FORMER LANGSTONE TECHNOLOGY PARK, LANGSTONE ROAD, HAVANT.

WATCHING BRIEF VERIFICATION REPORT

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Table of Contents

A. INTRODUCTION 1
1. Terms of Reference 1
2. Aims and Objectives 1
3. Previous Reports 1
4. Regulatory Liaison 1
4.1 Planning Conditions 1
B. BACKGROUND INFORMATION 3
5. Basic Site Details 3
5.1 Site Location 3
5.2 Overall Objectives 6
5.3 Summary of Environmental Setting 7
5.4 Development Proposal 7
5.5 Previously identified contamination. 8
C. WATCHING BRIEF 12
6. Introduction 12
7. Soils Reuse 12
8. Soils Testing 19
9. WS2 21
D. BARRier pipe 25
E. imported materials 28
F. CONCLUSIONS AND RECOMMENDATIONS 29
10. Conclusions 29

Table of Figures

Figure 1– Site Location (circled)....4
Figure 2 – Site Location existing....5
Figure 3 – Site Location (development area) showing Southwest and Northeast development areas....6
Figure 4 - Proposed Development (Southwest corner)....8
Figure 5 – SI locations.....9
Figure 6 – Borehole Log WS2....10
Figure 7 – Southwest development platform - Hardstanding and topsoil removed....12
Figure 8 – Segregation of soils (made ground to be reused in SW and concrete for crushing in NE)....13
Figure 9 – Attenuation tanks (resulting in mostly natural soils)....13
Figure 10 – Oversize and concrete for crushing (NE)....14
Figure 11 – Use of made ground and imported aggregate to create formation levels and subbase for building slab....15
Figure 12 – Stockpiling (suitable) made ground to raise levels to formation....16
Figure 13 – Stockpiled drainage arisings....17
Figure 14 – Ongoing drainage works....18
Figure 15 – Drainage work in and around WS2....21
Figure 16 – Drainage work in and around WS2....22
Figure 17 – Drainage arising from around WS2....23
Figure 18 – Drainage work in and around WS2....23
Figure 19 – Drainage work in and around WS2....24
Figure 20 – Main Water (Barrier Pipe).....25
Figure 21 – Main Water (Barrier Pipe).....26
Figure 22 – Main Water (Barrier Pipe).....27

Table of Tables

Table 1 – Summary of Delineation testing WS2....11
Table 2 – Summary of Delineation Trial Sample Analysis Summary #1....19
Table 3 – Summary of Delineation Trial Sample Analysis Summary #2....20

EXECUTIVE SUMMARY

Objectives	ADI Group appointed Envirotreat to undertake a Watching Brief during the enabling works, to facilitate soil / resource management and be cognisant of unexpected contamination.
Site Location	The Site is currently occupied by Langstone Technology Park. which comprises mixed commercial and industrial units. A number of new developments are being undertaken on the site.
Scope of work	• Watching brief at key stages of the enabling works. • Soils assessment of made ground prior to reuse back onsite.
Environmental Setting	The site is underlain by a sequence of Made Ground, Alluvium and River Terrace Deposits (Secondary A Aquifer). a limited band of superficial Head deposits in the southern central area of the Site. The bedrock geology is indicated to comprise the Lewes Nodular Chalk Formation, Seaford Chalk Formation. Newhaven Chalk Formation and Culver Chalk Formation (Principal Aquifer). The nearest surface water feature fir the Langstone Mill Channel running north-south adjacent *to* the eastern boundary of the Site.
Ground model	The ground investigation identified up to 1.70m of Made Ground. The Made Ground was found to comprise 'Topsoil' or Tarmac underlain by granular till type materials or reworked natural materials followed by natural strata comprising River Terrace Deposits or Brickearth to 4 m bgl. This was followed by weathered layers of the chalk bedrock to 6.00 m bgl. This was further underlain by chalk Bedrock. proven to a maximum depth of 19.85 m bgl.
Scope of Works	The scope of works covered by this report relates to identified and previously unidentified contamination associated with the development of the southwest corner of the site. As well as reuse of soils within the development.

This executive summary is to be read in conjunction with the remainder of the report and should not be relied upon in isolation.

A. INTRODUCTION

1. Terms of Reference

Envirotreat Solutions Ltd (hereinafter referred to as Envirotreat) was appointed by ADI Group (hereinafter referred to as 'the client') to undertake a watching brief and prepare a materials management plan for the reuse of soils onsite, associated with the development of the former Langstone Technology Park, Havant ('the site').

2. Aims and Objectives

The aim of this verification report is to summarise the findings of the works undertaken.

3. Previous Reports

Envirotreat has been provide with the following previous reports pertaining to the site:

- Applied Geology – Geotechnical Report on Ground Investigation at Langstone Technology Park – August 2021

Envirotreat has downloaded from the Planning Portal the following Site Investigation Report (some reports relate to the whole site):

- Delta Simons – Phase 1 Environmental Assessment – November 2020 – this included several appended historical site investigation reports
- Delta Simons – Preliminary Geo-Environmental Risk Assessment – July 2019
- Clancy - Remediation Strategy Report Langstone Technology Park, Havant – November 2020

This report should be read in conjunction with the above reports.

4. Regulatory Liaison

4.1 Planning Conditions

Planning condition 9 states:-

Prior to the commencement of any specific phase of development approved by this planning permission (other than demolition, site clearance, or any other date or stage in development as may be agreed in writing with the Local Planning Authority), an assessment of the nature and extent of contamination at the relevant part of the site, whether originating from within or outside the curtilage, shall be submitted to and approved in writing by the Local Planning Authority. The assessment may comprise separate reports as appropriate, but shall be undertaken by competent persons and unless specifically excluded in writing by the Local Planning Authority, shall include;

1. An intrusive site investigation based on the proposals outlined within the Preliminary Geo-Environmental Risk Assessment Re'-19-0687.01 (section 6.0); to provide sufficient data and information to adequately identify & characterise any physical contamination on or affecting the site, and to inform an appropriate assessment of the risks to all identified receptors.

2. The results of an appropriate risk assessment based upon (1), and where unacceptable risks are identified, a Remediation Strategy that includes; appropriately considered remedial objectives, an appraisal of remedial &/or risk mitigation options, having due regard to sustainability, and; · clearly defined proposals for mitigation of the identified risks, and;
3. A verification plan providing details of the data that will be collected in order to demonstrate that the works set out in any Remediation Strategy required under (2) are complete, identifying any requirements for longer-term monitoring of pollutant linkages, maintenance of engineered mitigation measures, and arrangements for contingency action.

All elements shall be adhered to unless agreed in writing by the Local Planning Authority. Reason: Having due regard to policies CS11 and DM10 of the Havant Borough Adopted Core Strategy (2011) and DM17 of the Havant Borough Local Plan (Allocations) (2014) and the National Planning Framework, Contamination may be present at the site as a result of previous land uses (& / or activities) on site and in the vicinity, that could pose a risk groundwater & local surface waters (ecology), to the proposed buildings, and future occupiers of the site.

Planning condition 16 states:-

Prior to the occupation of any relevant phase of the permitted development, any verification report for that phase required in accordance with condition 9 shall be submitted to and approved in writing by the Local Planning Authority. The report shall include results of sampling and monitoring carried out in accordance with the approved verification plan and must demonstrate that site remediation criteria have been met. Where longer-term monitoring of pollutant linkages is identified as being necessary, the report shall clearly set out plans for monitoring, provision for maintenance, relevant triggers and contingency actions (a "long-term monitoring and maintenance plan'). The long-term monitoring and maintenance plan shall be implemented as approved. Reason: Having due regard to policies CS11 and DM10 of the Havant Borough Adopted Core Strategy (2011) and DM17 of the Havant Borough Local Plan (Allocations) (2014), Contamination may be present at the site as a result of previous land uses (&/or activities) on site and in the vicinity, that could pose a risk groundwater & local surface waters (ecology), to the proposed buildings, and future occupiers of the site.

B. BACKGROUND INFORMATION

5. Basic Site Details

5.1 Site Location

The Langstone Technology Park comprises a roughly rectangular parcel of land occupying an area of approximately 16Ha. The site is located toward the southern periphery of Havant, 600m south of the town centre and 1.5km south-east of Junction 5 of the A3(M).

The site comprises a series of large buildings subdivided into leased units of mixed uses. Occupying the centre of the site are a series of buildings including two plant buildings ('Building 2000 and 3000'), offices and amenity complex with associated courtyards ('Building 4000'), a large data and distribution centre ('Building 5000') with a waste storage area to the west, along with three-storey office buildings ('Building 6000 and 7000').

A small nursery is present to the south of Building 5000.

Located in the north of the site is 'Building 1000', a single storey structure built on top of a man-made embankment and understood to contain a number of offices, manufacturing and laboratory units with access tunnels running from the car park to the north to beneath the building.

Toward the south-western corner of the site is a small gymnasium, vehicle washing area (with associated subsurface drainage), a storage area and a number of circular historic tank bases. All demolished prior to previous remediation works

Access infrastructure and soft landscaping covers the rest of the site, which include a number of engineered slopes. The remainder of the site is currently occupied by car parking areas (including the majority of the south of the site) – see figures 1, 2 and 3 overleaf.

Figure 1– Site Location (circled)

