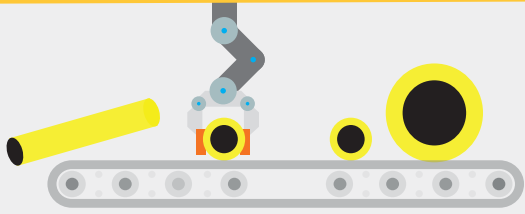
OTHER FITTING MARKINGS

All GPS fittings manufactured within a specific batch are marked with an identification number, unique to that batch.


This unique number consists of either 5 or 7 digits, which can be interpreted as follows on the table below:



DID YOU KNOW?



Other diameters, SDRs and lengths can be made to order subject to a minimum order value





FEATURES & BENEFITS

- Pipes are solid yellow PE80 for diameters from 16mm to 63mm
- From diameter 75mm to 250mm, pipes are co-extruded yellow PE80 over black PE80
- From 250mm and above pipes are co-extruded yellow PE80 over black PE100RC
- Available in standard SDRs 11/13.6/17.6/21
(Other SDRs are available on request)
- Standard coil available in sizes up to 180mm
- Standard stick lengths 6m and 12m
(Other lengths are available on request)
- Standard coil lengths of 50m, and 100m
(Other lengths are available on request)
- Compatible with GPS' portfolio of fittings
- Compliant with GIS/PL2-2
- BSI Kitemark certificate: KM512487

Straight lengths up to 18m can be made to order – please contact our Sales Office for further information.

Note: It is NOT peelable and SHALL be scraped as normal prior to electrofusion jointing. It does NOT require scraping back to the black core.

DID YOU KNOW?

GPS supply gas pipes and fittings to all of the Gas utility companies in the UK



BSI Kitemark certificate:
KM512487



Compliant with GIS/PL2-2

PIPE DIMENSIONS (GIS/PL2-2)

Nom OD (mm)	SDR 11					SDR 13.6				SDR 17.6				SDR 21				SDR 26			
	Max OD (mm)	Min t (mm)	Max t (mm)	Mean Weight (kg/m)	Mean Bore (mm)	Min t (mm)	Max t (mm)	Mean Weight (kg/m)	Mean Bore (mm)	Min t (mm)	Max t (mm)	Mean Weight (kg/m)	Mean Bore (mm)	Min t (mm)	Max t (mm)	Mean Weight (kg/m)	Mean Bore (mm)	Min t (mm)	Max t (mm)	Mean Weight (kg/m)	Mean Bore (mm)
16	16.3	2.3	2.7	0.1	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20*	20.3	2.3	2.7	0.1	15.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	25.3	2.3	2.7	0.2	20.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	32.3	3.0	3.4	0.3	25.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	40.4	3.7	4.2	0.4	32.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
50	50.4	4.6	5.2	0.7	40.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55	55.4	5.1	5.8	0.8	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
63	63.4	5.8	6.5	1.0	50.9	4.7	5.3	0.9	53.2	-	-	-	-	-	-	-	-	-	-	-	-
75	75.5	6.8	7.6	1.4	60.9	5.6	6.3	1.2	63.35	-	-	-	-	-	-	-	-	-	-	-	-
90	90.6	8.2	9.2	2.1	72.9	-	-	-	-	5.2	5.9	1.4	79.2	-	-	-	-	-	-	-	-
110	110.7	10.0	11.1	3.1	89.3	-	-	-	-	6.3	7.1	2.0	97.0	-	-	-	-	-	-	-	-
125	125.8	11.4	12.7	4.0	101.3	-	-	-	-	7.1	8.0	2.6	110.3	-	-	-	-	-	-	-	-
140	140.9	12.7	14.1	5.0	113.7	-	-	-	-	8.0	8.9	3.2	123.6	-	-	-	-	-	-	-	-
160	161.0	14.6	16.3	6.5	129.6	-	-	-	-	9.1	10.1	4.2	141.3	-	-	-	-	-	-	-	-
180	181.1	16.4	18.2	8.2	146.0	-	-	-	-	10.3	11.5	5.4	158.8	-	-	-	-	-	-	-	-
250	251.5	22.7	25.1	15.8	203.0	-	-	-	-	14.2	15.8	10.3	220.8	11.9	13.2	9.0	225.7	9.6	10.7	7.4	230.5
280	281.7	25.4	28.1	19.8	227.4	-	-	-	-	15.9	17.6	12.9	247.4	13.3	14.8	11.3	252.8	10.7	11.9	9.2	258.3
315	316.9	28.6	31.6	25.0	255.8	-	-	-	-	17.9	19.8	16.3	278.3	15.0	16.6	14.3	284.4	12.1	13.5	11.7	290.3
355	357.2	32.3	35.7	31.9	288.1	-	-	-	-	20.2	22.4	20.7	313.5	16.9	18.7	18.2	320.5	13.7	15.2	14.8	327.2
400	402.4	36.4	40.2	40.5	324.6	-	-	-	-	22.8	25.2	26.3	353.2	19.0	21.0	23.1	361.2	15.4	17.1	18.7	368.7
450	452.7	40.9	45.1	51.1	365.4	-	-	-	-	25.6	28.3	33.3	397.5	21.4	23.7	29.3	406.3	17.3	19.2	23.7	414.9
500	503.0	45.5	50.2	63.2	405.8	-	-	-	-	28.4	31.4	41.0	441.7	23.8	26.3	36.1	451.4	19.2	21.3	29.2	461.0
560	563.4	50.9	56.1	79.1	454.7	-	-	-	-	31.9	35.2	51.5	494.6	26.7	29.5	45.2	505.5	21.5	23.9	36.6	516.3
630	633.8	57.3	63.2	100.2	511.4	-	-	-	-	35.8	39.5	65.1	556.6	30.0	33.1	57.1	568.8	24.2	26.8	46.4	581.1
710	714.0	-	-	-	-	-	-	-	-	-	-	-	-	33.8	37.3	72.5	649.1	27.3	30.2	58.9	654.3
800	804.0	-	-	-	-	-	-	-	-	-	-	-	-	38.1	42.1	91.9	721.8	30.8	34.0	74.6	737.2

* SDR 9 only. Wall thickness increased to give a lower SDR and more resistance to damage.

STRAIGHT LENGTHS



SDR 11		
Size/OD (mm)	Length (m)	Product Code
63	6	52 512 311
90	6	25 512 313
	12	25 527 313
125	6	25 512 315
	12	25 527 315
180	6	25 512 318
	12	25 527 318

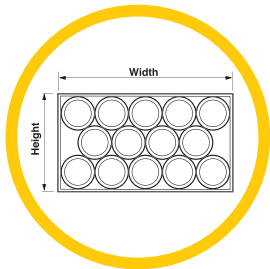
SDR 17.6		
Size/OD (mm)	Length (m)	Product Code
90	6	25 511 313
	12	25 526 313
125	6	25 511 315
	12	25 526 315
140	6	25 511 316
	12	25 526 316
180	6	25 511 318
	12	25 526 318

SDR 13.6		
Size/OD (mm)	Length (m)	Product Code
63	6	52 576 311
75	6	25 576 312

SDR 21		
Size/OD (mm)	Length (m)	Product Code
250	6	29 519 321
	12	29 539 321
280	6	29 519 322
	12	29 539 322
315	6	29 519 323
	12	29 539 323
355	6	29 519 324
	12	29 539 324
400	6	29 519 325
	12	29 539 325
450	6	29 519 326
	12	29 539 326
500	6	29 519 327
	12	29 539 327
560	6	29 519 328
	12	29 539 328
630	6	29 519 329
	12	29 539 329
710	6	29 519 330
	12	29 539 330
800	6	29 519 332
	12	29 539 332



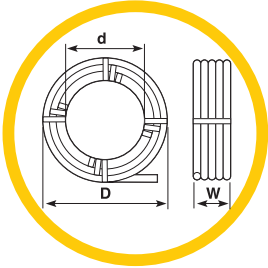
LENGTHS & BUNDLES



Size (mm)	SDR	Length (m)	No / Bundle	Width (mm)	Height (mm)	Approx. Weight (kg)
63	11	6	210	1238	760	1334
	13.6					1099
75	13.6	6	160	1238	845	1221
90	11	6	100	1188	805	1290
	17.6					848
	11	12				2571
	17.6					1688
125	11	6	50	1238	760	1251
	17.6					811
	11	12				2493
	17.6					1613
140	17.6	6	45	1238	805	890
		12				1755
180	11	6	22	1188	841	1130
	17.6					741
	11	12				2253
	17.6					1476
250	21	6	5	900	360	243
		12				482
280	21	6	4	1020	390	307
		12				610
315	21	6	3	845	425	282
		12				560
355	21	6	3	965	465	356
		12				707
400	21	6	3	1100	510	445
		12				886
450	21	6	3	1200	560	559
		12				1114
500	21	6	2	850	610	457
		12				911
560	21	6	2	950	670	567
		12				1130
630	21	6	2	1080	740	709
		12				1416
710	21	6	2	1240	820	894
		12				1785
800	21	6	1	630	910	564
		12				1126

Note: due to continuous development, bundle sizes and weights may vary from that shown.

COILS



SDR 11						
Size/OD (mm)	Length (m)	Product Code	d (mm)	D (mm)	W (mm)	Approx. Weight (kg)
16*	50	58 559 305	600	750	100	5.0
20**	50	52 559 306	600	790	140	6.5
	100	52 560 306	600	860	180	13.0
25	50	52 559 307	600	820	170	8.4
	100	52 560 307	600	890	200	16.7
32	50	52 559 308	700	1020	150	13.9
	100	52 560 308	700	1090	220	27.8
	150	52 561 308	700	1090	310	41.7
40	100	58 560 309	1000	1500	220	41.7
55	100	58 560 301	1300	1900	280	78.9
	150	58 561 301	1300	1900	350	118.4
63	50	52 559 311	1300	1780	190	52.7
	100	52 560 311	1300	1960	280	105.3
90	50	25 559 313	1800	2360	360	105.0
	100	25 560 313	1800	2540	450	210.0
125	50	25 559 315	2500	3000	500	201.0
	100	25 560 315	2500	3300	560	403.0
180	50	25 559 318	3000	3720	540	417.0
	100	25 560 318	3000	3720	900	834.0

* SDR7 only

** SDR9 only

SDR 13.6						
Size/OD (mm)	Length (m)	Product Code	d (mm)	D (mm)	W (mm)	Approx. Weight (kg)
63	50	52 577 311	1400	1765	230	42.4
	100	52 578 311	1400	1940	330	84.7
	150	52 579 311	1400	2075	400	127.1
75	50	25 577 312	1520	1800	410	60.0
	100	25 578 312	1520	2050	410	120.0

SDR 17.6						
Size/OD (mm)	Length (m)	Product Code	d (mm)	D (mm)	W (mm)	Approx. Weight (kg)
90	50	25 569 313	2500	2960	270	71.0
	100	25 570 313	2500	3040	360	142.0
125	50	25 569 315	2500	3000	400	136.0
	100	25 570 315	2500	3600	520	272.0
140	50	25 569 316	2500	3300	500	162.0
	100	25 570 316	2500	3300	710	324.0
180	50	25 569 318	3000	3720	540	281.0
	100	25 570 318	3000	3720	900	563.0

→ GPS completes UK's largest gas pipeline

Being central to the major £1bn National Grid project to replace and upgrade 1,800 miles of metal medium pressure gas mains in London is one of our greatest achievements.

With an ageing gas mains network that was suffering from 100 year old pipelines deteriorating, National Grid committed to an eight year project to create a robust medium pressure pipe network to continue to provide safe and reliable energy to businesses, schools and homes in the centre of London.