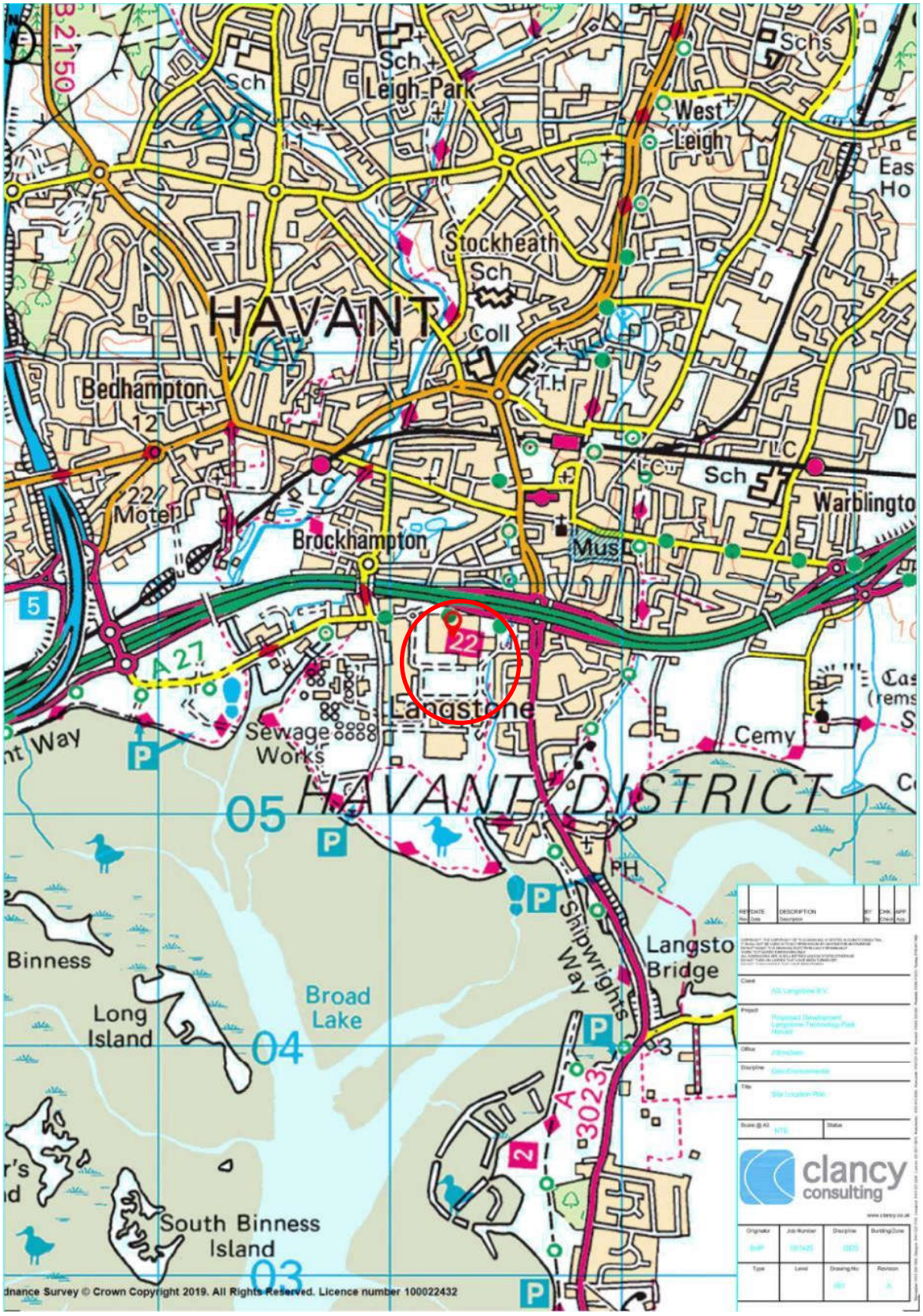


Figure 2 – Site Location existing

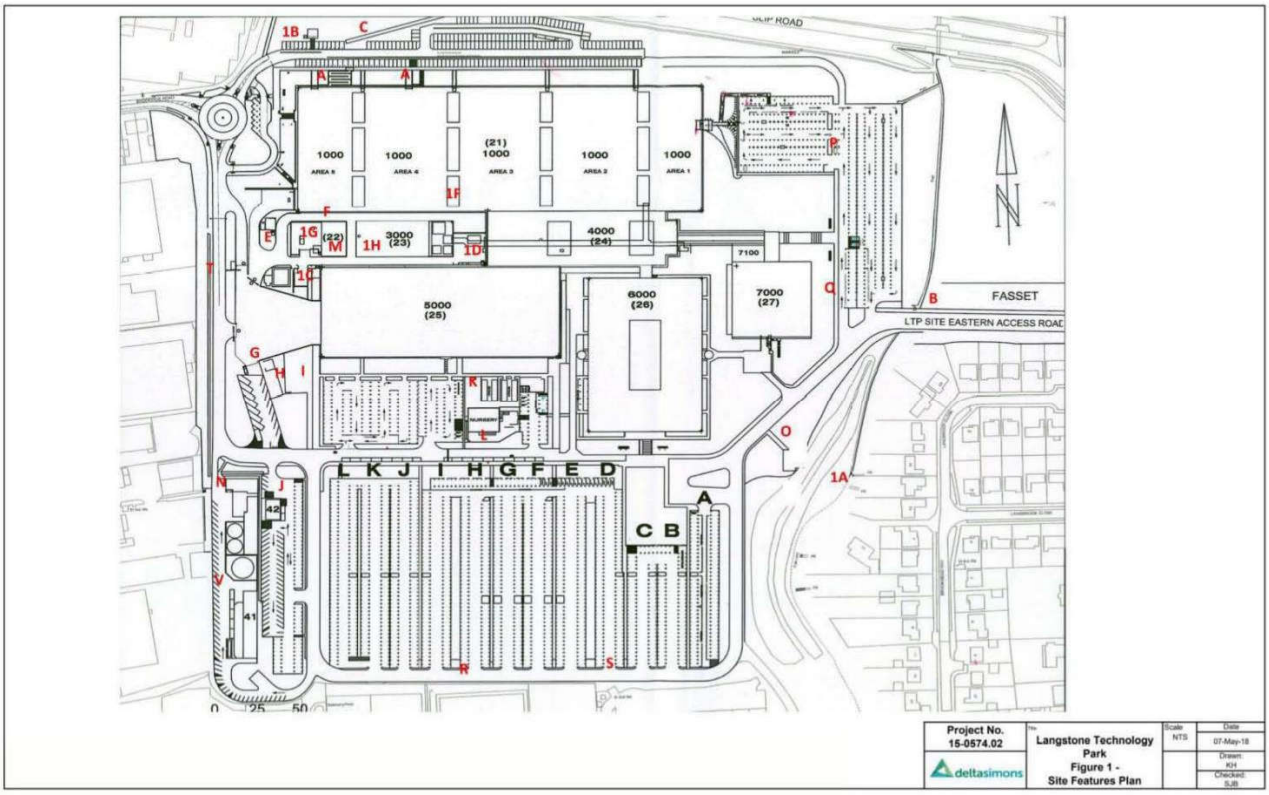
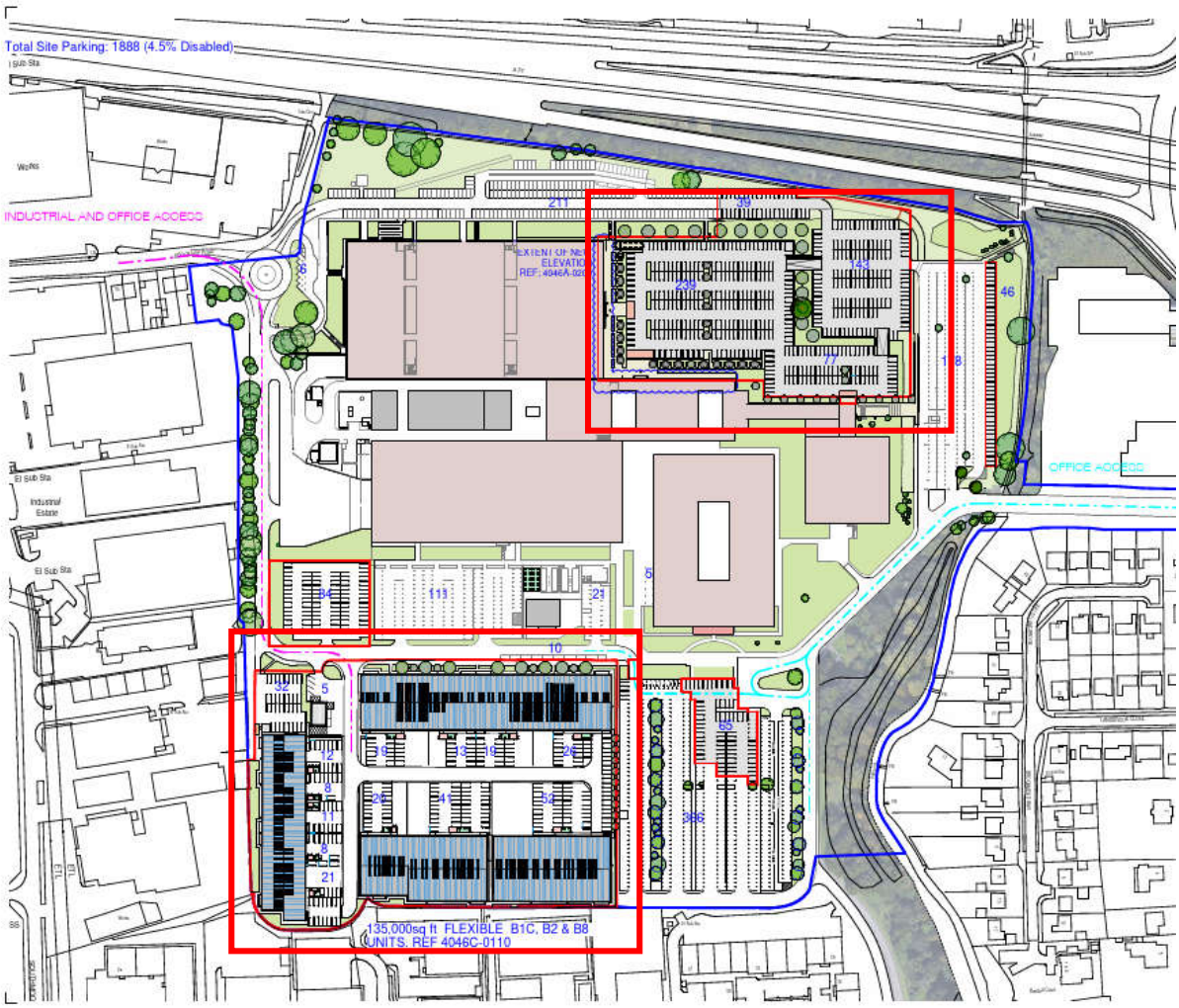


Figure 3 – Site Location (development area) showing Southwest and Northeast development areas



5.2 Overall Objectives

Delta Simons and Clancy Consulting identified potential contaminant linkages relating to the historic use of the site and (receptors).

The following scope of works is proposed to address the remediation requirements:

- Provision of a “watching brief” during enabling works during the development of the Southwest corner
- Provision of a “Discovery Strategy” during the development of the Southwest corner
- Provision of a comprehensive Validation and Verification Report (this report) detailing the works undertaken, supporting documentation and photographic record.

5.3 Summary of Environmental Setting

Historic Site Uses

Historical OS maps of the area indicate the site was undeveloped until the early 1900s, when a large sewage works, and engine house occupied the north-eastern section of the site. During the subsequent decades this facility underwent significant expansion. In the mid-1950s, an allotment garden occupied the centre of the site.

In the early to mid-1970s, the site had undergone large-scale redevelopment, resulting in the construction of many of the existing commercial / industrial units. A large building and an electrical sub-station occupied the southern section of the site, within the existing car-parking area. By the early 1990s the building / electricity substation across the south of the site had been replaced by the existing car park and the site is understood to have been in its current configuration. The surrounding area has comprised a mix of undeveloped, and industrial land uses including mills, sewage works, works and industrial units and a retail park with associated infrastructure.

Ground Conditions

Clancy Consulting recorded the following ground conditions:

Ground conditions encountered in exploratory holes comprised up to 3.10m thickness of Made Ground, underlain by River Terrace Deposits to depths of up to approximately 6.00m bgl. The White Chalk Subgroup was recorded beneath the River Terrace Deposits and proven to a maximum depth of approximately 25.00m bgl.

Groundwater was recorded in the River Terrace Deposits from depths of approximately 2.00m bgl.

Groundwater in the superficial deposits is considered to be in hydraulic conductivity within groundwater in the underlying White Chalk Subgroup Principal Aquifer. Hydrogeology and Hydrology

The nearest surface water feature is the Langstone Mill Channel running north to south adjacent to the eastern boundary of the Site.

5.4 Development Proposal

Development Team

The site will be redeveloped for commercial end use with associated parking, access and landscaped areas.

The development will be carried out by:

ADI Group

66 Melchett Rd,

Kings Norton Business Centre,

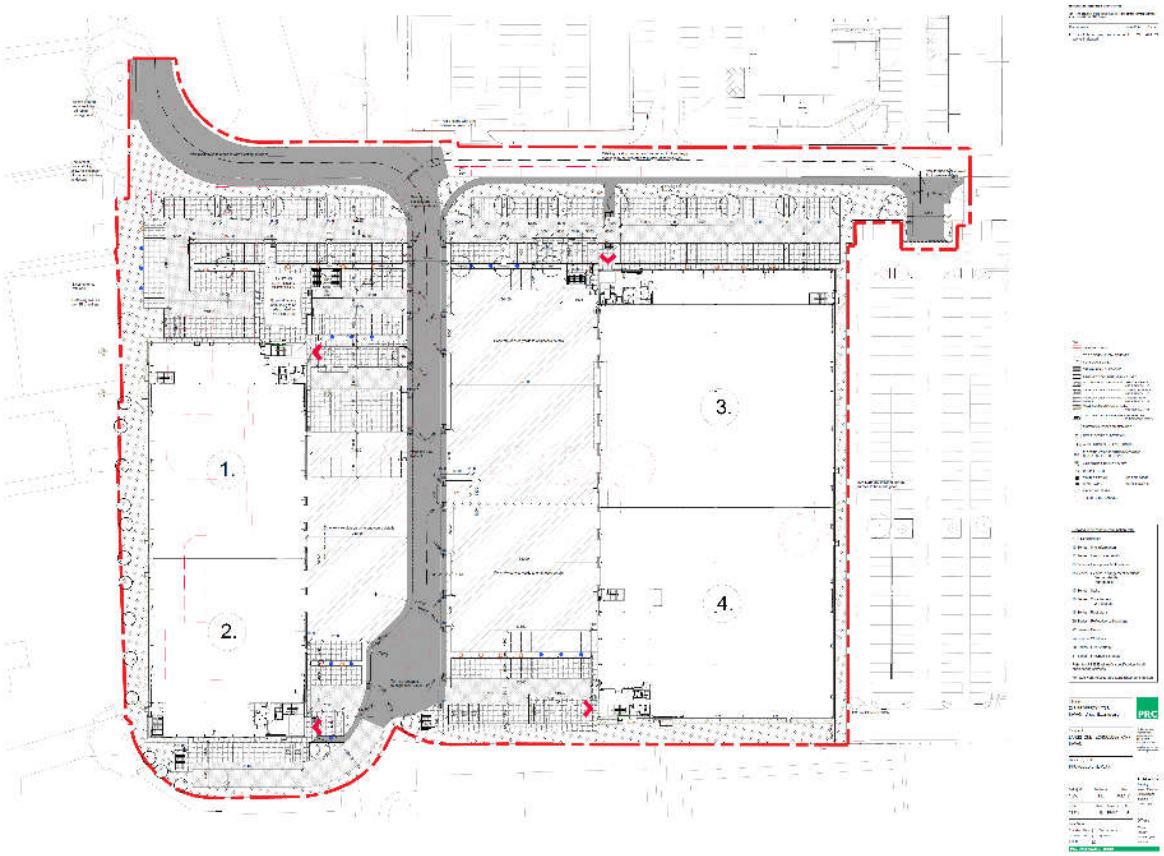
Birmingham

B30 3HX

Proposed Development

The Proposed development for the Southwest corner of the site is shown in Figure 4 below. NOTE WS2 falls OUTSIDE of this area.