This project pushed boundaries from the outset; from new manufacturing capabilities, bespoke training requirements and complex logistics, this scheme was not without challenges. Early engagement and collaboration with the entire supply chain was key to the successful delivery of the first phase of the London Medium Pressure (MP) scheme.

Phase one of the project involved replacing strategic gas mains in Chelsea and Fulham on the King's Road. An extremely busy area, the pipeline needed to run alongside major shopping hot spots and influential residential areas, in addition to being in close proximity to Stamford Bridge, creating a multitude of logistics and traffic management challenges.

To ensure the new pipeline could cater for the growing population in London and be capable of withstanding an increase in pressure, an 800mm pipeline was required, a size never previously used in the UK gas industry. National Grid considered two manufacturers for the scheme, but it was our willingness to collaborate with the client and supply chain to not only deliver the product, but also to provide several added value elements, that saw us awarded the scheme.

Working closely with National Grid, our research and development team was able to manufacture, test, accredit and deliver the new 800mm pipe within the strict timeframe. With this pipe being a new size for the industry, the installers assigned to the project had never worked with the product before so National Grid developed a training programme, independently accredited by EUSR, which was delivered to more than 50 installers. We were fundamental in creating and delivering certain aspects of the training, which covered all aspects of pipe handling, storage and jointing.

The logistics of delivering and storing the pipe within such a busy area were extremely complex and careful planning was vital to ensure minimum disruption to the local community. For our part, we arranged timed deliveries outside of peak traffic times, often during the night or before 6am and only delivered the pipe that was needed at a particular time as there was no space to store pipe. The space restraints also made off-loading the pipe difficult, with the pipe shuttled

along the site to ensure each pipe length was located where it would be needed.

Our ability to not only manufacture a completely new pipe for the gas industry, but to offer a truly collaborative



Onsite in the streets of London

approach, working in close partnership with National Grid and the wider supply chain to provide effective training programmes, delivery schedules, technical guidance, on-site support and installation advice, saw us selected to supply the next phase of the project.



FEATURES & BENEFITS

- Pipes are solid orange and black PE100RC
- Suitable for up to 7 bar pressurised gas supply
- Available in sizes from 75mm to 630mm OD
- Available in standard SDR 11
- Standard coil diameters available from 63mm to 180mm
- Standard stick lengths 6m and 12m
(Other lengths are available on request)
- Standard coil lengths of 50m, 100m
(Other lengths are available on request)
- Additional coils lengths are available on request
- Compatible with GPS' existing portfolio of fittings
- Compliant with GIS/PL2-8

Some items are made to order subject to a minimum order value - please contact our Sales Office for further information.

Compliant
with **GIS/PL2-8**

DID YOU KNOW?

GPS have produced the largest diameter 7 bar polyethylene pipe ever installed in London

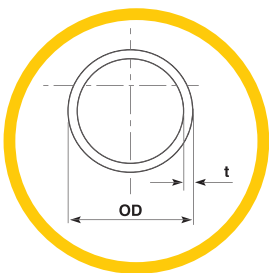


STRAIGHT LENGTHS



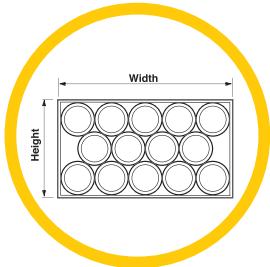
SDR 11		
Size/OD (mm)	Length (m)	Product Code
75	6	48 512 312
	12	48 527 312
90	6	48 512 313
	12	48 527 313
125	6	48 512 315
	12	48 527 315
180	6	48 512 318
	12	48 527 318
250	6	48 512 321
	12	48 527 321
315	6	48 512 323
	12	48 527 323
355	6	48 512 324
	12	48 527 324
400	6	48 512 325
	12	48 527 325
450	6	48 512 326
	12	48 527 326
500	6	48 512 327
	12	48 527 327
560	6	48 512 328
	12	48 527 328
630	6	48 512 329
	12	48 527 329

PIPE DIMENSIONS



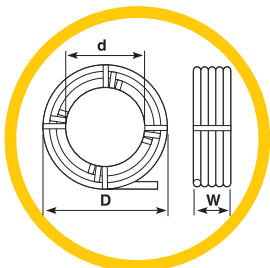
Size (mm)	Max OD (mm)	Mean Bore (mm)	Min t (mm)	Max t (mm)	Mean Weight (kg/m)
75	75.5	60.9	6.8	7.6	1.5
90	90.6	72.9	8.2	9.2	3.0
125	125.8	101.3	11.4	12.7	4.0
180	181.1	146.0	16.4	18.2	9.0
250	251.5	203.0	22.7	25.1	16.0
315	316.9	255.8	28.6	31.6	26.0
355	357.2	288.1	32.3	35.7	33.0
400	402.4	324.6	36.4	40.2	41.0
450	452.7	365.4	40.9	45.1	52.0
500	503.0	405.8	45.5	50.2	64.0
560	563.4	454.9	50.9	56.1	81.0
630	633.8	511.4	57.3	63.2	102.0

LENGTHS & BUNDLES



Size (mm)	Length (m)	No / Bundle	Width (mm)	Height (mm)	Weight (kg)
75	6	160	1238	760	1411
	12	160	1238	760	2822
90	6	100	1188	805	877
	12	100	1188	805	1755
125	6	50	1238	760	833
	12	50	1238	760	1666
180	6	22	1188	741	760
	12	22	1188	741	1520
250	6	5	900	360	265
	12	5	900	360	530
315	6	3	845	425	316
	12	3	845	425	632
355	6	3	965	465	403
	12	3	965	465	805
400	6	3	1100	510	509
	12	3	1100	510	1017
450	6	3	1200	560	644
	12	3	1200	560	1289
500	6	2	850	610	784
	12	2	850	610	1568
560	6	2	950	670	981
	12	2	950	670	1964
630	6	2	1080	740	1244
	12	2	1080	740	2488

COILS



SDR 11						
Size/OD (mm)	Length (m)	Product Code	d (mm)	D (mm)	W (mm)	Approx. Weight (kg)
75	50	48 559 312	1500	1900	310	73.0
	100	48 560 312	1500	2300	310	147.0
90	50	48 559 313	1800	2360	360	107.0
	100	48 560 313	1800	2540	450	213.0
125	50	48 559 315	2500	3000	500	205.0
	100	48 560 315	2500	3300	560	410.0
180	50	48 559 318	3000	3720	540	424.0
	100	48 560 318	3000	3720	900	849.0

→ Tata Steel Rotherham

Tata Steel replaced the 80-year-old steel gas pipeline at its Rotherham plant using a combination of GPS 7bar PE piping and steel piping to maximise cost-efficiency and ease of installation.

Tata Steel took the decision to phase out the use of liquefied petroleum gas (LPG) at its Rotherham plant in favour of natural gas, a choice that has seen the company make a considerable investment in a new natural gas pipeline that will run underground throughout the site.

The new 2.4km polyethylene pipeline with some steel sections will be capable of increased gas flow to allow the phase out of LPG.

Explains Don Mander from Tata Steel: “The existing 24” diameter steel pipe has been in use for around 80 years so needed to be replaced as it was nearing the end of its serviceable life. Meanwhile, the site’s reliance on LPG was



Tata Steel Rotherham

considered untenable because of the need to maintain secure storage for the LPG in order to avoid any safety risk for our own personnel and residents living in the vicinity. The combination of these

two factors lead to one obvious conclusion: by replacing the existing gas pipeline with a new pipeline capable of carrying more gas to site at higher pressures we can both update our infrastructure and phase out use of LPG in a single capital expenditure project.”

The original plan had been to replace the old steel pipeline with an entirely new steel pipeline, but discussions with

GPS PE Pipe Systems, soon convinced Tata Steel that using PE100 piping for most sections of the pipeline would provide a viable alternative with significant advantages. Over the past few years there has been a shift towards the use of orange 7 bar PE100 pipe because it complies with GIS PL2 Part 8 and has been proven in intermediate pressure applications. Like most gas pipelines, the Tata Steel pipeline requires different pressure levels at various sections so there were significant cost and installation advantages to using an orange PE100 piping for most of the installation.

The cost benefits of substituting PE100 piping for steel piping were clear – even for a steel producer! – but the advantages of changing the specification were more wide ranging. The pipe’s flexibility makes installation easier and its durability means that it will have a service life of at least 100 years. It is the jointing method for connecting sections of pipe that delivers the biggest cost and ease of installation benefits, however, as the lengths of PE pipe are butt fused together to form strings before being laid in an open trench installation. This reduces installation times, avoids the need for expensive steel fittings and removes the requirement for x-raying every joint which is normally carried out routinely for steel pipe installations to verify the integrity of each joint. Where PE pipe meets sections of steel pipe steel fittings can be used and verified in the usual way.

Installation of the new pipeline began in January 2012 and contractor, J Murphy & Sons Ltd, installed over 2100 metres of 315mm and 400mm Orange Excel (PE100) pipe in SDR11 to accommodate areas of the site that require pressures of 2-7 bar. Only areas of the pipeline that are close to domestic properties and run above a river have been specified in steel to ensure stringent safety standards. The pipeline was fully operational by the end of July 2012 and Tata Steel will utilise its full 7 bar capabilities from 2013 when the fuel supply switches from LPG to natural gas.

FRIALEN SAFETY FITTINGS

ELECTROFUSION FITTINGS FOR GAS



FEATURES & BENEFITS

- Sizes from 20mm to 800mm
- Comprehensive range of couplers, elbows and tapping tees
- 4mm terminal pins (adaptor pins are available)
- Premium quality Black PE100 materials used
- GIS/PL2-4
- Exposed heating coil for improved hold
- Longer fusion zone for a stronger joint
- Frialen fittings offer superior jointing technology
- Designed with the needs of the installer in mind
- Focus on improving joint quality / customer outcomes
- Major innovator in electrofusion jointing technologies

Size	Fusion Zone Length (mm)		
	EN 1555-3	GIS/PL2-4	Frialen
90	13	28	41
110	15	32	48
125	16	35	46
160	20	42	52
180	21	46	63
200	23	46	63
225	26	48	71
250	33	50	68
280	35	50	56
315	39	50	78

DID YOU KNOW?

The Frialen range of electrofusion couplers have been designed to address the 3 major causes of electrofusion joint failure:
Contamination,
Ovality and Mis-alignment

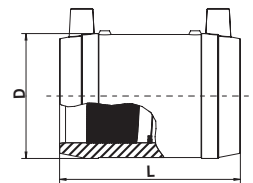


COUPLERS – Removable Centre Stop



Size (mm)	SDR	Product Code	D (mm)	L (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
20	11	FL 612 680	33	60	0.1	25	5
25	11	FL 612 681	37	78	0.1	30	5
32	11	FL 612 682	45	78	0.1	26	5
40	11	FL 612 683	54	86	0.1	46	7
63	11	FL 612 685	82	110	0.2	36	7
75	11	FL 612 686	98	122	0.3	barcode read only	
90	11	FL 612 687	114	138	0.4	85	10
125	11	FL 612 689	156	172	1.0	225	15
140	11	FL 612 690	174	184	1.3	280	15

Maximum continuous operating pressure SDR 11 - 7 bar gas (GIS/PL2) and 10 bar gas (EN 1555-3)
Manual fusion times are based on 39.5 volt fusion boxes
4.0mm terminal pins

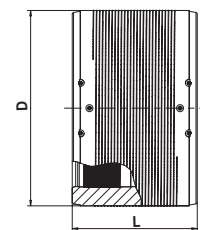


COUPLERS – Slideover SDR 11



Size (mm)	SDR	Product Code	D (mm)	L (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
180	11	FL 612 672	220	210	2.1	480	20
250	11	FL 612 675	315	246	5.8	620	30
280	11	FL 615 073	347	285	7.8	897	30
315	11	FL 612 670	390	300	10.1	1250	30
355	11	FL 615 074	445	300	14.6	1130	30
400	11	FL 615 075	500	320	20.8	750	40
450	11	FL 615 076	560	340	30.0	barcode read only	
500	11	FL 615 124	630	360	40.0	barcode read only	
560	11	FL 613 312	715	380	55.0	barcode read only	
	17	FL 615 706	630	380	24.2	barcode read only	
630	11	FL 616 269	810	420	79.6	barcode read only	
	17	FL 615 726	710	420	34.9	barcode read only	
710	11	FL 616 313	900	420	101.0	barcode read only	
	17	FL 615 994	800	420	47.5	barcode read only	
800	11	FL 616 314	1000	500	138.8	barcode read only	
	17	FL 616 290	900	500	65.9	barcode read only	

Maximum continuous operating pressure SDR 11 - 7 bar gas (GIS/PL2) and 10 bar gas (EN 1555-3)
Maximum continuous operating pressure SDR17 - 4 bar gas (GIS/PL2) and 5 bar gas (EN 1555-3)
Couplers from 400mm upwards are bifilament - have separate fusion zones
Couplers from 355mm upwards have external reinforcement
Manual fusion times are based on 39.5 volt fusion boxes
4.0mm terminal pins
* Can only be installed using the FRIAMAT XL control box

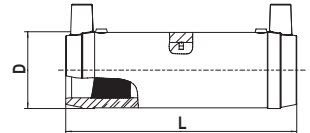


LONG COUPLERS – Removable Centre Stop



Size (mm)	SDR	Product Code	D (mm)	L (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
32	11	FL 615 736	45	136	0.1	barcode read only	
40	11	FL 615 737	54	146	0.1	barcode read only	
50	11	FL 615 608	68	175	0.3	barcode read only	
63	11	FL 615 738	82	197	0.4	42	7

Maximum continuous operating pressure SDR 11 - 7 bar gas (GIS/PL2) and 10 bar gas (EN 1555-3)
Manual fusion times are based on 39.5 volt fusion boxes
4.0mm terminal pins

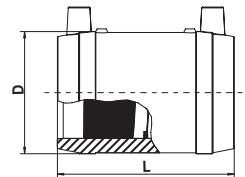


COUPLERS with excess flow limiters



Size (mm)	SDR	Product Code	D (mm)	L (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
32	11	FL 102 308	45	78	0.1	26	5

Meets GIS/EFV/1 specifications for valve operation and GIS/PL2 for the electrofusion coupler
Manual fusion times are based on 39.5 volt fusion boxes
4.0mm terminal pins

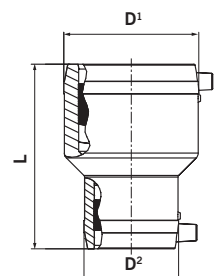


REDUCERS with excess flow limiters

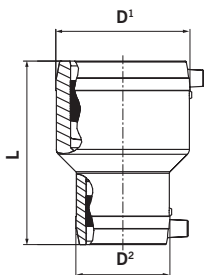


Size (mm)	SDR	Product Code	D ¹ (mm)	D ² (mm)	L (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
32 x 25	11	FL 102 409	45	38	88	0.1	30	5

Meets GIS/EFV/1 specifications for valve operation and GIS/PL2 for the electrofusion reducer
Manual fusion times are based on 39.5 volt fusion boxes
4.0mm terminal pins



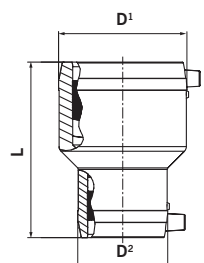
REDUCERS



Size (mm)	SDR	Product Code	D ¹ (mm)	D ² (mm)	L (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
32 x 20	11	FL 615 386	45	32	88	0.1	30	5
32 x 25	11	FL 615 502	45	38	88	0.1	30	5
40 x 20	11	FL 615 387	54	32	98	0.1	30	7
40 x 32	11	FL 615 388	54	45	98	0.1	30	7
63 x 32	11	FL 615 389	82	45	125	0.2	32	7
63 x 40	11	FL 615 390	82	54	125	0.2	42	7
90 x 63	11	FL 615 392	117	82	160	0.5	60	10
110 x 63	11	FL 615 393	142	82	160	0.7	90	10
110 x 90	11	FL 615 693	140	115	180	0.9	180	10
125 x 63	11	69 402 461	159	97	164	1.0	160	18
125 x 90	11	FL 615 694	155	115	200	1.0	240	15
180 x 125	11	FL 616 511	216	155	274	2.6	300	16

Maximum continuous operating pressure SDR 11 - 7 bar gas (GIS/PL2) and 10 bar gas (EN 1555-3)
 Manual fusion times are based on 39.5 volt fusion boxes
 4.0mm terminal pins
 * Pending GIS/PL2 approval

REDUCER KITS



Size (mm)	SDR	Product Code	D ¹ (mm)	D ² (mm)	L (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
250 x 180*	11	FL 402 529			Supplied as Kit	12.2	See individual couplers	
315 x 250*	11	FL 402 543			Supplied as Kit	24.0	See individual couplers	

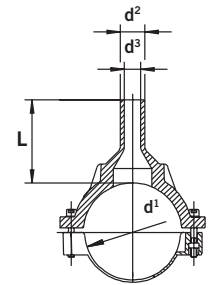
Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
 4.0mm terminal pins
 * Comes in kit form

UNDER CLAMP SPIGOT SADDLES



Size (mm)	SDR	Product Code	L (mm)	Drilling (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
63 x 32	11	FL 612 757	100	20	0.3	barcode read only	
90 x 32	11	FL 615 285	103	20	0.7	barcode read only	
90 x 63	11	FL 612 819	103	46	0.7	barcode read only	
125 x 32	11	FL 615 087	109	20	0.9	barcode read only	
125 x 63	11	FL 612 761	109	46	1.0	barcode read only	
125 x 90	11	FL 615 412	116	65	1.1	barcode read only	
180 x 63	11	FL 612 763	109	46	1.2	barcode read only	
180 x 90	11	FL 615 414	116	65	1.8	barcode read only	
180 x 125	11	FL 615 740	141	95	2.1	barcode read only	

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
4.0mm terminal pins

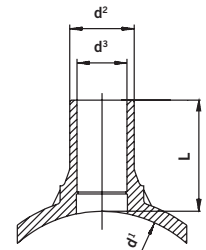


TOP LOADING SPIGOT SADDLES



Size (mm)	SDR	Product Code	B (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
250-560(630) x 32	11	FL 615 465	109	0.6	barcode read only	
250-560(630) x 63	11	FL 615 466	109	0.7	550	50

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
Manual fusion times are based on 39.5 volt fusion boxes
4.0mm terminal pins
Note: These fittings require special instructions when used at 630mm - please contact our Technical Support Department.
Friatop clamping unit shall be used to install this range of fittings.

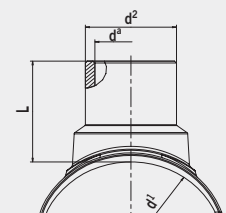


DID YOU KNOW?

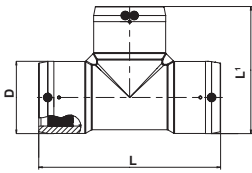
LARGE SPIGOT SADDLES

A range of vacuum saddles are available in main sizes from 315mm to 800mm

Spigot outlet size fabricated to request –
Dimensions of finished product change accordingly.



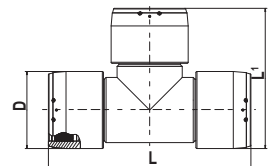
EQUAL TEES



Size (mm)	SDR	Product Code	D (mm)	L (mm)	L ¹ (mm)	Weight (kg)	Fusion Time (main) (Sec)	Fusion Time (branch) (Sec)	Cooling Time (mins)
25	11	FL 616 338	36	108	110	1.2	30	-	5
32	11	FL 615 719	44	116	131	0.2	28	-	5
40	11	FL 615 720	53	146	151	0.3	barcode read only		
63	11	FL 615 722	81	197	203	0.8	42	-	7
75	11	FL 612 165	96	278	187	1.0	72	80	10
90	11	FL 612 166	117	305	211	1.7	90	90	10
125	11	FL 612 168	160	384	272	3.5	180	200	15
180	11	FL 615 691	228	480	354	7.9	440	440	20

Maximum continuous operating pressure SDR 11 - 7 bar gas (GIS/PL2) and 10 bar gas (EN 1555-3)
Manual fusion times are based on 39.5 volt fusion boxes
4.0mm terminal pins

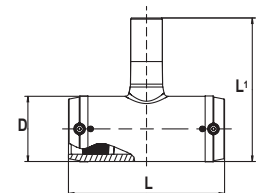
LARGE DIAMETER EQUAL TEES



Size (mm)	SDR	Product Code	D (mm)	L (mm)	L ¹ (mm)	Weight (kg)	Fusion Time (main) (Sec)	Fusion Time (branch) (Sec)	Cooling Time (mins)
250	11	FL 616 412	310	770	540	27.4	550	-	30
280	11	FL 616 413	350	905	630	42.2	550	-	30
315	11	FL 616 414	396	940	670	55.9	550	-	30

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
Manual fusion times are based on 39.5 volt fusion boxes
4.0mm terminal pins

REDUCED BRANCH TEES



Size (mm)	SDR	Product Code	D (mm)	L (mm)	L ¹ (mm)	Weight (kg)	Fusion Time (main) (Sec)	Cooling Time (mins)
32 x 20	11	FL 616 417	46	116	117	0.1	28	5
40 x 32	11	FL 616 418	55	146	148	0.2	barcode read only	
63 x 32	11	FL 616 421	84	197	173	0.4	46	7
63 x 40	11	FL 616 422	84	197	182	0.5	46	7

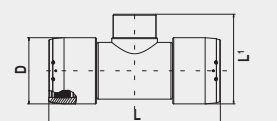
Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
Manual fusion times are based on 39.5 volt fusion boxes
4.0mm terminal pins

DID YOU KNOW?

LARGE REDUCED BRANCH TEES

A range of large reduced branch tees are available in main sizes 250mm, 280mm and 315m.

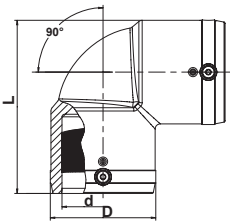
Main lengths combined with electrofusion couplers.
Spigot outlet size fabricated to request – Dimensions of finished product change accordingly.