Figure 4 - Proposed Development (Southwest corner)



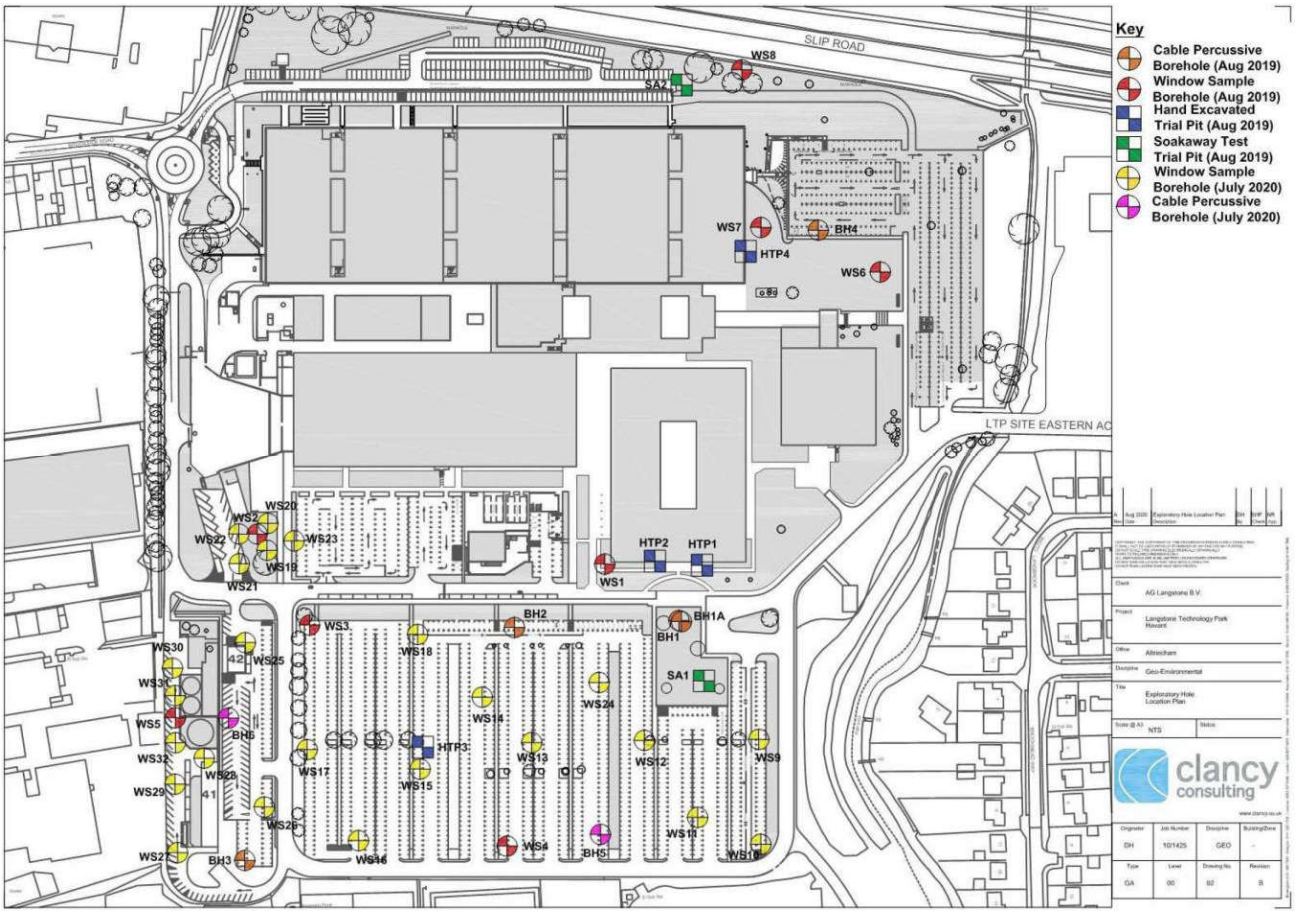
5.5 Previously identified contamination.

In addition to the contamination in and around WS5, further potential soil contamination was noted around WS2, see figure 5 for respective locations. However, WS2 fall outside of the development area.

Clancy noted strong olfactory evidence between 1.0m and 1.6m bgl, this was supported by laboratory testing of soils from 1.1m bgl. See figure 6 for borehole log and table 1 for summary of laboratory testing.

Clancy returned to site and drilled several further windowless boreholes WS19 to WS 23 inclusive, to delineate the contamination noted within WS2, the laboratory testing is also summarised in table 1 below.

Figure 5 – SI locations.



Watching Brief - Verification Report

Figure 6 – Borehole Log WS2

clancy consulting

	Project Title: Langstone Technology Park, Havant		WS2
	Project Number: 10/1425	Client: AG Langstone B.V.	Sheet 1 Of 1
	GL (mAOD):	N Coord: 50.846009	E Coord: -0.990914
Date: 17/07/2019	Method: Window Sampler	Driller: WB Drilling	Logged By: SHP

Depth (m)	Type	Test Result	Level	Legend	Depth (m)	Description	Water	Standpipe
0.50 0.60 - 0.80	ES B				0.55	MADE GROUND: Grass over brown slightly clayey very sandy angular to sub-rounded fine to coarse gravel of flint and concrete with a low cobble content of concrete. Occasional rootlets towards the top of the unit.		
1.00 - 1.45 1.10	SPT ES	N=16			1.00 1.25	MADE GROUND: Brown slightly clayey very gravelly fine to medium sand. Gravel is angular to sub-rounded fine to coarse of flint.		
					1.60	MADE GROUND: Dark blackish grey becoming brown very sandy slightly gravelly clay with fragments of wood and grass. Gravel is sub-rounded fine to coarse of flint. Strong olfactory evidence of hydrocarbons.		
2.00 - 2.45	SPT	N=2			2.00 2.10			
2.40	ES					Firm brown very sandy slightly gravelly CLAY with fragments of wood and grass. Strong olfactory evidence of hydrocarbons.		
3.00 - 3.45	SPT	N=8			3.00	Brown clayey sandy sub-angular to sub-rounded fine to coarse GRAVEL of flint.		
					3.50	Very soft becoming soft grey becoming brown sandy silty CLAY. Slightly gravelly towards the top of the unit. Gravel is sub-rounded fine to coarse of flint.		
4.00 - 4.45	SPT	N=12			4.00	Medium dense light brown clayey sandy angular to sub-rounded fine to coarse GRAVEL of flint and chalk (wet).		
5.00 - 5.45	SPT	N=22			5.00 5.45	End Of Borehole At 5.45 m		
					6.00			
					7.00			
					8.00			

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed
W - Water Sample
S - Standard Penetration Test
C - Cone Penetration Test
N - Penetration Test 'N' Value
V - Hand Shear Vane kPa
▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS
No Groundwater Encountered
Falling head test was undertaken in the borehole. Borehole backfilled with arisings.

Scale: 1:50

Water Strikes

Date	Strike	Level	Minutes	Casing	Sealed

Daily Log Of Depths / Chiselling

Date	Casing	Water	From	To	Hours

Printed By GeoLogs (www.GeoLogs.com)

Table 1 – Summary of Delineation testing WS2

Sample Reference	Sample Depth	PAH (mg/kg)	TPH (C5-35) (mg/kg)	Benzene (mg/kg)
WS2	1.1	40.1	9,200	< 0.01
WS2	2.4	< 0.08	< 0.01	< 0.01
WS19	NT	NT	NT	NT
WS20	0.4	< 0.08	< 0.01	< 0.01
WS20	0.9	< 0.08	< 0.01	< 0.01
WS20	1.9	< 0.08	< 0.01	< 0.01
WS21	1.3	< 0.08	< 0.01	< 0.01
WS21	2.7	0.09	< 0.01	< 0.01
WS22	NT	NT	NT	NT
WS23	1.0	3.05	< 0.01	< 0.01

None of the additional borehole installations indicated any significant hydrocarbon contamination, indicating that any contamination located at WS2 as being small in volume and isolated. In addition, the laboratory testing of WS2 indicated the absence of short chain (mobile) contaminants. Therefore, presenting a low risk to groundwater.

On the basis that the contaminants of concern identified onsite were hydrocarbon based, other analysis suites were omitted.

C. WATCHING BRIEF

6. Introduction

Envirotreat was in attendance during the main enabling works and at key stages of the site development.

7. Soils Reuse

To facilitate the design, a cut and fill was undertaken by the ADI approved subcontractor (JA Burke).

Arisings from the cut and fill (and subsequent drainage and services works) were segregated and stockpiled in accordance of

- Tarmac (reuse / offsite disposal)
- Concrete and materials suitable for crushing (relocated to Northeast of site for processing and reuse for new car parking)
- Made ground (assessed and reused within Southwest development by Envirotreat) and
- Natural soils (relocated to Northeast of site for reuse)

These works are shown in the following figures

Figure 7 – Southwest development platform - Hardstanding and topsoil removed



Figure 8 – Segregation of soils (made ground to be reused in SW and concrete for crushing in NE)



Figure 9 – Attenuation tanks (resulting in mostly natural soils)





Figure 10 – Oversize and concrete for crushing (NE)



Figure 11 – Use of made ground and imported aggregate to create formation levels and subbase for building slab



Figure 12 – Stockpiling (suitable) made ground to raise levels to formation



Figure 13 – Stockpiled drainage arisings



Figure 14 – Ongoing drainage works



8. Soils Testing

ALL made ground stockpiled for reuse in trimming levels to formation / backfilling / etc was sampled and tested for suitability, the results of these samples are summarised in tables and 3 below. Certificates of Analysis appended accordingly.

Table 2 – Summary of Delineation Trial Sample Analysis Summary #1

Lab Sample Number		2229955	2229956	2229957	2229958
Sample Reference		Sample 1	Sample 2	Sample 3	Sample 4
Depth (m)		Not Applicable	Not Applicable	Not Applicable	Not Applicable
Date Sampled		04/04/2022	04/04/2022	04/04/2022	04/04/2022
Analytical Parameter (Soil Analysis)	Units				
General Inorganics					
pH - Automated	pH Units	7.5	7.1	7.9	7.9
Total PAH					
Speciated Total EPA-16 PAHs	mg/kg	< 0.80	< 0.80	< 0.80	< 0.80
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	6.1	4	6	5.3
Boron (water soluble)	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Cadmium (aqua regia extractable)	mg/kg	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	44	45	45	34
Copper (aqua regia extractable)	mg/kg	15	16	16	12
Lead (aqua regia extractable)	mg/kg	15	12	16	13
Mercury (aqua regia extractable)	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	40	43	41	30
Selenium (aqua regia extractable)	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	57	56	69	48
Monoaromatics & Oxygenates					
Benzene	µg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	< 10	< 10	< 10	< 10

Table 3 – Summary of Delineation Trial Sample Analysis Summary #2

Lab Sample Number		2269717	2269718
Sample Reference		S5	S6
Depth (m)		Not applicable	Not applicable
Date Sampled		04/05/22	04/05/22
Time Taken		None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**		
General Inorganics			
pH - Automated	pH Units	8.5	8.1
Total PAH			
Speciated Total EPA-16 PAHs	mg/kg	< 0.80	< 0.80
Heavy Metals / Metalloids			
Arsenic (aqua regia extractable)	mg/kg	5.8	7.1
Boron (water soluble)	mg/kg	< 0.2	0.5
Cadmium (aqua regia extractable)	mg/kg	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	40	50
Copper (aqua regia extractable)	mg/kg	13	16
Lead (aqua regia extractable)	mg/kg	16	19
Mercury (aqua regia extractable)	mg/kg	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	36	37
Selenium (aqua regia extractable)	mg/kg	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	58	74
Monoaromatics & Oxygenates			
Benzene	µg/kg	< 1.0	< 1.0
Petroleum Hydrocarbons			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	< 10	< 10

The above testing shows the suitability of the made ground for reuse on the Southwest development. No unsuitable soils were observed during the enabling works.

Surplus natural soils were stockpiled in the north of the overall development for either future reuse within the overall planning application or future disposal onsite.

Natural in-situ soils at formation were not tested, they were assessed visually and olfactory for evidence of contamination as part of the watching brief. The Envirotreat RMS states that laboratory testing will be undertaken as part of the contamination in and around WS5.

9. WS2

Previous site investigation had highlighted potential hydrocarbon contamination around the borehole WS2.

Envirotreat attended site for the duration of drainage works in and around WS2 (exact location of WS2 was not confined). These works were outside the development area and consisted of connection to local drainage only. All excavated soils and the sides / base of all excavations were assessed by visual, olfactory and headspace analysis (by PID). This was undertaken to demonstrate that excavated soils could be reused within the works. The works were limited to two small excavations only.

No contamination was observed, and the excavated soils were reused to reinstate the excavations.

Figure 15 – Drainage work in and around WS2



Figure 16 – Drainage work in and around WS2



Figure 17 – Drainage arising from around WS2



Figure 18 – Drainage work in and around WS2



Figure 19 – Drainage work in and around WS2



D. BARRIER PIPE

Barrier pipe was used for the mains water supply (attachments of type used appended to this document).

Photograpghs of the installation are shown below

Figure 20 – Main Water (Barrier Pipe).



Figure 21 – Main Water (Barrier Pipe).



Figure 22 – Main Water (Barrier Pipe).



E. IMPORTED MATERIALS

Imported materials are summarised in the attached spreadsheet.

F. CONCLUSIONS AND RECOMMENDATIONS

10. Conclusions

Envirotreat has completed the Watching Brief at the former Langstone Technology Park, Havant in accordance with the requirements of Planning Conditions and the agreed Remediation Strategy.

The watching brief works carried out clearly show that any contamination risks have been managed and no risk to human health or groundwater has arisen during / as a consequence of the enabling works.

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Analytical Report Number : 22-57270

Replaces Analytical Report Number: 22-57270, issue no. 1
Result correction by laboratory.
Accreditation for Petroleum Hydrocarbons withdrawn

Project / Site name:	Langstone	**Samples received on:**	10/05/2022
Your job number:		**Samples instructed on/ Analysis started on:**	10/05/2022
Your order number:		**Analysis completed by:**	18/05/2022
Report Issue Number:	2	**Report issued on:**	27/01/2023
Samples Analysed:	2 soil samples		

Signed:

Anna Goc
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 22-57270
Project / Site name: Langstone

Lab Sample Number				2269717	2269718
Sample Reference				S5	S6
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				Deviating	Deviating
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	12	12
Total mass of sample received	kg	0.001	NONE	0.4	0.4
General Inorganics					
pH - Automated	pH Units	N/A	MCERTS	8.5	8.1
Speciated PAHs					
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Total PAH					
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.8	7.1
Boron (water soluble)	mg/kg	0.2	MCERTS	< 0.2	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	40	50
Copper (aqua regia extractable)	mg/kg	1	MCERTS	13	16
Lead (aqua regia extractable)	mg/kg	1	MCERTS	16	19
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	36	37
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	58	74

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 22-57270
Project / Site name: Langstone

Lab Sample Number				2269717	2269718
Sample Reference				S5	S6
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				Deviating	Deviating
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Monoaromatics & Oxygenates					
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0
Petroleum Hydrocarbons					
TPH-CWG - Aliphatic >EC5 - EC6 HS_1D_AL *	mg/kg	0.001	NONE	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 HS_1D_AL *	mg/kg	0.001	NONE	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 HS_1D_AL *	mg/kg	0.001	NONE	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_1D_AL *	mg/kg	10	NONE	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7 HS_1D_AR *	mg/kg	0.001	NONE	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 HS_1D_AR *	mg/kg	0.001	NONE	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 HS_1D_AR *	mg/kg	0.001	NONE	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_1D_AR *	mg/kg	10	NONE	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

*Data reported unaccredited due to quality control parameter failure associated with this result; other checks applied prior to reporting the data have been accepted.The result should be considered as being deviating and therefore may be unreliable.

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 22-57270
Project / Site name: Langstone

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2269717	S5	None Supplied	None Supplied	Brown clay and sand with gravel.
2269718	S6	None Supplied	None Supplied	Brown clay and sand with gravel and vegetation.

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Analytical Report Number : 22-57270
Project / Site name: Langstone

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 22-57270
Project / Site name: Langstone

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis.Please note that the associated result(s) may be unreliable and should be interpreted with care.

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
S5	None Supplied	S	2269717	a	None Supplied	None Supplied	None Supplied
S6	None Supplied	S	2269718	a	None Supplied	None Supplied	None Supplied

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The results included within the report relate only to the sample(s) submitted for testing.

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Analytical Report Number : 22-50314

Replaces Analytical Report Number: 22-50314, issue no. 1
Result correction by laboratory.
Accreditation for Petroleum Hydrocarbons withdrawn

Project / Site name:	Langstone Havant	**Samples received on:**	07/04/2022
Your job number:		**Samples instructed on/ Analysis started on:**	07/04/2022
Your order number:		**Analysis completed by:**	19/04/2022
Report Issue Number:	2	**Report issued on:**	26/01/2023
Samples Analysed:	4 soil samples		

Signed:

Adam Fenwick
Technical Reviewer
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 22-50314
Project / Site name: Langstone Havant

Lab Sample Number				2229955	2229956	2229957	2229958
Sample Reference				Sample 1	Sample 2	Sample 3	Sample 4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				04/04/2022	04/04/2022	04/04/2022	04/04/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	12	11	12	11
Total mass of sample received	kg	0.001	NONE	0.4	0.4	0.4	0.4
General Inorganics							
pH - Automated	pH Units	N/A	MCERTS	7.5	7.1	7.9	7.9
Speciated PAHs							
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	< 0.80
Heavy Metals / Metalloids							
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.1	4	6	5.3
Boron (water soluble)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	44	45	45	34
Copper (aqua regia extractable)	mg/kg	1	MCERTS	15	16	16	12
Lead (aqua regia extractable)	mg/kg	1	MCERTS	15	12	16	13
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	40	43	41	30
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	57	56	69	48
Monoaromatics & Oxygenates							
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0

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Analytical Report Number: 22-50314
Project / Site name: Langstone Havant

Lab Sample Number				2229955	2229956	2229957	2229958
Sample Reference				Sample 1	Sample 2	Sample 3	Sample 4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				04/04/2022	04/04/2022	04/04/2022	04/04/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**				
Petroleum Hydrocarbons							
TPH-CWG - Aliphatic >EC5 - EC6* HS_1D_AL	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8* HS_1D_AL	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10* HS_1D_AL	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)* EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7* HS_1D_AR	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8* HS_1D_AR	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10* HS_1D_AR	mg/kg	0.001	NONE	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)* EH_CU+HS_1D_AR	mg/kg	10	NONE	< 10	< 10	< 10	< 10

U/S = Unsuitable Sample I/S = Insufficient Sample

*Data reported unaccredited due to quality control parameter failure associated with this result; other checks applied prior to reporting the data have been accepted. The result should be considered as being deviating and therefore may be unreliable.

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Analytical Report Number : 22-50314
Project / Site name: Langstone Havant

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2229955	Sample 1	None Supplied	None Supplied	Brown clay and loam with vegetation.
2229956	Sample 2	None Supplied	None Supplied	Brown clay and loam with vegetation.
2229957	Sample 3	None Supplied	None Supplied	Brown clay and loam with vegetation.
2229958	Sample 4	None Supplied	None Supplied	Brown clay and loam with vegetation.

Analytical Report Number : 22-50314
Project / Site name: Langstone Havant

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

3 COUNTIES CIVIL ENGINEERING LTD **9th May 2023**

Project: **New car park, Langstone Park, Havant**

Client: **aDI Building and Refurbishment Ltd**

Schedule of imported aggregates and topsoil

Type 3 Limestone

Ticket nr	Tonnes
1797100	19.20
1797101	18.90
1797102	18.98
1797103	18.94
1797104	18.82
1797105	18.86
1797106	18.88
1797107	19.16
1797108	19.10
1797109	19.08
1797110	18.74
1797111	19.18
1797112	19.28
1797113	19.14
1797114	18.84
1797115	18.86
1797116	19.34
1797117	18.76
1797118	18.68
1797119	19.16
1797793	19.04
1797794	19.06
1797795	18.78
1797796	18.84
1797797	18.84
1797798	18.82
1797799	18.90
1797800	19.14
1797801	19.14
1797802	19.14
1797803	19.10
1797804	19.12
1797805	19.12
1797806	19.12
1797807	19.14
1797808	19.60
1797809	19.36
1797810	19.30
1797811	19.34
1797812	18.73
1797816	18.74
1797817	19.28
1797818	19.28
1797819	19.34
1797820	19.32
1797821	19.32
1797822	19.16
1797823	19.14
1797824	18.90
1797825	18.88
1797826	18.90
1797827	18.92
1797828	18.90
1797829	18.98
1797830	18.96
1797831	18.82
1797832	18.80
1797833	18.74
1797834	18.80
1797835	18.74
1797837	18.70
1797838	18.76
1797839	18.80
1797840	18.78
1797841	18.78
1797846	18.90
1797847	18.88
1797848	19.06
1797849	18.96
1797850	18.92
1797851	18.92
1797852	18.96
1797853	18.72
1797854	18.92
1797855	19.24
1797856	19.16
1797842	18.76
1797843	18.74
1797844	18.78
1797845	18.76
1797859	19.10
1797860	19.10
1797861	19.18
1797862	19.26
1797863	19.10
1797864	19.40
1797865	18.92
1797866	18.92
1797867	19.28
1797868	19.34
1797869	19.56
1797870	19.36
1797871	19.36
1797872	18.90
1797873	18.92
1797874	18.90
1797875	18.78
1797876	18.78
1797877	18.74
1797878	18.84
1805242	18.94
1805243	18.86
1805244	18.88
1805245	18.88
1805246	18.80
1805247	18.88
1805248	18.86
1805249	18.92
1805250	18.84
1805251	18.84
1805252	18.58
1805253	18.58
1805254	18.62
1805255	18.64
1805256	18.88
1805259	18.84
1805260	18.84
1805261	19.14
1805262	18.88
1805263	18.92
1805264	19.18
1805265	18.94
1805266	18.94
1805267	19.30
1805268	19.28
1805269	18.90
1805270	19.40
1805271	19.16
1805272	19.16
1805273	19.06
1805274	18.82
1805275	18.94
1805276	18.74
1805277	18.66
1805278	18.62
1805279	18.94
1805280	18.86
1805281	19.18
1805282	18.88
1805283	18.86
1805284	18.82
1805285	18.78
1805286	18.74
1805287	18.88
1805288	18.80
	2,751.15

Type 1 Limestone

Ticket nr	Tonnes
86967937	18.88
86968358	19.50
86968409	19.30
1818486	18.68
1825664	18.74
1822283	18.90
	114.00

Fittleworth Gravel

Ticket nr	Tonnes
86750541	18.82
86757535	18.86
86755272	19.60
86755372	19.06
86766906	19.06
292097	19.70
4654073	19.39
4654074	19.36
4654080	19.22
137554	18.50
86777224	18.90
86777971	19.26
86778706	20.26
86778775	19.26
86768810	19.38
86769343	19.38
86770595	19.34
86771968	19.30
86772674	19.38
86779192	20.06
86779244	19.00
86779800	18.92
86796496	19.34
86796988	19.34
292497	19.10
137363	17.86
137364	18.60
133326	18.90
3706	18.82
3709	18.82
3710	18.82
139090	18.18
86938140	19.44
86944647	19.44
86969259	19.48
86969821	19.38
361126	19.08
1811524	19.06
1811525	18.88
	746.55

Topsoil

Ticket nr	Tonnes
13884	20.00
13399	20.00
13400	20.00
12502	20.00
12535	20.00
12534	20.00
12533	20.00
11523	20.00
	160.00

Sand

Ticket nr	Tonnes
86914551	19.22
86915233	19.44
87054491	10.00
1801648	19.00
	67.66

WOLSELEY

Collection Ticket

Dispatch Date and Tax Point	Shipment Note
19 Dec 22	MPB 89691 / 1
Order Date	**Your Order Reference**
16 Dec 22	ADI LANGSTONE

Invoice Number	86755332
Invoice Date	19 Dec 22
Account Number	7829Y20/MPH

Invoice To:-

JTS CIVIL ENGINEERS LTD
REGENCY HOUSE DEPOT
PETERSFIELD ROAD BLACKMOOR
LISS
HAMPSHIRE
GU33 6BH

Originating Branch:-

MPB - FAREHAM CODE:MPB
SEGENSWORTH BUSINESS CENTRE
SEGENSWORTH ROAD
TITCHFIELD PARK
FAREHAM
PO15 5RQ TEL:01329 849100

Product Code	Description	Quantity Sent
P28507	GPS 63MMX50M P-LINE COIL SDR11	1
K83102	AVK 80MM R/S SLUICE VLV + SCAP RHC S21	1
BA6613	ELE 80X80MM FLG TEE BLUE	2
CA0220	FL SET 80MM M16X90 EPDM F/F WAT RILSAN	6
K83136	AVK 80MM TYPE 2 FIXED HYDRANT S29/388	2
P76096	GPS 90-125X32MM P-LINE FERRULE STRAP	2
P76095	GPS 63X32MM P-LINE FERRULE STRAP	2
P28741	GPS 32MMX3/4" P-LINE PE-MI BSP CON	8
P28505	GPS 32MMX50M P-LINE COIL SDR11	8
P28744	GPS 63MMX2" P-LINE PE-MI BSP CON	2
P80058	PAM 80MMX90D DBL FLG D/FOOT BLUE	1
CA8931	FUS AUTO TRANS CPLR M THRD BLK 63X2IN	2
BE7897	ELE 80MM BLANK D&T 2" BLUE	2
P28702	GPS 32MM P-LINE PE-PE COUPLER	4
T80180	* JET 100MMX10M ANTI CORROSION TAPE	2
MP3558	BRU 75MMX50M FOIL BACKED TAPE	2

Our Conditions of Business apply to all transactions – these can be found in branch or at www.wolseley-terms.co.uk eDocs 08
If you do receive any form of correspondence notifying you of a change of bank account details please do not reply and contact us as above.



PT003/4

PRODUCT & TECHNICAL

PROTECTA-LINE

BARRIER PIPE AND FITTINGS SYSTEM

For complete peace of mind

Product and Technical Guide



www.gpsuk.com



GPS
PE PIPE SYSTEMS

Our Company

GPS PE Pipe Systems is a member of the international Aliaxis Group of Companies who manufacture and sell pipe systems and related products for residential and commercial construction, industrial and public utilities.