90° ELBOWS



Size (mm)	SDR	Product Code	D (mm)	L (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
25	11	FL 612 091	37	73	0.1	32	5
32	11	FL 612 093	43	82	0.1	24	5
40	11	FL 612 095	53	96	0.1	30	7
63	11	FL 612 099	83	136	0.3	44	7
75	11	FL 612 101	96	170	0.6	70	10
90	11	FL 612 103	115	202	1.0	90	10
125	11	FL 612 107	157	254	2.0	180	15
180	11	FL 615 689	228	354	5.8	440	20

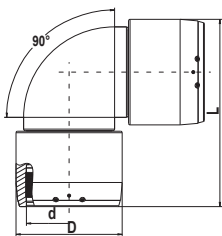


Maximum continuous operating pressure SDR 11 - 7 bar gas (GIS/PL2) and 10 bar gas (EN 1555-3)
 Manual fusion times are based on 39.5 volt fusion boxes
 4.0mm terminal pins

LARGE DIAMETER 90° ELBOWS



Size (mm)	SDR	Product Code	D (mm)	L (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
250	11	FL 616 408	310	534	19.1	550	30
280	11	FL 616 409	350	621	27.5	550	30
315	11	FL 616 410	396	677	40.0	550	30

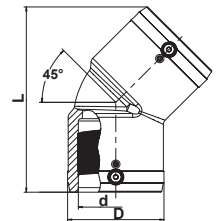


Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
 Manual fusion times are based on 39.5 volt fusion boxes
 4.0mm terminal pins

45° ELBOWS

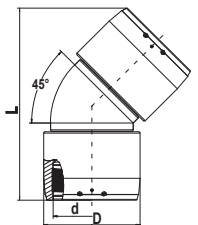
Size (mm)	SDR	Product Code	D (mm)	L (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
32	11	FL 612 092	43	102	0.1	24	5
40	11	FL 612 094	54	120	0.1	30	7
63	11	FL 612 098	82	158	0.3	44	7
75	11	FL 612 100	96	198	0.5	70	10
90	11	FL 612 102	115	232	0.8	90	10
125	11	FL 612 106	157	279	1.8	180	15
180	11	FL 615 687	228	382	4.6	440	20

Maximum continuous operating pressure SDR 11 - 7 bar gas (GIS/PL2) and 10 bar gas (EN 1555-3)
Manual fusion times are based on 39.5 volt fusion boxes
4.0mm terminal pins

**LARGE DIAMETER
45° ELBOWS**

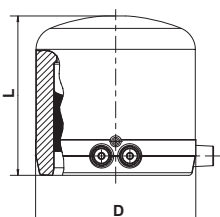
Size (mm)	SDR	Product Code	D (mm)	L (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
250	11	FL 616 404	310	621	17.3	550	30
280	11	FL 616 405	350	702	25.6	550	30
315	11	FL 616 406	396	755	36.0	550	30

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
Manual fusion times are based on 39.5 volt fusion boxes
4.0mm terminal pins

**END CAPS**

Size (mm)	SDR	Product Code	D (mm)	L (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
20	11	FL 612 025	31	62	0.1	24	5
25	11	FL 612 026	35	65	0.1	28	5
32	11	FL 612 027	44	70	0.1	26	5
40	11	FL 612 028	55	75	0.1	34	7
63	11	FL 612 030	84	88	0.2	52	7
75	11	FL 612 031	99	99	0.3	86	10
90	11	FL 612 032	117	155	0.5	90	10
125	11	FL 612 034	158	186	1.2	235	15
180	11	FL 616 183	225	195	2.8	440	20

Maximum continuous operating pressure SDR 11 - 7 bar gas (GIS/PL2) and 10 bar gas (EN 1555-3)
Manual fusion times are based on 39.5 volt fusion boxes
4.0mm terminal pins

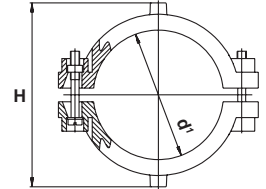


REINFORCING SADDLES



Size (mm)	SDR	Product Code	H (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
63	11	FL 612 519	106	0.3	barcode read only	

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
4.0mm terminal pins

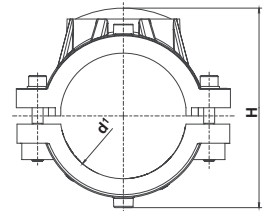


REPAIR & REINFORCING SADDLES



Size (mm)	SDR	Product Code	H (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
90	11	FL 615 164	148	1.0	barcode read only	
125	11	FL 615 166	183	1.4	barcode read only	
180	11	FL 615 169	238	1.9	barcode read only	

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
4.0mm terminal pins

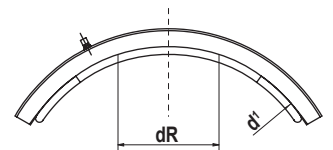


REPAIR SADDLES



Size (mm)	SDR	Product Code	Repair diameter, dR (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
560	17	FL 616 367	230	14.3	barcode read only	
630	17	FL 616 368	230	15.0	barcode read only	
710	17	FL 616 369	230	18.9	barcode read only	
800	17	FL 616 370	230	15.8	barcode read only	

Maximum continuous operating pressure SDR17 - 5 bar gas (EN 1555-3)
4.0mm terminal pins
Only for use with the Friatec VACUSET XL Clamping Equipment
- please contact our Technical Support Department for further information.

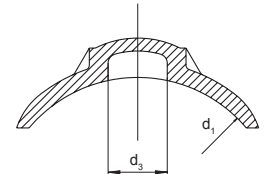


**TOP LOADING
REPAIR SADDLE**



Size (mm)	SDR	Product Code	d ³ (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
250-560	11	FL 615 397	50	0.6	barcode read only	

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
4.0mm terminal pins

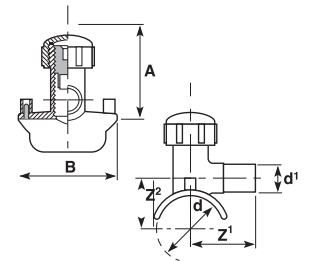


**32MM TOP LOADING
TAPPING TEES**



Size (mm)	SDR	Product Code	A (mm)	B (mm)	Z ¹ (mm)	Z ² (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
63/2" x 32	11	FL 411 415	98	109	79	58	0.3	70	4
75 x 32	11	FL 411 416	98	109	79	66	0.3	70	4
90/3" x 32	11	FL 411 417	98	109	79	71	0.3	70	4
110-140/4" x 32	11	FL 411 419	98	109	79	81-96	0.3	70	4
160-213/6" x 32	11	FL 411 422	98	109	79	106-133	0.3	70	4
225-315 x 32	11	FL 411 427	138	109	79	141-186	0.3	70	4

Maximum continuous operating pressure SDR 11 - 5.5 bar gas (GIS/PL2)
Manual fusion times are based on 39.5 volt fusion boxes
4.0mm terminal pins
Product supplied may vary in design to that shown above.
Supplied complete with 12mm hexagon drive cutter.

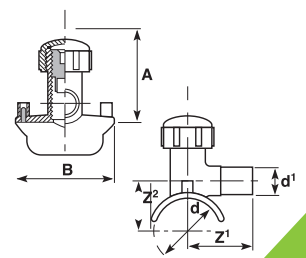


**63MM TOP LOADING
TAPPING TEES**



Size (mm)	SDR	Product Code	A (mm)	B (mm)	Z ¹ (mm)	Z ² (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
63 x 63*	11	87 996 001	140	77	116	58	0.76	55	4
90 x 63	11	58 404 459	184	160	116	102	1.3	46	6
125 x 63	11	58 404 461	184	160	116	120	1.3	46	6
180 x 63	11	58 404 464	184	160	116	147	1.3	46	6
250 x 63	11	58 404 467	184	160	116	182	1.3	46	6
315 x 63	11	58 404 469	184	160	116	218	1.3	46	6

Maximum continuous operating pressure SDR 11 - 5.5 bar gas (GIS/PL2)
Manual fusion times are based on 39.5 volt fusion boxes
4.7mm terminal pins
Made from PE80 yellow material
*Made from PE80 black material
Supplied complete with 12mm Hexagon Drive Cutter



UNDER CLAMPED PRESSURE TAPPING TEES



NEW PRODUCT DESIGN AVAILABLE*

Size (mm)	SDR	Product Code	L (mm)	D ³ (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
90 x 63	11	FL 612 701	125	50	1.3	120	20
125 x 63	11	FL 612 309	122	50	1.3	barcode read only	
180 x 63	11	FL 612 652	165	50	1.3	barcode read only	

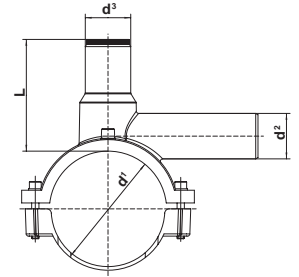
Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
Manual fusion times are based on 39.5 volt fusion boxes

4.0mm terminal pins

90mm x 63mm (FL 610 701), 125mm x 63mm (FL 610 309) and 180mm x 63mm (FL 610 652) are also available as kits with a Cap for Pressure Tapping Tees. Contact Sales Office for further information.

Utilize a 19mm hexagonal driver cutter. If actuator key required, order item FE 613 250

*Utilize a 17mm hexagonal drive cutter. If actuator key required, order item FE 613 246



TOP LOADING PRESSURE TAPPING TEE



Size (mm)	SDR	Product Code	L (mm)	D ³ (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
250-315(355-400) x 63	11	FL 615 339	167	50	1.5	barcode read only	

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)

- for mains sizes up to 315mm

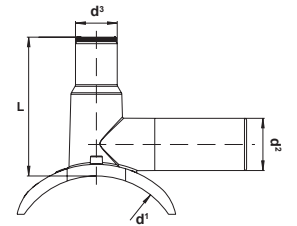
Maximum continuous operating pressure SDR17 - 5 bar gas (EN 1555-3)

- for mains 355mm and 400mm

Manual fusion times are based on 39.5 volt fusion boxes

4.0mm terminal pins

Friatop Clamping Unit shall be used to install this fitting

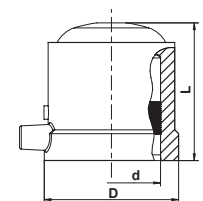


CAP FOR PRESSURE TAPPING TEES



Size (mm)	SDR	Product Code	D (mm)	L (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
50	11	FL 612 310	69	72	0.1	barcode read only	

4.0mm terminal pins

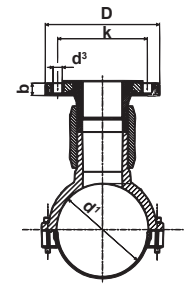


FULL FACED FLANGED BRANCH SADDLES



Size (mm)	SDR	Product Code	D (mm)	d ^k (mm)	Drilling Ø da (mm)	Ø k (mm)	Z (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)
125 x 80 PN16	11	FL 616 017	204	16.5	65	160	180	3.9	barcode read only	
180 x 80 PN16	11	FL 616 019	204	16.5	65	160	180	4.6	barcode read only	
125 x 100 PN16	11	FL 616 021	224	16.5	84	180	180	4.8	barcode read only	
180 x 100 PN16	11	FL 616 023	224	16.5	84	180	180	5.5	barcode read only	

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
Manual fusion times are based on 39.5 volt fusion boxes
Drilled to BS EN 1092-1:2007 Table 13.
Additional washers are required for the flange



STUB FLANGE ADAPTOR KITS



Size (mm)	SDR	Product Code	SDR	Product Code
63 x 50	11	FL 254 311	-	-
90 x 80	11	FL 254 313	17	FL 253 313
125 x 100	11	FL 254 315	17	FL 253 315
90 x 100	11	FL 254 484	17	FL 253 484
180 x 150	11	FL 254 318	17	FL 253 318

Drilled to BS EN 1092-1:2007 Table 13.
Larger sized spigot fittings maybe available depending on pressure of the gas system.

ADAPTOR KIT COMPRISES

- 1 x Stub Flange
- 1 x Coupler
- 1 x Gasket (representation)
- 1 x backing Ring
- 1 x Bolt set

SPIGOT FITTINGS

SPIGOT FITTINGS FOR GAS



FEATURES & BENEFITS

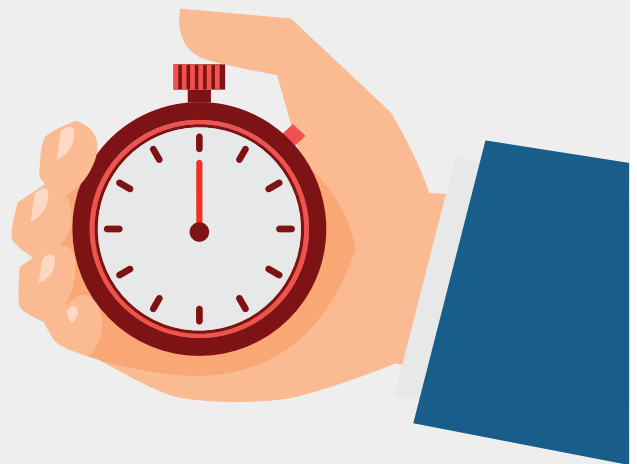
- Ease of installation
- Increase in installation productivity
- Beneficial where operational footprint is tight
- Can be pre-fabricated off site
- Available in SDR 11, SDR 17.6 and SDR 21 in sizes up to 630mm

Available in a wide range of shapes

- Reducers
- Elbows
- Equal Tees
- Stub Flanges
- Stub Flange Adaptor Kits
- Reduced Branch Tees
- Flanged Branch Tees
- All Flanged Equal Tees
- End Caps
- 90°, 45°, 22½° and 11¼° Formed Bends
- Stub Flange Assembly

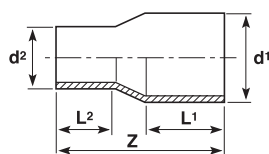
DID YOU KNOW?