We specialise in the research, development and manufacture of polyethylene and multi-layer pipe systems including fittings for gas and water transportation in the utilities, offshore and industrial markets.

Resulting from the amalgamation of two market leading companies, GPS PE Pipe Systems brings together over one hundred years of experience and knowledge in plastic pipe systems.

The Environment

We actively and consistently strive to reduce our impact on the environment. We have measured our performance against various environmental indicators since 1997 and operated an environmental management system accredited to ISO 14001 since 1999. We are currently working towards an independent verification of our carbon footprint under the Certified Emissions Measurement And Reduction Scheme (CEMARS).

Market Oriented

GPS PE Pipe Systems products have a broad range of applications in the industrial and utilities markets on a worldwide basis. The utilities of water and gas distribution are important sectors for high integrity products where the maintenance of water quality and the safe transport of gaseous fuels are of paramount importance. Industrial applications include: alternative energy installations in landfill gas systems; effluent transportation and mineral slurries.

Many of the brands in the GPS portfolio have a long record of innovation in meeting the needs of the water and gas utilities. One of the foremost pioneers in polyethylene pipe systems, GPS is continually improving and updating its offering to meet the ever growing needs of the distribution engineer, ensuring they stay at the forefront of world gas and water distribution/treatment systems.

Manufactured in the UK, our products are sold to more than 60 countries worldwide.

Customer Focus

The key to our success lies in the commitment we pledge to provide the highest quality service and support to our customers and industry end-users. We are a team of highly motivated and experienced individuals who are dedicated to helping our customers achieve their goals.

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

Quality

Designed, manufactured and supplied under a BS EN ISO 9001:2008 accredited Quality Management System, GPS products comply with relevant national, European and international product standards to ensure peace of mind for our customers.

Certificate No. fm 34819

Certificate No. E 51385

Business in the Community AWARDS 2010



World leaders in the design, manufacture, marketing and sales of high performance, high integrity plastic and composite piping systems.

- Introduction to Protecta-Line System 4-5
- Product Range Overview 6
- Pipe 7-11
- Protecta-Line 3^{C} and 3^{CTH} Coils 8-9
- Mechanical Compression Fittings 12-13
- Ferrule Off-Takes 14
- Mechanical Fittings 15-18
- Electrofusion Fittings 19-20
- Pupped Fittings 21-24
- Jointing instructions for Mechanical Compression Fittings (inc. Protecta-Line to copper joint) 25
- Instructions for 25mm and 32mm Self Tapping Ferrule Off-Takes 26-27
- Installation Instructions for 63mm Ferrule Off-Takes 28-29
- Installation Instructions for Protecta-Line Mechanical Fittings 30
- Repair Section Using 90mm–180mm Mechanical Repair Couplers 31
- Procedures for Butt-Fusion and Electrofusion of Protecta-Line Pipes 32
- Jointing Instructions for Repairs Using Electrofusion 33
- Procedure for Using Protecta-Line Surprep Scraper 34-35
- Procedure for Using the Large Diameter Protecta-Line Scraper 36-37
- Enabling Products, Wrapping, Connecting to Other Systems and Commissioning 38

Confidence in safe drinking water supply



Protecta-Line is the UK leading, award winning fully integrated barrier pipe and fittings system for safe transportation of water through contaminated land.

Its tough multi-layer construction ensures that any contaminants remaining in brownfield sites and former industrial land cannot permeate into the water supply. The Protecta-Line system offers complete performance assurance thanks to its second-to-none approval status and Kitemark to WIS 4-32-19. It is also the most comprehensive PE barrier pipe system available, incorporating a full range of pipes and dedicated, approved fittings.

For over 15 years, water companies, contractors and self-lay organisations have trusted Protecta-Line with maintaining the long term safety and quality of the water supply. It is an established favourite in the UK and abroad, and with a wealth of approval, installation and cost benefits, it remains the market leader.



Applications

- Drinking water distribution in contaminated land (brownfield sites)
- Drinking water distribution in sites with potential future contamination issues (eg: new petrol station forecourts).

Features

- Prevents the tainting that can be caused by through-wall permeation by hydrocarbons and related chemicals that might be present in contaminated land
- Proven protection against all recognised brownfield contaminants, both organic and inorganic, even in their maximum reported concentrations
- Suitable for corrosive conditions
- Second–to-none approval status for total peace of mind to the highest standards of safety demanded by water companies and other installers
- Fully integrated range of pipe and approved dedicated fittings
- May be used for trenchless installations or subjected to cold bending as standard polyethylene pipes

Benefits

- All the installation advantages of conventional PE pipe – a lightweight, flexible pipe in longer lengths that is fast and easy to install
- Reduced leakage
- Long-term security of supply
- Avoids the need for expensive soil sampling and remediation
- Lower cost of installation than metallic pipe and is significantly less disruptive
- Excellent lifetime cost savings

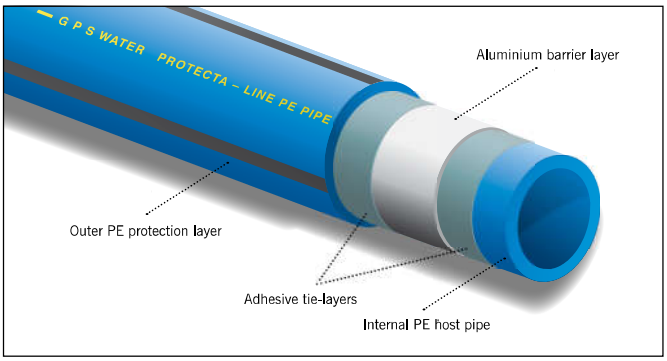
Tel: +44 (0)1480 442600 **Fax:** +44 (0)1480 458829 **Technical Support:** +44 (0)1480 442620



Design

Introduced to the UK market in 1996, Protecta-Line won the IWEX Innovation Award for its design, which prevents any chemicals left in the land from damaging the pipe wall, ensuring preservation of long-term strength, many years of usage and whole-life cost savings.

The double bonded five-layer construction comprises of an internal standard PE host pipe (PE80 or PE100 conforming to BS EN 12201) for carrying water, an impermeable aluminium barrier layer to stop the ingress of contaminants, an outer polyethylene protection layer and two adhesive tie-layers.



Second-to-none Approval Status

- Regulation 31/27/30 approved (England & Wales/Scotland/NI)
- WRAS approved **(complete** system)
- Protecta-Line system is Kitemarked to WIS 4-32-19, the only industry standard for pipe systems for potable water in contaminated land
- BS EN 12201 (25mm – 630mm – core pipes)
- System permeation tests independently verified.

WRAS
1109402
1105515
1109400
1410516
1102074

BS EN 12201-2
508224

WIS 4-32-19
KM 514626

No Expensive Soil Sampling

According to UKWIR Guidance (10/MW/03/21), PE barrier pipes provide sufficient protection from all recognised brownfield site conditions where there is no expectation of toxic substances.

This means that choosing Protecta-Line can help developers avoid the cost of expensive soil sampling. Conversely, wrapped metal pipes can corrode under certain soil conditions, so if metallic pipes are selected, soil sampling is required to establish how corrosive the site could be.

Lower Installation Costs

Lightweight and flexible for ease of handling and efficient logistics; supplied in longer lengths for fewer joints and with no requirement for thrust blocks, Protecta-Line is easier and faster to install than its metallic alternatives.

The system provides cost and ease of installation advantages with a comprehensive range of fittings and, thanks to PE's corrosion resistance, maintenance is minimised too, making it cost effective at the installation level and throughout its lifespan.

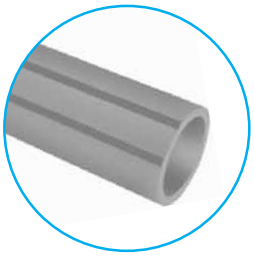
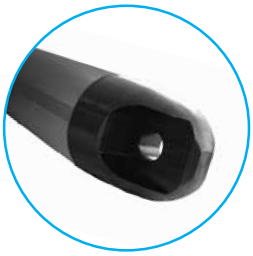
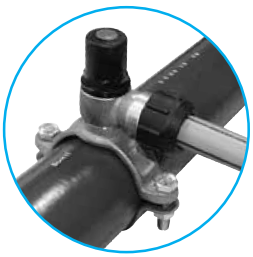
System Notice

Protecta-Line is an approved system. Only Protecta-Line fittings shall be used with Protecta-Line pipe.
The use of alternative fittings will have the following effects on your Protecta-Line system:

- Invalidation of WRAS approval and manufacturer's system performance warranty.
- Compromised permeation resistance (causing non-compliance with WIS 4-32-19 and possible risks to health).
- Danger of pipe-layer delamination, compromising system performance integrity and risking pipe bursts.
  It would be illegal to install non-WRAS approved fittings.

USE ONLY PROTECTA-LINE APPROVED FITTINGS

Product Range Overview

		DESCRIPTION	STANDARDS/APPROVALS	MATERIAL	SIZE RANGE
Protecta-Line Pipe		PE barrier pipe for water distribution through contaminated land	• Regulation 31/27/30 • WRAS • WIS 4-32-19 • BS EN 12201 (core pipes)	Polyethylene Aluminium	25mm – 630mm (SDR11) 90mm – 630mm (SDR17)
Protecta-Line 3C and 3CTH Coils		Clean, capped and coiled PE barrier pipe for installation without pre-chlorination	• Regulation 31/27/30 • WRAS • WIS 4-32-19 • BS EN 12201 (core pipes)	Polyethylene Aluminium	90mm – 180mm
Mechanical Compression Fittings		Mechanical compression fittings for service connections	• WRAS • WIS 4-32-19	Acetal	25mm – 63mm
Mechanical Fittings		Mechanical compression fittings for mechanical jointing without the need for pipe preparation or welding	• WRAS • WIS 4-24-01 Type 1 • WIS 4-32-19	Stainless steel Rilsan coated steel	63mm – 180mm
Ferrule Off-Takes		Saddle ferrules for live off-takes wthout any flow restrictions	• WRAS • WIS 4-32-19 • WIS 4-22-02	Gunmetal Acetal Stainless steel	25mm & 32mm (for 63mm – 355mm mains) 63mm (for 90mm to 355mm mains)
Electrofusion Fittings		Electrofusion fittings with a bar coding system or rapid and convenient jointing	• WRAS • WIS 4-32-19	Polyethylene	90mm – 630mm
Pupped Fittings		Extended spigots suitable for electrofusion and butt-fusion jointing	• WRAS • WIS 4-32-19	Polyethylene	90mm – 630mm

Tel: +44 (0)1480 442600 **Fax:** +44 (0)1480 458829 **Technical Support:** +44 (0)1480 442620

Protecta-Line Pipe

Features

- Black PE100 (Excel) or blue PE80 (MDPE) core pipe with aluminium barrier layer and protective outer PE skin
- Suitable for corrosive conditions
- Can be used for trenchless installations
- Brown stripes provide easy identification and comply with NJUG regulations

Benefits

- Proven protection against all recognised brownfield contaminants
- All the installation advantages of polyethylene
- No need for expensive soil sampling
- Lower cost of installation than metallic pipe and is significantly less disruptive
- Excellent lifetime cost savings.

Straight Lengths



Size* (mm)	SDR	Pressure Rating (bar)	Material	6M Code	12M Code
63	11	12.5	PE80 (MDPE)	44 512 311	-
90	11	16	PE100 (Excel)	44 512 313	44 527 313
	17	10	PE100 (Excel)	44 653 313	44 654 313
110	11	16	PE100 (Excel)	44 512 314	44 527 314
	17	10	PE100 (Excel)	44 653 314	44 654 314
125	11	16	PE100 (Excel)	44 512 315	44 652 315
	17	10	PE100 (Excel)	44 653 315	44 654 315
160	11	16	PE100 (Excel)	44 512 317	44 652 317
	17	10	PE100 (Excel)	44 653 317	44 654 317
180	11	16	PE100 (Excel)	44 512 318	44 652 318
	17	10	PE100 (Excel)	44 653 318	44 654 318
225	11	16	PE100 (Excel)	44 512 320	44 652 320
	17	10	PE100 (Excel)	44 653 320	44 654 320
250	11	16	PE100 (Excel)	44 512 321	44 652 321
	17	10	PE100 (Excel)	44 653 321	44 654 321
280	11	16	PE100 (Excel)	44 512 322	44 652 322
	17	10	PE100 (Excel)	44 653 322	44 654 322
315	11	16	PE100 (Excel)	44 512 323	44 652 323
	17	10	PE100 (Excel)	44 653 323	44 654 323
355	11	16	PE100 (Excel)	44 512 324	44 527 324
	17	10	PE100 (Excel)	44 653 324	44 654 324
400	11	16	PE100 (Excel)	44 512 325	44 527 325
	17	10	PE100 (Excel)	44 506 325	44 507 325
450	11	16	PE100 (Excel)	44 512 326	44 527 326
	17	10	PE100 (Excel)	44 506 326	44 507 326
500	11	16	PE100 (Excel)	44 512 327	44 527 327
	17	10	PE100 (Excel)	44 506 327	44 507 327
560	11	16	PE100 (Excel)	44 512 328	44 527 328
	17	10	PE100 (Excel)	44 506 328	44 507 328
630	11	16	PE100 (Excel)	44 512 329	44 527 329
	17	10	PE100 (Excel)	44 506 329	44 507 329

Coils



Size* (mm)	SDR	Pressure Rating (bar)	Material	25M Code	50M Code	100M Code
25	11	12.5	PE80 (MDPE)	44 658 307	44 659 307	-
32	11	12.5	PE80 (MDPE)	44 658 308	44 659 308	-
63	11	12.5	PE80 (MDPE)	44 658 311	44 659 311	44 660 311
90	11	16	PE100 (Excel)	-	44 659 313	44 660 313
	17	10	PE100 (Excel)	-	44 655 313	44 656 313
110	11	16	PE100 (Excel)	-	44 659 314	44 660 314
	17	10	PE100 (Excel)	-	44 655 314	44 656 314
125	11	16	PE100 (Excel)	-	44 659 315	44 660 315
	17	10	PE100 (Excel)	-	44 655 315	44 656 315
160	11	16	PE100 (Excel)		44 659 317	44 660 317
	17	10	PE100 (Excel)	-	44 655 317	44 656 317
180	11	16	PE100 (Excel)	-	44 659 318	44 660 318
	17	10	PE100 (Excel)	-	44 655 318	44 656 318

Protecta-Line 3^{C} and 3^{CTH} Coils

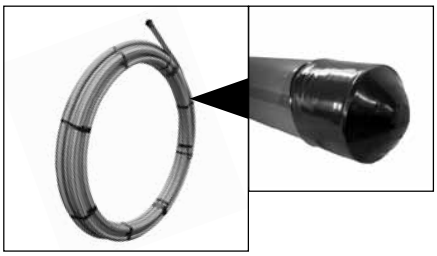
Features

- Protecta-Line PE100 pipe coils with factory-sealed pipe ends
- Factory-clean pipe bore when delivered to site
- Regulations 31, 27 and 30 approved for installation without pre-chlorination
- 3^{C} has factory heat sealed protective caps on both ends. 3^{CTH} has a factory heat sealed protective cap on one end and an integral Towing Head on the other.

Benefits

- All the advantages of conventional PE and Protecta-Line pipes
- Immediate installation from stock, without lengthy pre-chlorination
- Less disruption to water supply
- Higher installation productivity compared to unsealed coils
- Post-installation sterilisation for 30 minute contact only – DWI recognised methodology.
- Significant installation cost savings
- Ready to use at the point of delivery
- Fewer visits to site needed – reduced traffic disruption

3^{C} (Clean, Capped, Coiled) Coils

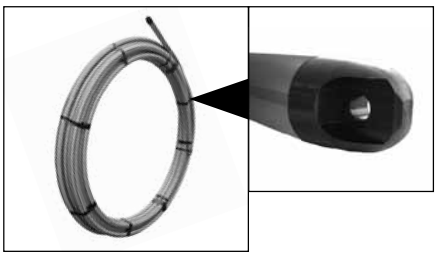


Size* (mm)	SDR	Pressure Rating (bar)	Coil Length Available (m)	50M Code	75M Code	100M Code
90	11	16	PE100 (Excel)	44 845 313	44 862 313	44 860 313
	17	10	PE100 (Excel)	44 846 313	44 847 313	44 849 313
110	11	16	PE100 (Excel)	44 845 314	44 862 314	44 860 314
	17	10	PE100 (Excel)	44 846 314	44 847 314	44 849 314
125	11	16	PE100 (Excel)	44 845 315	44 862 315	44 860 315
	17	10	PE100 (Excel)	44 846 315	44 847 315	44 849 315
160	11	16	PE100 (Excel)	44 845 317	44 862 317	44 860 317
	17	10	PE100 (Excel)	44 846 317	44 847 317	44 849 317
180	11	16	PE100 (Excel)	44 845 318	44 862 318	44 860 318
	17	10	PE100 (Excel)	44 846 318	44 847 318	44 849 318

Protecta-Line 3^{C} is a factory clean, capped and coiled pipe solution to negate the need for the lengthy pre-chlorination process prior to installation of potable water pipes. The DWI recognised methodology allows post-installation sterilisation for 30 minutes contact only.

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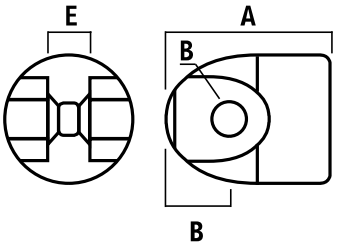
3CTH (Clean, Capped, Coiled with Towing Head) Coils



Size* (mm)	SDR	Pressure Rating (bar)	Coil Length Available (m)	50M Code	75M Code	100M Code
90	11	16	PE100 (Excel)	44 850 313	44 851 313	44 852 313
	17	10	PE100 (Excel)	44 853 313	44 854 313	44 855 313
110	11	16	PE100 (Excel)	44 850 314	44 851 314	44 852 314
	17	10	PE100 (Excel)	44 853 314	44 854 314	44 855 314
125	11	16	PE100 (Excel)	44 850 315	44 851 315	44 852 315
	17	10	PE100 (Excel)	44 853 315	44 854 315	44 855 315
160	11	16	PE100 (Excel)	44 850 317	44 851 317	44 852 317
	17	10	PE100 (Excel)	44 853 317	44 854 317	44 855 317
180	11	16	PE100 (Excel)	44 850 318	44 851 318	44 852 318
	17	10	PE100 (Excel)	44 853 318	44 854 318	44 855 318

Protecta-Line 3CTH is supplied with a factory fitted towing head, ready to be attached to a towing shackle. It is a factory clean, capped and coiled pipe solution to negate the need for the lengthy pre-chlorination process prior to installation of potable water pipes. The DWI recognised methodology allows post-installation sterilization for 30 minutes contact only.

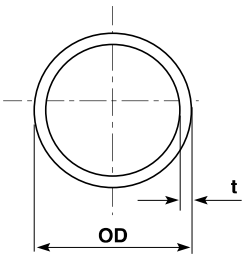
Towing Head Dimensions



Size * (mm)	A (mm)	B (mm)	C (mm)	E (mm)	Max Towing Load (tonnes) SDR11	Max Towing Load (tonnes) SDR17	Shackle Size (tonnes)
90	123	27	44	28	2.1	1.4	4.8
110	131	30	51	32	3.1	1.6	6.5
125	149	33	62	38	4.1	2.7	8.5
160	166.5	40	72.5	46	6.8	4.5	12
180	171.5	40	72.5	46	8.6	5.7	12

* The nominal size is the nominal core pipe outside diameter.

Pipe Dimensions

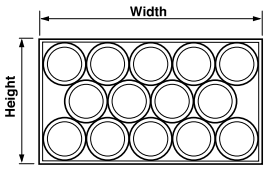


Size * (mm)	SDR	Min OD (mm)	Max OD (mm)	Mean Bore (mm)	Min Wall Thickness (mm)	Min Wall Thickness (mm)	Approx Weight (kg/m)
25	11	26.2	27.4	20.0	3.0	3.7	0.3
32	11	33.3	34.5	26.0	3.7	4.4	0.4
63	11	64.3	65.6	50.9	6.5	7.6	1.3
90	11	92.2	93.5	72.9	9.3	10.7	2.6
	17	92.2	93.5	78.8	6.5	7.5	1.9
110	11	112.2	113.5	89.2	11.1	12.7	3.7
	17	112.2	113.5	96.3	7.7	8.8	2.7
125	11	127.2	128.5	101.2	12.5	14.2	4.7
	17	127.2	128.5	109.6	8.5	9.8	3.4
160	11	163.2	165.1	130.4	15.8	17.9	7.6
	17	163.2	165.1	141.1	10.7	12.4	5.4
180	11	183.3	185.4	146.8	17.6	20.0	9.5
	17	183.3	185.4	158.8	11.9	13.7	6.8
225	11	227.3	229.5	182.5	21.7	24.4	14.5
	17	227.3	229.5	197.4	14.6	16.6	10.3
250	11	252.3	254.9	203.0	23.9	26.8	17.7
	17	252.3	254.9	219.6	16.0	18.3	12.4
280	11	282.3	285.1	227.4	26.6	29.8	22.0
	17	282.3	285.1	245.9	17.8	20.1	15.4
315	11	317.3	320.2	255.7	29.8	33.3	27.6
	17	317.3	320.2	276.6	19.9	22.4	19.3
355	11	357.3	360.6	288.3	33.4	37.3	34.8
	17	357.3	360.6	311.6	22.3	25.1	24.3
400	11	402.3	405.8	324.8	37.5	41.8	43.9
	17	402.3	405.8	351.3	24.9	27.9	30.4
450	11	452.3	456.1	365.4	42.1	46.8	55.3
	17	452.3	456.1	395.2	27.9	31.2	38.2
500	11	502.3	506.4	406.0	46.6	51.8	67.9
	17	502.3	506.4	439.0	30.9	34.5	46.9
560	11	562.3	566.8	454.9	52.0	57.7	84.7
	17	562.3	566.8	491.8	34.4	38.4	58.4
630	11	632.3	637.2	511.6	58.4	64.8	106.9
	17	632.3	637.2	553.2	38.6	43.0	73.6

* The size is the nominal core pipe outside diameter.
Other diameters, SDRs and lengths can be made to order subject to a minimum order value.

Tel: +44 (0)1480 442600 **Fax:** +44 (0)1480 458829 **Technical Support:** +44 (0)1480 442620

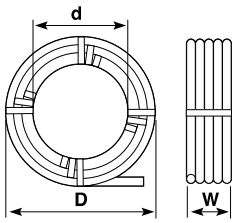
Lengths & Bundles



Size (mm)	Length (m)	No/Bundle	Width (mm)	Height (mm)	Weight SDR11 (Kg)	Weight SDR17 (Kg)
63	6	210	1238	750	1616	-
90	6/12	100	1188	795	1558/3116	1139/2278
110	6/12	67	1238	795	1488/2979	1088/2179
125	6/12	50	1238	750	1427/2839	1032/2054
160	6/12	33	1238	795	1455/2895	1040/2069
180	6/12	22	1188	730	1226/2553	870/1812
225	6/12	5	1125	335	436/872	310/620
250	6/12	4	1000	360	429/858	301/602
280	6/12	4	1120	390	529/1058	369/738
315	6/12	3	945	425	501/1002	350/700
355	6/12	3	1065	465	631/1261	440/880
400	6/12	3	1200	510	793/1586	550/1103
450	6/12	3	1350	560	998/1996	691/1385
500	6/12	2	1000	610	818/1635	566/1137
560	6/12	2	1120	670	1019/2038	704/1412
630	6/12	2	1260	740	1286/2571	886/1777

Due to continuous development, bundle sizes and weights may vary from that shown.

Coil Dimensions



Size (mm)	Coil Length (m)	d (mm)	D (mm)	W (mm)	Weight SDR11 (Kg)	Weight SDR17 (Kg)
25	25	1000	1200	200	7.5	-
	50				15	-
32	25	1000	1200	200	10	-
	50				20	-
63	25	1900	2200	200	32	-
	50		2300	200	63	-
	100		2400	300	126	-
90	50	2500	3100	300	130	95
	100		3300	400	260	190
110	50	2500	2900	500	185	135
	100		3200	600	370	270
125	50	2500	3000	500	235	170
	100		3200	700	470	340
160	50	3000	3900	500	380	270
	100		3900	700	760	540
180	50	3000	4000	600	475	340
	100		4000	700	950	680

Non standard diameters and lengths are usually available to order subject to a minimum order value.