Prefabricated Pipped spigots can reduce installation time by up to 40% when compared to fabricating on site



SPIGOT FITTINGS FOR ELECTROFUSION JOINTING OR BUTT FUSION WITH NARROW CLAMPS

REDUCERS

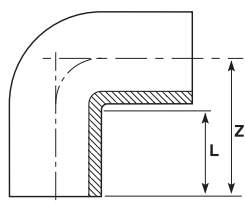


Size (mm)	SDR 11 Code	SDR 17 Code	L ¹ (mm)	L ² (mm)	Z (mm)	SDR 11 Weight (kg)	SDR17 Weight (kg)
63 x 32	40 441 415	-	63	44	146	0.1	-
63 x 40	40 441 430	-	63	49	147	0.1	-
75 x 32	40 441 416	-	70	55	155	0.2	-
75 x 40	40 441 431	-	70	55	155	0.2	-
75 x 63	40 441 458	40 440 445	70	65	171	0.2	0.2
90 x 63	40 441 459	40 440 459	79	70	182	0.3	0.2
90 x 75	40 441 471	40 440 471	79	70	180	0.3	0.2
125 x 63	40 441 461	40 440 461	91	69	200	0.6	0.5
125 x 75	40 441 473	40 440 473	95	78	191	0.6	0.4
125 x 90	40 441 484	40 440 484	91	80	202	0.7	0.5
140 x 90	40 441 485	40 440 485	116	90	230	1.0	0.7
140 x 125	40 441 503	40 440 503	117	96	235	1.1	0.7
180 x 125	40 441 505	40 440 505	105	87	245	1.7	1.1
180 x 140	40 441 513	40 440 513	115	100	258	1.9	1.3

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)

Maximum continuous operating pressure SDR17 - 6 bar gas (EN 1555-3)

90° ELBOWS



Size (mm)	SDR 11 Code	SDR 17 Code	L (mm)	Z (mm)	SDR 11 Weight (kg)	SDR17 Weight (kg)
32	40 209 308	-	70	95	0.1	-
63	40 209 311	-	80	117	0.3	-
75	40 210 312	40 208 312	90	132	0.4	0.3
90	40 210 313	40 208 313	91	142	0.6	0.5
125	40 210 315	40 208 315	103	169	1.5	1.0
180	40 210 318	40 208 318	142	247	4.4	3.0

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)

Maximum continuous operating pressure SDR17 - 6 bar gas (EN 1555-3)

Note: 250 and 315mm sizes have sections of pipe butt-fused to the moulding.

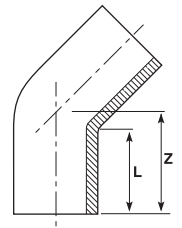
On these sizes L = minimum length of pipe added.

45° ELBOWS



Size (mm)	SDR 11 Code	SDR 17 Code	L (mm)	Z (mm)	SDR 11 Weight (kg)	SDR17 Weight (kg)
32	40 215 308	-	71	90	0.1	-
63	40 215 311	-	66	88	0.2	-
90	40 216 313	40 214 313	83	105	0.5	0.3
110	40 216 314	40 214 314	93	121	0.9	0.6
125	40 216 315	40 214 315	99	137	1.2	0.8
180	40 216 318	40 214 318	141	196	3.5	2.5

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
 Maximum continuous operating pressure SDR17 - 6 bar gas (EN 1555-3)
 Note: 250 and 315mm sizes have sections of pipe butt-fused to the moulding.
 On these sizes L = minimum length of pipe added.

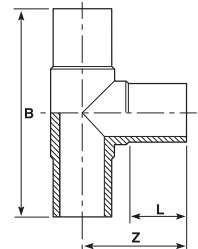


90° EQUAL TEES



Size (mm)	SDR 11 Code	SDR 17 Code	L (mm)	B (mm)	Z (mm)	SDR 11 Weight (kg)	SDR17 Weight (kg)
63	40 221 311	-	65	216	105	0.3	-
75	40 222 312	40 220 312	72	248	122	0.5	0.4
90	40 222 313	40 220 313	80	277	137	0.9	0.7
125	40 222 315	40 220 315	98	350	176	2.2	1.6
180	40 222 318	40 220 318	143	528	260	6.9	4.9

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
 Maximum continuous operating pressure SDR17 - 6 bar gas (EN 1555-3)
 Note: 250 and 315mm sizes have sections of pipe butt-fused to the moulding.
 On these sizes L = minimum length of pipe added.

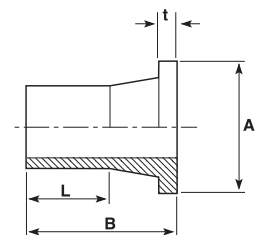


STUB FLANGES



Size (mm)	SDR 11 Code	SDR 17 Code	A (mm)	B (mm)	L (mm)	t (mm)	SDR 11 Weight (kg)	SDR17 Weight (kg)
63	40 227 311	-	102	106	70	14	0.2	-
75	40 228 312	40 226 312	122	129	94	16	0.3	0.3
90	40 228 313	40 226 313	138	140	100	17	0.5	0.4
125	40 228 315	40 226 315	158	183	134	25	1.0	0.7
180	40 228 318	40 226 318	212	202	168	30	2.0	1.3

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
 Maximum continuous operating pressure SDR17 - 6 bar gas (EN 1555-3)
 Note: 250 to 355mm sizes have sections of pipe butt-fused to the moulding.
 On these sizes L = minimum length of pipe added.



STUB FLANGE ASSEMBLIES

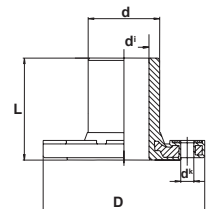

Size (mm)	SDR 11 Code	SDR 17 Code	SDR 11 Weight (kg)	SDR17 Weight (kg)
63 x 50	40 334 311	-	1.3	-
90 x 80	40 334 313	40 333 313	1.8	1.7
125 x 100	40 334 315	40 333 315	2.5	2.2
180 x 150	40 334 318	40 333 318	4.8	4.1

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
 Maximum continuous operating pressure SDR17 - 6 bar gas (EN 1555-3)
 Stub Flange Assemblies include the appropriate backing ring and gasket. Bolt set not supplied.
 Drilled to BS EN 1092-1:2007 Table 13.

FULL FACED FLANGES

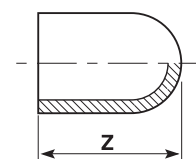

Size (mm)	SDR	Product Code	D (mm)	d ⁱ (mm)	d ^k (mm)	L (mm)	Weight (kg)
63x50 PN10/16	11	FL 615 417	169	51	16.5	105	1.5
90x80 PN10/16	11	FL 615 418	204	72	16.5	130	2.5
125x100 PN10/16	11	FL 615 605	224	101	16.5	160	3.3
180x150 PN10/16	11	FL 615 927	288	123	20.5	200	6.7

Maximum continuous operating pressure SDR 11 - 7 bar gas (GIS/PL2) and 10 bar gas (EN 1555-3)
 Drilled to EN 1092-1:2007 Table 13
Note: Loose Backing Ring not required for these items

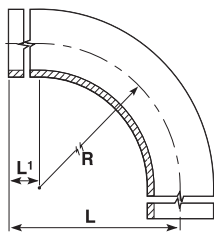

END CAPS


Size (mm)	SDR 11 Code	SDR 17 Code	Z (mm)	SDR 11 Weight (kg)	SDR17 Weight (kg)
63	40 233 311	-	84	0.1	-
75	40 234 312	-	94	0.1	0.1
90	40 234 313	40 232 313	109	0.2	0.2
125	40 234 315	40 232 315	128	0.5	0.4
180	40 234 318	40 232 318	167	1.4	1.0

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
 Maximum continuous operating pressure SDR17 - 6 bar gas (EN 1555-3)
 Larger sized spigot fittings maybe available depending on pressure of the gas system,
 please contact Customer Service for further information.



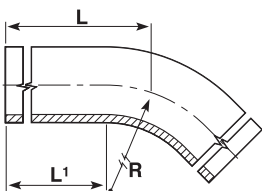
90° FORMED BENDS



Size (mm)	SDR 11 Code	SDR 17 Code	SDR 21 Code	Min L (mm)	Min L ¹ (mm)	R/D	SDR 11 Weight (kg)	SDR17 Weight (kg)	SDR 21 Weight (kg)
90	40 371 313	40 370 313	-	300	150	1.5	1.1	0.7	-
125	40 371 315	40 370 315	-	400	150	1.5	2.8	1.9	-
180	40 371 318	40 370 318	-	530	150	1.5	7.6	5.2	-
250	40 371 321	-	40 169 321	730	250	1.5	20.2	-	13.6
315	40 371 323	-	40 169 323	900	300	1.5	39.2	-	26.5
355	40 371 324	-	40 169 324	1000	300	1.5	55.1	-	37.4
400	40 371 325	-	40 169 325	1050	300	1.5	72.7	-	49.1
450	40 371 326	-	40 169 326	1150	300	1.5	100.6	-	68.0
500	40 371 327	-	40 169 327	1300	350	1.5	140.9	-	95.3
560	40 371 328	-	40 169 328	1350	350	1.5	181.2	-	122.5
630	40 371 329	-	40 169 329	1600	350	1.5	275.6	-	186.4

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
 Maximum continuous operating pressure SDR17 - 6 bar gas (EN 1555-3)
 Maximum continuous operating pressure SDR 21 - 5 bar gas (EN 1555-3)
 SDR 21 formed bends are made from SDR17 pipe and machined to SDR 21 at each end.

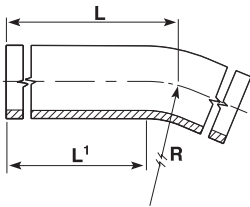
45° FORMED BENDS



Size (mm)	SDR 11 Code	SDR 17 Code	SDR 21 Code	Min L (mm)	Min L ¹ (mm)	R/D	SDR 11 Weight (kg)	SDR17 Weight (kg)	SDR 21 Weight (kg)
90	40 376 313	40 375 313	-	220	150	1.5	0.6	0.6	-
125	40 376 315	40 375 315	-	250	150	1.5	1.9	1.3	-
180	40 376 318	40 375 318	-	350	150	1.5	5.6	3.8	-
250	40 376 321	-	40 170 321	490	250	1.5	15.0	-	10.1
315	40 376 323	-	40 170 323	560	300	1.5	27.1	-	18.4
355	40 376 324	-	40 170 324	630	300	1.5	38.7	-	26.3
400	40 376 325	-	40 170 325	670	300	1.5	52.2	-	35.3
450	40 376 326	-	40 170 326	750	300	1.5	74.1	-	50.1
500	40 376 327	-	40 170 327	900	350	1.5	109.9	-	74.4
560	40 376 328	-	40 170 328	950	350	1.5	145.2	-	98.2
630	40 376 329	-	40 170 329	1000	350	1.5	193.5	-	130.9

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)
 Maximum continuous operating pressure SDR17 - 6 bar gas (EN 1555-3)
 Maximum continuous operating pressure SDR 21 - 5 bar gas (EN 1555-3)
 SDR 21 formed bends are made from SDR17 pipe and machined to SDR 21 at each end.

22½° FORMED BENDS



Size (mm)	SDR 11 Code	SDR 17 Code	SDR 21 Code	Min L (mm)	Min L ¹ (mm)	R/D	SDR 11 Weight (kg)	SDR17 Weight (kg)	SDR 21 Weight (kg)
90	40 381 313	40 380 313	-	210	150	1.5	0.8	0.6	-
125	40 381 315	40 380 315	-	235	150	1.5	1.8	1.2	-
180	40 381 318	40 380 318	-	280	150	1.5	4.5	3.1	-
250	40 381 321	-	40 171 321	430	250	1.5	13.4	-	9.0
315	40 381 323	-	40 171 323	500	300	1.5	24.6	-	16.7
355	40 381 324	-	40 171 324	590	300	1.5	36.9	-	25.0
400	40 381 325	-	40 171 325	650	300	1.5	51.6	-	34.9
450	40 381 326	-	40 171 326	700	300	1.5	70.5	-	47.6
500	40 381 327	-	40 171 327	750	350	1.5	93.1	-	63.0
560	40 381 328	-	40 171 328	800	350	1.5	124.5	-	84.1
630	40 381 329	-	40 171 329	850	350	1.5	167.5	-	113.3

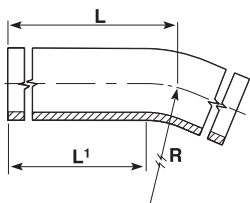
Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)

Maximum continuous operating pressure SDR17 - 6 bar gas (EN 1555-3)

Maximum continuous operating pressure SDR 21 - 5 bar gas (EN 1555-3)

SDR 21 formed bends are made from SDR17 pipe and machined to SDR 21 at each end.

11¼° FORMED BENDS



Size (mm)	SDR 11 Code	SDR 17 Code	SDR 21 Code	Min L (mm)	Min L ¹ (mm)	R/D	SDR 11 Weight (kg)	SDR17 Weight (kg)	SDR 21 Weight (kg)
90	40 373 313	40 372 313	-	210	150	1.5	0.8	0.6	-
125	40 373 315	40 372 315	-	235	150	1.5	1.8	1.2	-
180	40 373 318	40 372 318	-	280	150	1.5	4.5	3.1	-
250	40 373 321	-	40 172 321	430	250	1.5	13.4	-	9.0
315	40 373 323	-	40 172 323	500	300	1.5	24.7	-	16.7
355	40 373 324	-	40 172 324	590	300	1.5	37.0	-	25.1
400	40 373 325	-	40 172 325	650	300	1.5	51.7	-	34.9
450	40 373 326	-	40 172 326	700	300	1.5	70.6	-	47.7
500	40 373 327	-	40 172 327	750	350	1.5	93.3	-	63.2
560	40 373 328	-	40 172 328	800	350	1.5	124.7	-	84.3
630	40 373 329	-	40 172 329	850	350	1.5	167.9	-	113.6

Maximum continuous operating pressure SDR 11 - 10 bar gas (EN 1555-3)

Maximum continuous operating pressure SDR17 - 6 bar gas (EN 1555-3)

Maximum continuous operating pressure SDR 21 - 5 bar gas (EN 1555-3)

SDR 21 formed bends are made from SDR17 pipe and machined to SDR 21 at each end.

PUPPED FITTINGS

PUPPED FITTINGS FOR GAS



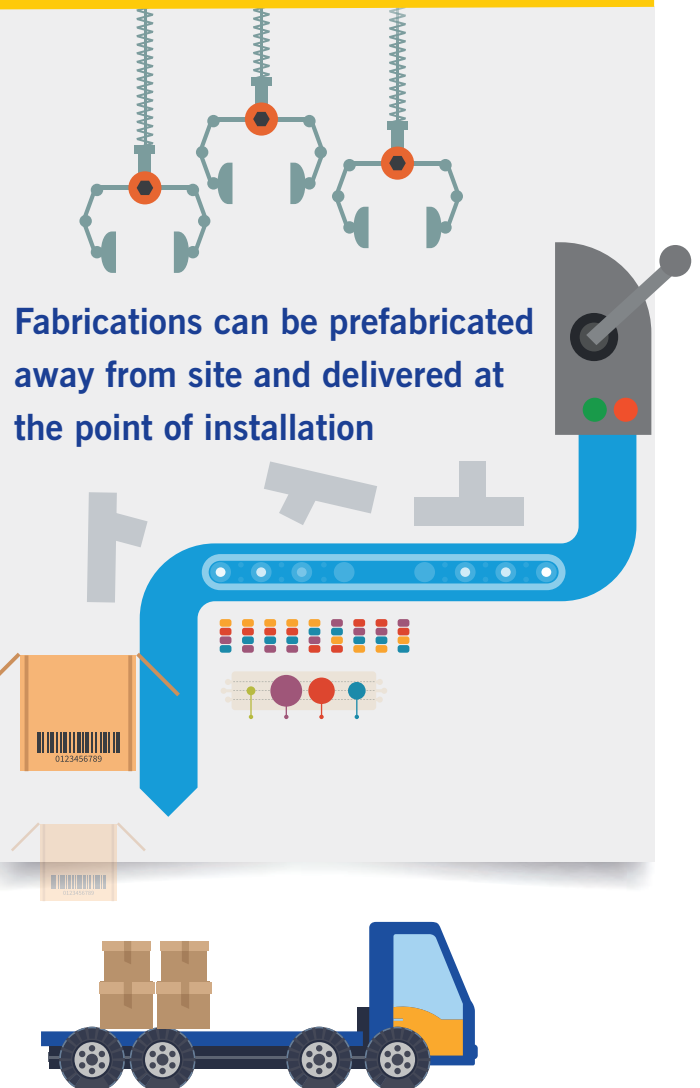
FEATURES & BENEFITS

- Deliver cost savings up to 30%
- Fabrications can be produced offsite – reducing the installation footprint
- Manufactured in a clean process environment
- Improve productivity – through a “just in time” philosophy
- Manufactured to an industry Kitemark specification
- Available in SDR 11, SDR 17.6 and SDR 21 for yellow pupped fittings in sizes up to 800mm.

Available in an extensive range of fittings configurations

- Reducers
- 90° and 45° Elbows
- Equal Tees
- Large Diameter Equal Tees
- Reduced Branch Tees
- Large Diameter Reduced Branch Tees
- Stub Flange Assemblies
- Flanged Short Branch Tees
- SlimFlange Assemblies
- Special Flange Assemblies PN16
- 90°, 45°, 22½°, 11¼° Mitred Elbows

DID YOU KNOW?



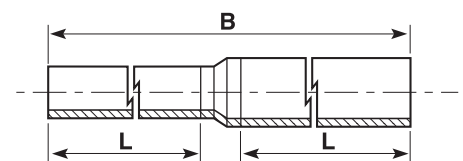
ELONGATED SPIGOT FITTINGS FOR BUTT FUSION OR ELECTROFUSION JOINTING

REDUCERS



Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code	B (mm)	L (mm)	SDR 11 Weight (kg)	SDR 17.6 Weight (kg)	SDR 21 Weight (kg)
90 x 63	58 323 459	58 322 459	-	48 323 459	1182	500	1.9	1.3	-
125 x 63	58 323 461	58 322 461	-	48 323 461	1200	500	3.2	2.2	-
125 x 90	58 323 484	58 322 484	-	48 323 484	1202	500	3.6	2.6	-
180 x 90	58 323 487	58 322 487	-	48 323 487	1245	500	6.8	4.7	-
180 x 125	58 323 505	58 322 505	-	48 323 505	1245	500	8.0	5.4	-
200 x 160	58 323 506	58 322 506	-	48 323 506	1277	500	11.0	7.5	-
225 x 160	58 323 507	58 322 507	-	48 323 507	1295	500	13.0	9.0	-
250 x 125*	-	-	29 740 508	48 323 508	1316	500	10.2	-	7.9
250 x 180*	-	-	29 740 529	48 740 529	1316	500	16.7	-	9.2
315 x 250	-	-	29 740 543	48 740 543	1365	500	29.3	-	16.3
315 x 280	-	-	29 740 545	48 740 545	1365	500	32.1	-	17.7
355 x 125*	-	-	29 740 571	48 740 571	1390	500	18.5	-	12.1
355 x 180*	-	-	29 740 532	48 740 532	1390	500	20.7	-	13.2
355 x 225*	-	-	29 740 541	48 740 541	1390	500	23.1	-	16.5
355 x 250	-	-	29 740 544	48 740 544	1390	500	38.2	-	19.5
355 x 280	-	-	29 740 546	48 740 546	1390	500	39.9	-	22.1
355 x 315	-	-	29 740 547	48 740 547	1390	500	42.4	-	24.5
400 x 180*	-	-	29 740 560	48 740 560	1415	500	25.2	-	21.7
400 x 250	-	-	29 740 563	48 740 563	1415	500	29.0	-	25.1
400 x 280	-	-	29 740 564	48 740 564	1415	500	48.0	-	28.2
400 x 315	-	-	29 740 565	48 740 565	1415	500	51.6	-	29.4
400 x 355	-	-	29 740 566	48 740 566	1415	500	55.2	-	32.9
450 x 250	-	-	29 740 573	48 740 573	2390	1000	69.3	-	45.4
450 x 280	-	-	29 740 584	48 740 584	2390	1000	89.6	-	49.9
450 x 315	-	-	29 740 574	48 740 574	2390	1000	95.6	-	53.0
450 x 355	-	-	29 740 575	48 740 575	2400	1000	103.4	-	57.2
450 x 400	-	-	29 740 576	48 740 576	2400	1000	113.2	-	62.7
500 x 355	-	-	29 740 579	48 740 579	2430	1000	120.8	-	67.2
500 x 400	-	-	29 740 580	48 740 580	2430	1000	130.7	-	72.4
500 x 450	-	-	29 740 581	48 740 581	2430	1000	143.3	-	79.2
560 x 450	-	-	29 740 586	48 740 586	2470	1000	167.1	-	92.6
560 x 500	-	-	29 740 594	48 740 594	2470	1000	181.2	-	100.3
630 x 500	-	-	29 740 599	48 740 599	2510	1000	213.6	-	118.5
630 x 560	-	-	29 740 595	48 740 595	2520	1000	232.2	-	128.5

*SDR17.6 pipe is used for the downstream side unless requested otherwise



Dimensions of pupped fittings should be used subject to a +/- 5mm tolerance due to the nature of the fabrication process.

Standard pup leg lengths: 0.5m in sizes up to 400mm; 1.0m in sizes 450mm to 1200mm

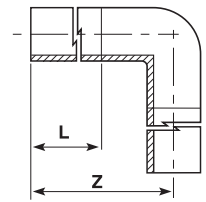
Additional bespoke large diameter fabricated fittings are available to order – please contact our Sales Office for further information.