Protecta-Line Mechanical Compression Fittings

Features

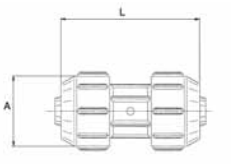
- Acetal fittings for jointing Protecta-Line service pipes or connecting to standard PE pipe
- Feature a unique pipe insert that seals securely against the pipe bore
- WRAS approved
- Meet the requirements of WIS-4-32-19
- No pipe preparation, wrapping or specialist equipment required

Benefits

- Proven barrier protection against contamination
- No contact between the pipe's protective aluminium layer and drinking water
- No risk of joint corrosion
- Easy and rapid all weather installation

PE to PE Couplers

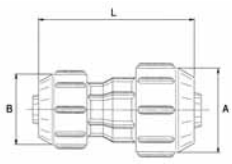




Size (mm)	A (mm)	L (mm)	Weight (kg)	Code
25 x 25	51	93	0.1	44 100 307
32 x 32	60	99	0.2	44 100 308
63 x 63	105	155	0.7	44 100 311

PE to PE Reducing Couplers

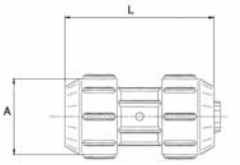




Size (mm)	A (mm)	B (mm)	L (mm)	Weight (kg)	Code
32 x 25	60	51	100	0.2	44 114 409
63 x 25	105	81	155	0.6	44 114 412
63 x 32	105	105	155	0.8	44 114 415

PE to Copper Couplers

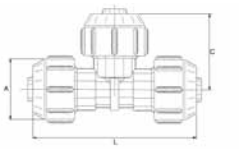




Size (mm)	A (mm)	L (mm)	Weight (kg)	Code
25 x 15	51	93	0.1	44 996 005
25 x 22	51	93	0.1	44 996 006
32 x 28	60	93	0.2	44 996 007

Equal Tees

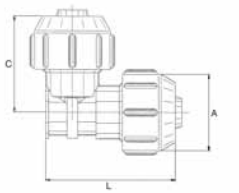




Size (mm)	A (mm)	C (mm)	L (mm)	Weight (kg)	Code
25 x 25	51	64	134	0.2	44 122 307
32 x 32	60	68	146	0.3	44 122 308
63 x 63	105	100	216	1.3	44 122 311

90° Elbows



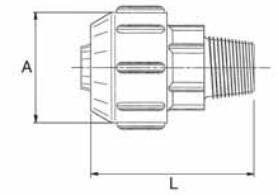


Size (mm)	A (mm)	C (mm)	L (mm)	Weight (kg)	Code
25	51	68	93	0.1	44 115 307
32	60	71	97	0.2	44 115 308
63	105	105	158	0.9	44 115 311

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End Connectors – PE x Male Iron BSP Tapered

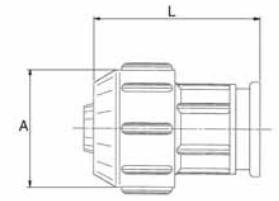




Size (mm x inch)	A (mm)	L (mm)	Weight (kg)	Code
25 x ¾	51	64	0.1	44 151 608
32 x ¾	60	74	0.1	44 151 611
32 x 1	60	77	0.1	44 151 612
63 x 1½	105	100	0.4	44 151 628
63 x 2	105	105	0.4	44 151 629

End Connectors – PE x Female Iron BSP Tapered

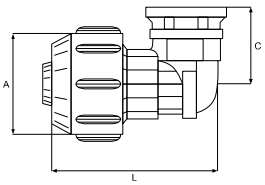




Size (mm x inch)	A (mm)	L (mm)	Weight (kg)	Code
25 x ¾	51	67	0.1	44 101 608
32 x 1	60	75	0.1	44 101 612
63 x 2	105	100	0.4	44 101 629

90º Elbows – PE x Female Iron BSP Tapered

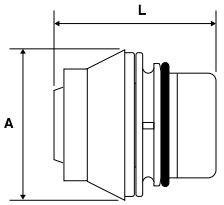




Size (mm x inch)	A (mm)	C (mm)	L (mm)	Weight (kg)	Code
25 x ¾	51	35	73	0.1	44 396 608
32 x 1	60	39	80	0.2	44 396 612
63 x 2	105	62	145	0.6	44 396 629

Reducing Sets – to allow easy Protecta-Line diameter changes

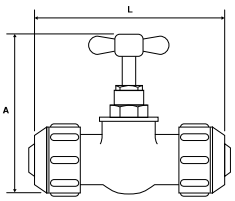




Size (mm x inch)	A (mm)	L (mm)	Weight (kg)	Code
32 x 25	44	42	0.1	44 105 409
63 x 32	80	51	0.2	44 105 415

Stop Cocks – BS 5433 Type





Size (mm x inch)	A (mm)	L (mm)	Weight (kg)	Code
25*	140	135	0.9	44 142 307
32**	165	170	1.7	44 142 308

* Includes 22mm copper Type A insert
** Includes 28mm copper Type A insert

Only Protecta-Line fittings shall be used with Protecta-Line pipe. The use of alternative fittings will have the following effects on your Protecta-Line system:

- Invalidation of WRAS approval and manufacturer's system performance warranty.
- Compromised permeation resistance (causing non-compliance with WIS 4-32-19 and possible risks to health).
- Danger of pipe-layer delamination, compromising system performance integrity and risking pipe bursts.
- It is illegal to install fittings non-compliant with the Water Fittings Regulations (or Byelaws in Scotland).

WIS 4-32-19
KM 514626

Protecta-Line Ferrule Off-Takes

Features

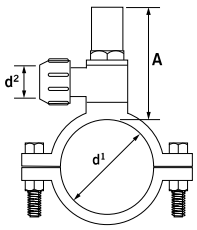
- Enable live off-takes from Protecta-Line mains without any flow restrictions
- No contact between the pipe's aluminium barrier layer and the drinking water supply
- Self-locking liner sleeve
- WRAS approved and Kitemarked to WIS 4-32-19.

Benefits

- No disruption to water supply
- Secure isolation of drinking water from ground contaminants
- Simple, all weather installation with no wrapping or pipe preparation required
- Excellent headloss and flow characteristics
- Proven mechanical compression connections.

25mm and 32mm Self-Tapping Ferrule Off-Takes (for 63mm to 355m Protecta-Line mains)



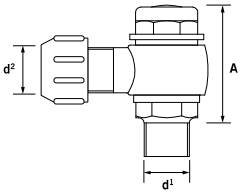


Size d¹ x d² (mm)	A (mm)	Weight (kg)	Code
63 x 25	95	0.9	44 762 412
90 x 25	95	1.1	44 762 393
110 x 25	95	1.1	44 762 394
125 x 25	95	1.2	44 762 395
160 x 25	95	1.3	44 762 397
180 SDR17 x 25	95	1.4	44 762 398
180 SDR11 x 25	95	1.4	44 996 030
225 x 25	95	1.9	44 762 400
250 x 25	95	2.3	44 762 401
280 x 25	95	2.5	44 762 402
315 x 25	95	3.2	44 762 403
355 x 25	95	3.3	44 762 404

Size d¹ x d² (mm)	A (mm)	Weight (kg)	Code
63 x 32	100	1.2	44 762 415
90 x 32	100	1.3	44 762 417
110 x 32	100	1.4	44 762 418
125 x 32	100	1.4	44 762 419
160 x 32	100	1.5	44 762 421
180 SDR17 x 32	100	1.6	44 762 422
180 SDR11 x 32	100	1.6	44 996 031
225 x 32	100	2.1	44 762 424
250 x 32	100	2.5	44 762 425
280 x 32	100	2.7	44 762 426
315 x 32	100	3.4	44 762 427
355 x 32	100	3.5	44 762 428

Ductile Iron Ferrule



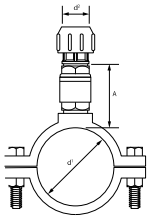


Size d¹ x d² (mm)	A (mm)	Weight (kg)	Code
25mm x ¾ MI	60	0.5	44 762 407

For installation of Protecta-Line Service Off-Take onto existing ductile iron main

63mm Off-Takes (for 90mm to 355mm Protecta-Line mains)





Size (mm) d¹ x d²	A (mm)	Weight (kg)	Code
90 x 63	155	3.4	44 762 459
110 x 63	155	3.8	44 762 460
125 x 63	155	3.8	44 762 461
160 x 63	155	3.9	44 762 463
180 x 63	155	3.9	44 762 464

Size (mm) d¹ x d²	A (mm)	Weight (kg)	Code
225 x 63	155	5.0	44 762 466
250 x 63	155	5.1	44 762 467
280 x 63	155	5.3	44 762 468
315 x 63	155	5.5	44 762 469
355 x 63	155	6.1	44 762 470

Assembly includes 1 x 63mm PE x Male Iron BSP Tapered End Connector

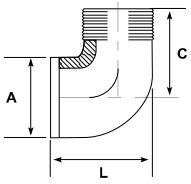
Drill and Liner Tool Heads (for use with 63mm Off-Takes)



Size (mm) d¹ x d²	Code
Protecta-Line 2" Drill Head	44 794 003
Protecta-Line 2" Liner Head	44 794 004
Protecta-Line Drill/Liner Head O-Ring Kit	44 996 062

90° Gunmetal Elbows (optional for use with 63mm Off-Takes)





Size (mm)	A (mm)	C (mm)	L (mm)	Weight (kg)	Code
2" MI x 2" FI	72	70	90	0.9	44 996 050

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Protecta-Line Mechanical Fittings

Features

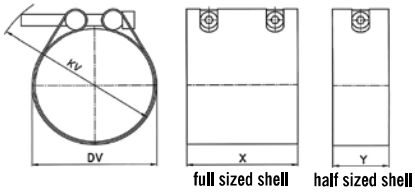
- Supplied ready to install, as a full set of Rilsan coated steel liner insert and corrosion resistant stainless steel outer shells
- The shell mechanically swages Protecta-Line pipe onto the insert liner grooves to give a fully end load bearing joint (WIS 4-24-01 Type 1)
- Lightweight and with a low profile

Benefits

- Full barrier performance (WIS 4-32-19)
- Fast and easy all weather jointing by a single installer: no need for elastomeric seals, pipe end preparation or welding.
- Only a torque wrench with an Allen (hex) bit socket is required
- No need for specialist tooling (eg. hydraulic pump) or external power supply – reduced health & safety risk
- Can be installed in the tightest of spaces.

Outer Shells



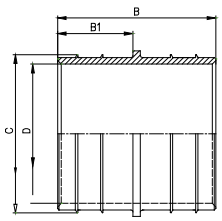


Size (mm)	DV (mm)	KV (mm)	X (mm)	Y (mm)	Hex Size (mm)	Bolts	Torque (NM)
63	64	94	95	48	10	M12	**50**
90	94	120	95	48	10	M12	**60**
110	113	139	110	55	10	M12	**60**
125	129	155	110	55	10	M12	**60**
160	165	188	110	55	14	M16	**150**
180	184	216	110	55	14	M16	**160**

Protecta-Line Mechanical Fittings are supplied as a full set of liner insert and outer shell(s).
Weights shown are for the complete product.

Couplers



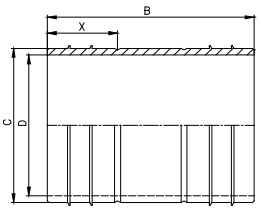


Size (mm)	SDR	B (mm)	B1 (mm)	C (mm)	D (mm)	Weight (kg)	Code
63	11	95	45	50	41	1.5	PM 110 311
90	11	95	45	71	62	2.0	PM 100 313
	17	95	45	tbc	tbc	tbc	PM 109 313
110	11	110	53	88	76	2.6	PM 100 314
	17	110	53	tbc	tbc	tbc	PM 109 314
125	11	110	53	100	87	3.1	PM 100 315
	17	110	53	108	95	3.0	PM 109 315
160	11	110	53	128	114	4.4	PM 100 317
	17	110	53	139	125	4.3	PM 109 317
180	11	110	53	144	127	4.5	PM 100 318
	17	110	53	156	139	4.8	PM 109 318

Supplied as a set with 1 full shell.

Repair Couplers



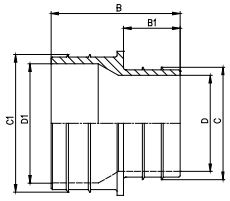


Size (mm)	SDR	B (mm)	X (mm)	C (mm)	D (mm)	Weight (kg)	Code
63	11	195	48	50	40	1.0	PM 246 311
90	11	195	48	71	61	2.4	PM 246 313
	17	195	55	tbc	tbc	tbc	PM 245 313
110	11	210	55	88	75	3.0	PM 246 314
	17	210	55	tbc	tbc	tbc	PM 245 314
125	11	210	55	100	86	4.0	PM 246 315
	17	210	55	108	94	4.4	PM 245 315
160	11	210	55	128	114	5.7	PM 246 317
	17	210	55	139	124	6.0	PM 245 317
180	11	210	55	144	127	6.6	PM 246 318
	17	210	55	156	140	7.0	PM 245 318

Supplied as a set with 2 half shells. Other repair liner lengths may be available on request.

Reducers



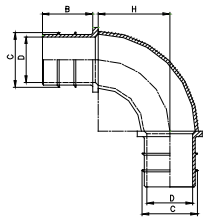


Size (mm)	SDR	B (mm)	B1 (mm)	C (mm)	C1 (mm)	D (mm)	D1 (mm)	Weight (kg)	Code
90 x 63	11	95	45	50	71	41	62	2.0	PM 441 459
110 x 90	11	103	53/45	71	88	62	76	2.5	PM 441 483
	17	103	53/45	tbc	tbc	tbc	tbc	2.5	PM 440 483
125 x 110	11	110	53	88	114	76	87	3.2	PM 441 493
	17	110	53	88	100	tbc	tbc	3.2	PM 440 493
160 x 125	11	110	53	100	128	88	114	4.8	PM 441 504
	17	110	53	108	139	95	125	4.8	PM 440 504
180 x 125	17	110	53	108	156	95	139	6.0	PM 440 505

Consists of 1 x reducing liner and 2 x half sized shells.