PUPPED FITTINGS

90° ELBOWS



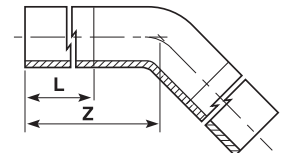
Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code	L (mm)	Z (mm)	SDR 11 Weight (kg)	SDR 17.6 Weight (kg)	SDR 21 Weight (kg)
90	58 309 313	58 308 313	-	48 309 313	500	642	2.8	1.9	-
125	58 309 315	58 308 315	-	48 309 315	500	669	5.6	3.8	-
180	58 309 318	58 308 318	-	48 309 318	500	747	12.9	8.8	-
250	-	-	29 743 321	48 309 321	500	793	27.4	-	15.4
280	-	-	29 743 322	48 309 322	500	830	35.5	-	20.1
315	-	-	29 743 323	48 309 323	500	870	47.3	-	27.3



45° ELBOWS



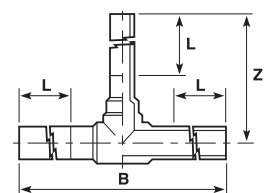
Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code	L (mm)	Z (mm)	SDR 11 Weight (kg)	SDR 17.6 Weight (kg)	SDR 21 Weight (kg)
90	58 315 313	58 314 313	-	48 315 313	500	605	2.6	1.8	-
125	58 315 315	58 314 315	-	48 315 315	500	637	5.3	3.6	-
180	58 315 318	58 314 318	-	48 315 318	500	696	12.0	8.2	-
250	-	-	29 744 321	48 315 321	500	720	24.7	-	13.8
280	-	-	29 744 322	48 315 322	500	727	31.1	-	17.6
315	-	-	29 744 323	48 315 323	500	750	40.6	-	22.9



EQUAL TEES



Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code	L (mm)	B (mm)	Z (mm)	SDR 11 Weight (kg)	SDR 17.6 Weight (kg)	SDR 21 Weight (kg)
90	58 321 313	58 320 313	-	48 321 313	500	1277	637	4.2	2.9	-
125	58 321 315	58 320 315	-	48 321 315	500	1350	676	8.4	5.8	-
180	58 321 318	58 320 318	-	48 321 318	500	1528	760	19.6	13.5	-
250	-	-	29 741 321	48 321 321	500	1582	791	38.5	-	21.2
280	-	-	29 741 322	48 321 322	500	1622	812	49.6	-	27.6
315	-	-	29 741 323	48 321 323	500	1690	851	65.3	-	35.9



Dimensions of pupped fittings should be used subject to a +/- 5mm tolerance due to the nature of the fabrication process.

Standard pup leg lengths: 0.5m in sizes up to 400mm; 1.0m in sizes 450mm to 1200mm

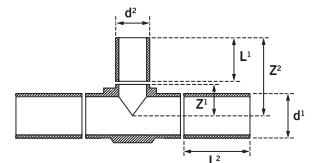
Additional bespoke large diameter fabricated fittings are available to order – please contact our Sales Office for further information.

LARGE DIAMETER EQUAL TEE

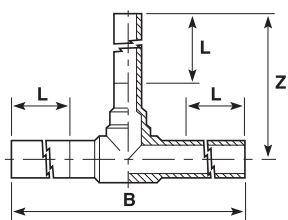


Size (mm)	SDR 21 Code	Z ¹ (mm)	Z ² (mm)	L ¹ (mm)	SDR 21 Weight (kg)
450	29 741 326	485	1485	1000	90
500	29 741 327	530	1530	1000	112
560	29 741 328	705	1705	1000	160
630	29 741 329	740	1740	1000	207
710	29 741 330	780	1780	1000	270
800	29 741 332	826	1826	1000	350

Larger sizes and different SDRs and other configurations including flanged branches are available, please contact our Sales Office for further information.
Dimensions are approximate and given as a guide only



REDUCED BRANCH TEES



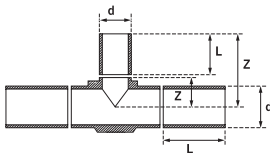
Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code	L (mm)	B (mm)	Z (mm)	SDR 11 Weight (kg)	SDR 17.6 Weight (kg)	SDR 21 Weight (kg)
125 x 90	58 347 315	58 356 315	-	48 347 315	500	1350	878	6.0	4.2	-
180 x 90	58 347 318	58 356 318	-	48 347 318	500	1528	1207	14.6	10.1	-
250 x 90	-	-	29 797 321	48 347 321	500	1582	1554	29.9	-	18.2
280 x 90	-	-	29 797 322	48 347 322	500	1622	1673	40.6	-	25.2
315 x 90	-	-	29 797 323	48 347 323	500	1690	1732	52.6	-	32.1
355 x 90	-	-	29 797 324	48 347 324	500	1698	1942	64.4	-	49.6
400 x 90	-	-	29 797 325	48 347 325	500	1730	1991	80.0	-	62.9
180 x 125	58 348 318	58 357 318	-	48 348 318	500	1528	1005	14.9	10.3	9.3
200 x 125	58 348 319	58 357 319	-	48 348 319	500	1505	1277	19.4	13.3	12.1
225 x 125	58 348 320	58 357 320	-	48 348 320	500	1559	1308	24.9	17.1	15.5
250 x 125	-	-	29 798 321	48 348 321	500	1582	1352	30.2	20.3	18.3
280 x 125	-	-	29 798 322	48 348 322	500	1622	1687	41.9	28.6	26.1
315 x 125	-	-	29 798 323	48 348 323	500	1690	1746	55.5	37.5	34.2
355 x 125	-	-	29 798 324	48 348 324	500	1698	1740	64.7	54.0	49.8
400 x 125	-	-	29 798 325	48 348 325	500	1730	2128	79.8	68.8	53.7
225 x 180	-	58 358 320	-	48 349 320	500	1559	1063	25.8	17.8	16.2
250 x 180	-	-	29 799 321	48 349 321	500	1582	1107	30.7	20.7	18.7
280 x 180	-	-	29 799 322	48 349 322	500	1622	1442	42.8	29.0	26.5
315 x 180	-	-	29 799 323	48 349 323	500	1690	1501	56.0	37.9	34.6
355 x 180	-	-	29 799 324	48 349 324	500	1698	1495	65.2	54.4	50.2
400 x 180	-	-	29 799 325	48 349 325	500	1730	1883	81.0	67.6	62.5
315 x 250	-	-	29 796 323	48 335 323	500	1690	1216	55.6	37.6	34.3
355 x 250	-	-	29 796 324	48 335 324	500	1698	1179	64.8	54.1	49.9
400 x 250	-	-	29 796 325	48 335 325	500	1730	1253	79.7	67.7	62.6

Dimensions of pupped fittings should be used subject to a +/- 5mm tolerance due to the nature of the fabrication process.

Standard pup leg lengths: 0.5m in sizes up to 400mm; 1.0m in sizes 450mm to 1200mm

Additional bespoke large diameter fabricated fittings are available to order – please contact our Sales Office for further information.

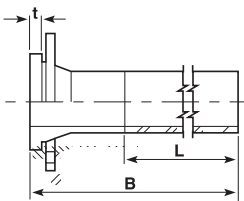
LARGE DIAMETER REDUCED BRANCH TEES



Size (mm)	SDR 21 Code	SDR 11 Code	L (mm)	B (mm)	Z (mm)	SDR 11 Weight (kg)	SDR 21 Weight (kg)
450 x 180	29 799 326	48 799 326	1000	2397	1406	139.4	88.7
450 x 250	29 796 326	48 796 326	1000	2467	1506	154.9	99.5
450 x 315	29 795 326	48 795 326	1000	2532	1556	172.8	112.2
500 x 180	29 799 327	48 799 327	1000	2397	1431	169.6	107.5
500 x 250	29 796 327	48 796 327	1000	2467	1531	186.0	129.0
500 x 315	29 795 327	48 795 327	1000	2532	1581	204.7	132.3
630 x 180	29 799 329	48 799 329	1000	2395	1496	262.5	166.0
630 x 250	29 796 329	48 796 329	1000	2465	1596	281.7	179.6
630 x 315	29 795 329	48 795 329	1000	2530	1646	303.1	194.8

Larger sizes and different SDRs and other configurations including flanged branches are available, please contact our Sales Office for further information.
Dimensions are approximate and given as a guide only.

STUB FLANGE ASSEMBLIES



Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code	B (mm)	t SDR 11 (mm)	t SDR 17.6 (mm)	t SDR 21 (mm)	SDR 11 Wgt (kg)	SDR 17.6 Wgt (kg)	SDR 21 Wgt (kg)	Metric Bolt Size**
*63 x 50	58 327 311	-	-	-	575	14	-	-	1.7	-	-	M16
90 x 80	58 327 313	58 326 313	-	48 327 313	630	14	-	-	3.9	2.4	-	M16
125 x 100	58 327 315	58 326 315	-	48 327 315	675	25	25	-	5.7	3.7	-	M16
125 x 150	58 327 505	-	-	-	675	25	-	-	5.7	-	-	M20
180 x 150	58 327 318	58 326 318	-	48 327 318	675	30	30	-	11.5	7.5	-	M20
250 x 250	-	-	29 742 321	48 327 321	675	35	25	25	22.6	-	14.1	M24
280 x 250	-	-	29 742 322	48 327 322	602	35	25	25	24.2	-	14.7	M24
315 x 300	-	-	29 742 323	48 327 323	575	35	25	25	32.4	-	22.1	M24
355 x 350	-	-	29 742 324	48 327 324	610	40	30	30	42.9	-	29.6	M24
400 x 400	-	-	29 742 325	48 327 325	610	46	33	33	57.5	-	40.5	M27
450 x 450	-	-	29 742 326	48 327 326	1110	60	46	46	105.1	-	67.2	M27
500 x 500	-	-	29 742 327	48 327 327	1110	60	46	46	124.3	-	84.0	M30
560 x 600	-	-	29 742 328	48 327 328	1110	60	50	50	178.3	-	137.1	M33
630 x 600	-	-	29 742 329	48 327 329	1110	60	50	50	193.5	-	141.5	M33
710 x 700	-	-	29 742 330	48 327 330	1110	60	50	50	227.5	-	170.1	M33
800 x 800	-	-	29 742 332	-	1110	-	52	52	-	-	216.9	M36

* Puppated with Yellow PE80

With backing ring drilled to BS EN 1092-1:2007 Table 13.

All sizes of (58) Yellow supplied with a nitrile gasket.

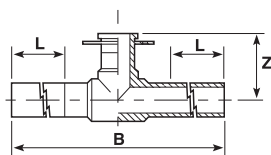
Other lengths (B) available - please contact our Sales office for further information.

Dimensions of pupped fittings should be used subject to a +/- 5mm tolerance due to the nature of the fabrication process.

Standard pup leg lengths: 0.5m in sizes up to 400mm; 1.0m in sizes 450mm to 1200mm

Additional bespoke large diameter fabricated fittings are available to order - please contact our Sales Office for further information.

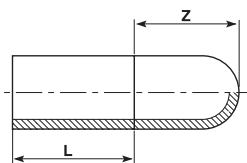
FLANGED SHORT BRANCH TEES



Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code	L (mm)	B (mm)	Z (mm)	SDR 11 Weight (kg)	SDR 17.6 Weight (kg)	SDR 21 Weight (kg)
90 x 80	58 341 313	58 310 313	-	48 341 313	500	1277	277	3.0	2.2	-
125 x 80	58 341 315	58 310 315	-	48 341 315	500	1340	310	5.8	4.2	-
180 x 80	58 341 318	58 310 318	-	48 341 318	500	1420	340	12.9	9.1	-
250 x 80	-	-	29 802 321	48 341 321	500	1706	493	29.0	-	17.9
280 x 80	-	-	29 802 322	48 341 322	500	1706	493	36.1	-	25.5
315 x 80	-	-	29 802 323	48 341 323	500	1806	543	47.9	-	29.8
125 x 100	58 342 315	58 311 315	-	48 342 315	500	1350	359	6.3	4.4	-
180 x 100	58 342 318	58 311 318	-	48 342 318	500	1430	406	13.6	9.9	-
250 x 100	-	-	29 803 321	48 342 321	500	1741	554	30.1	-	18.8
280 x 100	-	-	29 803 322	48 342 322	500	1741	554	37.4	-	23.5
315 x 100	-	-	29 803 323	48 342 323	500	1841	604	49.4	-	16.0
355 x 100	-	-	29 803 324	48 342 324	500	1841	604	62.5	-	39.2
180 x 150	58 343 318	58 312 318	-	48 343 318	500	1528	462	15.4	10.7	-
250 x 150	-	-	29 804 321	48 343 321	500	1797	601	32.2	-	20.4
315 x 150	-	-	29 804 323	48 343 323	500	1897	651	52.1	-	33.0
355 x 150	-	-	29 804 324	48 343 324	500	1897	651	64.5	-	41.6

Flanged Branch PN16. SDR 17.6 is available in Yellow only.
 Drilled to BS EN 1092-1:2007 Table 13.

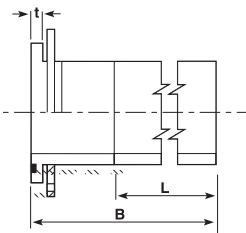
END CAPS



Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code	L (mm)	Z (mm)	SDR 11 Weight (kg)	SDR 17.6 Weight (kg)	SDR 21 Weight (kg)
90	58 332 313	58 331 313	-	48 332 313	500	109	1.3	0.9	-
125	58 332 315	58 331 315	-	48 332 315	500	128	2.6	1.8	-
180	58 332 318	58 331 318	-	48 332 318	500	167	5.7	3.9	-
250	-	-	29 748 321	48 332 321	500	217	11.8	-	6.5
280	-	-	29 748 322	48 332 322	500	239	15.2	-	8.4
315	-	-	29 748 323	48 332 323	500	256	19.8	-	10.9
355	-	-	29 748 324	48 332 324	500	291	26.2	-	14.5
400	-	-	29 748 325	48 332 325	500	316	34.6	-	19.1
450	-	-	29 748 326	48 332 326	1000	95	64.7	-	37.6
500	-	-	29 748 327	48 332 327	1000	105	81.7	-	47.2

Dimensions of pupped fittings should be used subject to a +/- 5mm tolerance due to the nature of the fabrication process.
 Standard pup leg lengths: 0.5m in sizes up to 400mm; 1.0m in sizes 450mm to 1200mm
 Additional bespoke large diameter fabricated fittings are available to order – please contact our Sales Office for further information.

SLIMFLANGE ASSEMBLIES



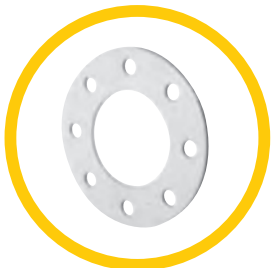
Size (mm)	SDR 21 Code	L (mm)	B (mm)	t SDR21 (mm)	SDR 21 Weight (kg)
250 x 200	29 487 321	500	610	27	7.0
315 x 250	29 487 323	500	610	30	10.0
355 x 300	29 487 324	500	610	35	17.0
400 x 350	29 487 325	500	610	38	26.0
450 x 400	29 487 326	1000	1110	42	31.0
500 x 450	29 487 327	1000	1110	45	37.0
560 x 500	29 487 328	1000	1110	50	46.0

The SlimFlange is a unique product and allows size-for-size connection of a PE pipeline to a metal flange without loss of nominal bore. It is only sold as a complete assembly.

Bolt kits are not supplied in the assembly. However, it is recommended that, to achieve the best performance, bolt kits with washers of type form A (normal range) as per BS4320 are used.

SlimFlange Assemblies comprise of SlimFlange, galvanised mild steel backing ring and full faced gasket.

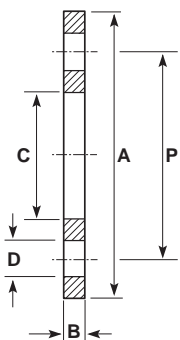
SLIMFLANGE BACKING RING



Size (mm)	SDR	A (mm)	B (mm)	C (mm)	D (mm)	PCD P (mm)	No of Holes	Weight (kg)	Metric Bolt Size*
250 x 200	21	340	13	252	23	295	12	3.5	M20
315 x 250	21	405	15	317	22	359	12	5.2	M20
355 x 300	21	460	20	358	27	410	12	9.0	M24
400 x 350	21	520	25	403	27	470	16	14.6	M24
450 x 400	21	580	25	453	30	525	16	17.1	M27
500 x 450	21	640	25	504	30	585	20	20.2	M27
560 x 500	21	715	25	564	33	650	20	25.1	M30

Drilled to BS EN 1092-1:2007 Table 13. Except for 315x250mm SDR 17

(For dimensional purpose only - not for sale individually)

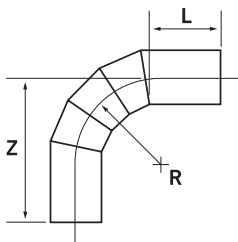


Dimensions of pupped fittings should be used subject to a +/- 5mm tolerance due to the nature of the fabrication process.

Standard pup leg lengths: 0.5m in sizes up to 400mm; 1.0m in sizes 450mm to 1200mm

Additional bespoke large diameter fabricated fittings are available to order – please contact our Sales Office for further information.

90° MITRED ELBOWS



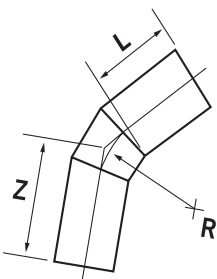
Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	L (mm)	Z (mm)	SDR 11 Weight (kg)	SDR 17.6 Weight (kg)	SDR 21 Weight (kg)
90	58 244 313	58 243 313	-	500	617	2.4	1.6	-
125	58 244 315	58 243 315	-	500	663	5	4	-
180	58 244 318	58 243 318	-	500	734	12	8	-
250	-	-	29 248 321	500	803	-	-	14
280	-	-	29 248 322	500	845	-	-	17
315	-	-	29 248 323	500	888	-	-	23
355	-	-	29 248 324	500	938	-	-	30
400	-	-	29 248 325	500	993	-	-	39
450	-	-	29 248 326	500	1055	-	-	81
500	-	-	29 248 327	500	1116	-	-	102
560	-	-	29 248 328	1000	1690	-	-	131
630	-	-	29 248 329	1000	1776	-	-	177
710	-	-	29 248 330	1000	1883	-	-	259
800	-	-	29 248 332	1000	1985	-	-	344

We can supply longer legs for some Butt Fusion machines or shorter (long spigot) for electrofusion.

R = Radius of curvature = approx 1.5 x D (the pipe size)

90° Gas mitres only contain four segments

45° MITRED ELBOWS



Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	L (mm)	Z (mm)	SDR 11 Weight (kg)	SDR 17.6 Weight (kg)	SDR 21 Weight (kg)
90	58 242 313	58 241 313	-	500	538	2.3	1.6	-
125	58 242 315	58 241 315	-	500	553	5	3	-
180	58 242 318	58 241 318	-	500	576	10	7	-
250	-	-	29 247 321	500	606	-	-	12
280	-	-	29 247 322	500	618	-	-	15
315	-	-	29 247 323	500	632	-	-	19
355	-	-	29 247 324	500	650	-	-	25
400	-	-	29 247 325	500	669	-	-	33
450	-	-	29 247 326	500	691	-	-	42
500	-	-	29 247 327	500	711	-	-	89
560	-	-	29 247 328	1000	1237	-	-	114
630	-	-	29 247 329	1000	1266	-	-	147
710	-	-	29 247 330	1000	1300	-	-	191
800	-	-	29 247 332	1000	1339	-	-	249

We can supply longer legs for some Butt Fusion machines or shorter (long spigot) for electrofusion.

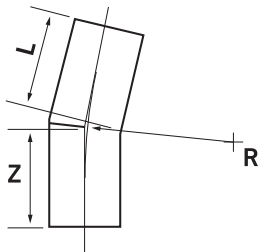
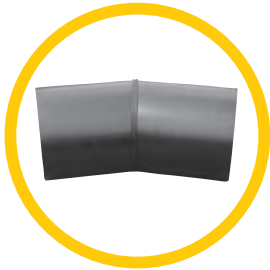
R = Radius of curvature = approx 1.5 x D (the pipe size)

Dimensions of pupped fittings should be used subject to a +/- 5mm tolerance due to the nature of the fabrication process.

Standard pup leg lengths: 0.5m in sizes up to 400mm; 1.0m in sizes 450mm to 1200mm

Additional bespoke large diameter fabricated fittings are available to order – please contact our Sales Office for further information.

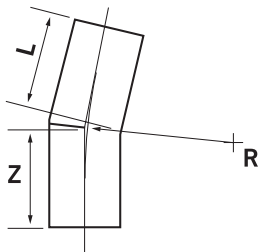
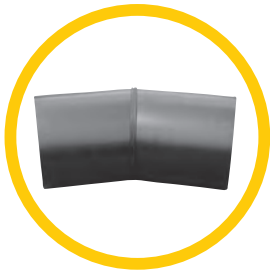
22½° MITRED ELBOWS



Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	L (mm)	Z (mm)	SDR 11 Weight (kg)	SDR 17.6 Weight (kg)	SDR 21 Weight (kg)
90	58 317 313	58 316 313	-	500	509	2.2	1.5	-
125	58 317 315	58 316 315	-	500	514	4.2	2.8	-
180	58 317 318	58 316 318	-	500	518	9	6	-
250	-	-	29 246 321	500	525	-	-	10
280	-	-	29 246 322	500	528	-	-	12
315	-	-	29 246 323	500	531	-	-	16
355	-	-	29 246 324	500	535	-	-	20
400	-	-	29 246 325	500	540	-	-	26
450	-	-	29 246 326	500	545	-	-	62
500	-	-	29 246 327	500	550	-	-	77
560	-	-	29 246 328	1000	1056	-	-	97
630	-	-	29 246 329	1000	1063	-	-	123
710	-	-	29 246 330	1000	1071	-	-	157
800	-	-	29 246 332	1000	1080	-	-	201

We can supply longer legs for some Butt Fusion machines or shorter (long spigot) for electrofusion.
R = Radius of curvature = approx 1.5 x D (the pipe size)

11¼° MITRED ELBOWS



Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	L (mm)	Z (mm)	SDR 11 Weight (kg)	SDR 17.6 Weight (kg)	SDR 21 Weight (kg)
90	58 298 313	58 297 313	-	500	504	2.1	1.5	-
125	58 298 315	58 297 315	-	500	506	4.1	2.8	-
180	58 298 318	58 297 318	-	500	509	9	6	-
250	-	-	29 245 321	500	512	-	-	10
280	-	-	29 245 322	500	514	-	-	12
315	-	-	29 245 323	500	516	-	-	16
355	-	-	29 245 324	500	518	-	-	20
400	-	-	29 245 325	500	520	-	-	25
450	-	-	29 245 326	500	522	-	-	61
500	-	-	29 245 327	500	525	-	-	75
560	-	-	29 245 328	1000	1028	-	-	94
630	-	-	29 245 329	1000	1031	-	-	120
710	-	-	29 245 330	1000	1035	-	-	152
800	-	-	29 245 332	1000	1039	-	-	194

We can supply longer legs for some Butt Fusion machines or shorter (long spigot) for electrofusion.
R = Radius of curvature = approx 1.5 x D (the pipe size)

Dimensions of pupped fittings should be used subject to a +/- 5mm tolerance due to the nature of the fabrication process.

Standard pup leg lengths: 0.5m in sizes up to 400mm; 1.0m in sizes 450mm to 1200mm

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BAGS / WIPES / PIN ADAPTORS



Item	Description	Product Code	Weight (kg)
Service Coil Dispenser Bags*	-	53 590 100	0.5
Electrofusion iso-propyl Alcohol Wipes 100% (100 per tub)	-	53 996 603	-
Electrofusion Pin Adaptors 4.7 – 4.0mm	Resusable (Pair)	53 EWO 002	-
	Economy (Each)	C0 101 102	-

* Suitable for 25mm and 32mm pipe coils.

FRIALEN® PIPE-MARKER



Item	Product Code
Silver (pack of 10)	FE 613 069

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