90º Elbows



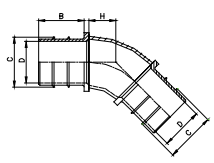


Size (mm)	SDR	B (mm)	C (mm)	D (mm)	H (mm)	Weight (kg)	Code
63	11	45	50	41	69	2.1	PM 209 311
90	11	45	71	62	97	3.4	PM 210 313
	17	45	tbc	tbc	tbc	3.4	PM 208 313
110	11	53	88	76	122	4.4	PM 210 314
	17	53	tbc	tbc	tbc	4.4	PM 208 314
125	11	53	100	87	138	6.1	PM 210 315
	17	53	108	95	147	5.8	PM 208 315
160	11	53	128	114	180	9.3	PM 210 317
	17	53	139	125	195	10.1	PM 208 317
180	11	53	144	127	200	10.6	PM 210 318
	17	53	156	139	226	11.5	PM 208 318

Consists of 1 x elbow liner and 2 x half sized shells.

45º Elbows





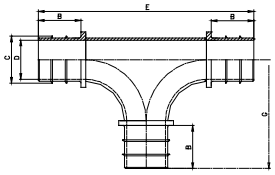
Size (mm)	SDR	B (mm)	C (mm)	D (mm)	H (mm)	Weight (kg)	Code
63	11	45	50	41	32	1.8	PM 215 311
90	11	45	71	62	43	2.6	PM 216 313
	17	45	tbc	tbc	tbc	2.6	PM 214 313
110	11	53	88	76	53	3.6	PM 216 314
	17	53	tbc	tbc	tbc	3.6	PM 214 314
125	11	53	100	87	60	4.9	PM 216 315
	17	53	108	95	64	4.9	PM 214 315
160	11	53	128	114	78	7.4	PM 216 317
	17	53	139	125	84	7.7	PM 214 317
180	11	53	144	127	89	8.1	PM 216 318
	17	53	156	139	94	8.2	PM 214 318

Consists of 1 x elbow liner and 2 x half sized shells.

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Equal Tees



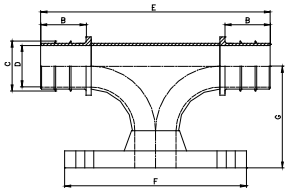


Size (mm)	SDR	B (mm)	C (mm)	D (mm)	E (mm)	G (mm)	Weight (kg)	Code
63	11	45	50	41	214	62	3.0	PM 221 311
90	11	45	71	62	252	81	5.3	PM 222 313
	17	45	tbc	tbc	tbc	tbc	5.3	PM 220 313
110	11	53	88	76	287	91	7.4	PM 222 314
	17	53	tbc	tbc	tbc	tbc	7.4	PM 220 314
125	11	53	100	87	315	105	7.5	PM 222 315
	17	53	108	95	325	110	8.9	PM 220 315
160	11	53	128	114	355	125	11.6	PM 222 317
	17	53	139	125	363	129	11.6	PM 220 317
180	11	53	144	127	363	129	12.6	PM 222 318
	17	53	156	139	401	148	12.6	PM 220 318

Consists of 1 x equal tee liner and 3 x half sized shells.

Flanged Branch Tees



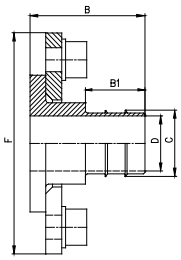


Size (mm x PN)	SDR	Bolts, Qty	Flange Torgue (NM ±10%)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	Weight (kg)	Code
90 x DN80 PN16	11	8 x M16	70	45	71	62	252	200	176	8.9	PM 351 313
	17	8 x M16	70	45	tbc	tbc	tbc	200	tbc	8.9	PM 363 313
110 x DN80 PN16	11	8 x M16	70	53	88	76	287	200	136	9.5	PM 351 314
	17	8 x M16	70	53	tbc	tbc	tbc	200	tbc	9.5	PM 363 314
125 x DN80 PN16	17	8 x M16	70	53	108	95	287	200	136	12.0	PM 363 315
160 x DN80 PN16	17	8 x M16	70	53	139	125	287	200	161	16.2	PM 363 317
180 x DN80 PN16	17	8 x M16	70	53	156	139	325	200	174	19.6	PM 363 318
90 x DN100 PN16	11	8 x M16	80	45	71	62	252	220	178	9.1	PM 352 313
	17	8 x M16	80	45	tbc	tbc	tbc	220	tbc	9.1	PM 364 313
110 x DN100 PN16	11	8 x M16	80	53	88	76	287	220	188	9.7	PM 352 314
	17	8 x M16	80	53	tbc	tbc	tbc	220	tbc	9.7	PM 364 314
125 x DN100 PN16	17	8 x M16	80	53	108	95	325	220	157	12.2	PM 364 315
160 x DN100 PN16	17	8 x M16	80	53	139	125	325	220	169	16.9	PM 364 317
180 x DN100 PN16	17	8 x M16	80	53	156	139	325	220	182	20.0	PM 364 318
160 x DN150 PN16	17	8 x M20	120	53	139	125	363	285	229	20.4	PM 365 317
180 x DN150 PN16	17	8 x M20	120	53	156	139	401	285	198	23.4	PM 365 318

Consists of 1 x flanged branch tee liner and 2 x half sized shells.
The information given for bolting torque values are for metal to metal connections.
Flange bolts and gaskets are not included.
Drilled to BS EN 1092-1:2007 Table 13.

Stub Flange Adaptors



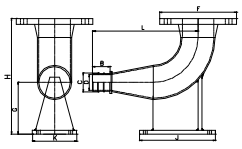


Size (mm x PN)	SDR	Bolts, Qty	Flange Torgue (NM±10%)	B (mm)	C (mm)	D (mm)	B1 (mm)	F (mm)	Weight (kg)	Code
63 x DN50 PN16	11	M16 X 4	60	83	50	41	45	165	3.1	PM 227 311
63 x DN80 PN16	11	M16 X 8	60	85	50	41	45	200	3.4	PM 228 311
90 x DN80 PN16	11	M16 X 8	70	85	71	62	45	200	6.0	PM 228 313
	17	M16 X 8	70	85	tbc	tbc	45	200	6.0	PM 226 313
110 x DN100 PN16	11	M16 X 8	80	93	88	76	53	220	8.9	PM 228 314
	17	M16 X 8	80	93	tbc	tbc	53	220	8.9	PM 226 314
125 x DN100 PN16	11	M16 X 8	80	93	100	87	53	220	10.9	PM 228 315
	17	M16 X 8	80	93	108	95	53	220	10.9	PM 226 315
160 x DN150 PN16	11	M20 X 8	120	105	128	114	53	285	17.9	PM 228 317
	17	M20 X 8	120	105	139	125	53	285	17.9	PM 226 317
180 x DN150 PN16	11	M20 X 8	120	105	144	127	53	285	21.9	PM 228 318
	17	M20 X 8	120	105	156	139	53	285	21.9	PM 226 318

Consists of 1 x stub flange liner, 1 x half sized shell and backing ring.
The information given for bolting torque values are for metal to metal connections.
Flange bolts and gaskets are not included.
Drilled to BS EN 1092-1:2007 Table 13.

Duck Foot Bends





Size (mm x PN)	SDR	Bolts, Qty	Flange Torgue (NM±10%)	B (mm)	C (mm)	D (mm)	F (mm)	G (mm)	H (mm)	J (mm)	K (mm)	L (mm)	Total Fitting Weight (kg)*	Code
63 x DN80 PN16	11	M16 x 8	70	45	50	41	200	135	302	152	90	275	6.8	PM 384 459
90 x DN80 PN16	11	M16 x 8	70	45	71	62	200	135	302	152	115	235	7.3	PM 384 313
110 x DN80 PN16	11	M16 x 8	70	53	88	76	200	135	302	152	130	231	8.0	PM 384 483
125 x DN80 PN16	17	M16 x 8	70	53	108	95	200	135	302	152	150	243	8.7	PM 385 484
160 x DN80 PN16	17	M16 x 8	70	53	139	125	200	135	302	152	180	310	10.0	PM 385 486
180 x DN80 PN16	17	M16 x 8	70	53	156	140	200	135	302	152	200	347	10.9	PM 385 487

Consists of 1 x flanged bend, 1 x half sized shell and gasket.
The information given for bolting torque values are for metal to metal connections.
Flange bolts and gaskets are not included.
Drilled to BS EN 1092-1:2007 Table 13.

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Protecta-Line Electrofusion Fittings

Features

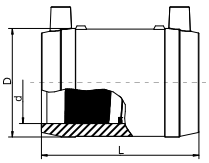
- For use with pipe sizes in sizes 90mm to 630m.
- Each fitting has a barcode to allow Electrofusion Control Units (ECU's) to read information such as Product Type and Size, Fusion Time and Cooling Time to ensure quick and easy installation.
- Fittings can be jointed either in manual mode (where available) or by scanning their integral barcode label.
- Kitemarked to WIS 4-32-19

Benefits

- Easy and rapid installation.
- Can be carried out in a trench, especially useful for repairs or tie-ins.
- Proven barrier protection against contamination.
- No risk of joint corrosion.
- No contact between the pipe's protective aluminium layer and drinking water.

Couplers - Removable Centre Stop (MB)

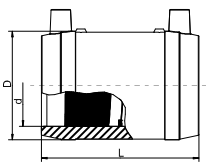




Size (mm)	SDR	D (mm)	L (mm)	Weight (kg)	Fusion Time* (Sec)	Cooling Time (mins)	Black Code	Old Black Code
90	11	119	127	0.4	65	10	PF 612 687	PL 100 313
110	11	141.5	135	0.7	120	10	PF 612 688	PL 100 314
125	11	158.5	147	1.0	225	15	PF 612 689	PL 100 315
160	11	198	164	1.8	360	20	PF 612 691	PL 100 317

Couplers - Slideover (UB)

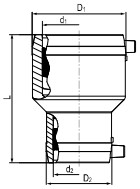




Size (mm)	SDR	D (mm)	L (mm)	Weight (kg)	Fusion Time* (Sec)	Cooling Time (mins)	Black Code	Old Black Code
180	11	220	210	2.1	480	20	PF 612 672	PL 100 318
225	11	277	236	4.0	550	20	PF 612 674	PL 100 320
250	11	315	246	5.8	620	30	PF 612 675	PL 100 321
280	11	347	285	7.7	barcode read	30	PF 615 073	PL 100 322
315	11	390	300	10.0	1250	30	PF 612 670	PL 100 323
355	11	445	300	16.7	barcode read	30	PF 615 074	PL 100 324
400	11	500	320	20.8	750	40	PF 615 075	
450	11	560	340	30.0	barcode read	40	PF 615 076	
500	11	630	360	39.8	barcode read	40	PF 615 124	
560	11	715	380	56.4	barcode read	40	PF 613 312	
	17	630	380	24.8	barcode read	40	PF 615 706	
630	11	810	420	80.6	barcode read	40	PF 616 269	
	17	710	420	36.8	barcode read	40	PF 615 726	

Reducers (MR)

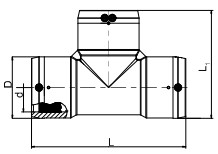




Size (mm) d x d_1	D_1 (mm)	D_2 (mm)	L (mm)	Weight (kg)	Fusion Time* (Sec)	Cooling Time (mins)	Black Code	Old Black Code
110 x 90	140	115	180	0.9	180	10	PF 615 693	PL 402 483
125 x 90	155	115	200	1.0	240	15	PF 615 694	PL 402 484
125 x 110	156	142	201	1.3	240	14	PL 402 493	
160 x 110	201	140	230	2.0	300	20	PF 615 695	PL 402 495
180 x 125	214	156	276	2.6	300	16	PL 402 505	

Equal Tees (T)





Size (mm)	D_1 (mm)	L (mm)	L_1 (mm)	Weight (kg)	Fusion Time (main)* (Sec)	Fusion Time (branch)* (Sec)	Cooling Time (mins)	Black Code	Old Black Code
90	117	305	211	1.1	90	90	10	PF 612 166	PL 408 313
110	142	355	248	2.2	140	160	10	PF 612 167	PL 408 314
125	160	384	272	2.7	180	200	15	PF 612 168	PL 408 315
160	200	430	315	4.9	400	400	20	PF 615 277	PL 408 317
180	228	480	354	7.8	440	440	20	PF 615 691	PL 408 318

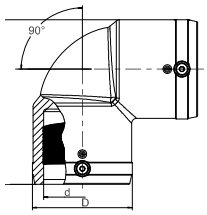
Supplied factory-wrapped to ensure complete barrier perfomance.

* Manual fusion times are based on 39.5 volt fusion boxes. 4.0mm Terminal Pins.

When made in accordance with GPS PE Pipe Systems' recommended procedures, butt-fusion and electrofusion joints of the Protecta-Line System have been independently shown to meet the requirements of WIS 4-32-19 without any need for subsequent wrapping. This does not exempt installers from local regulations and the local Water Company preferences must be adhered to. See page 38 for details on wrapping tape.

90° Elbows (W90°)



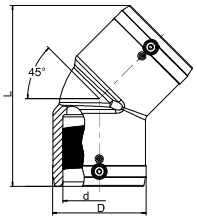


Size (mm)	D (mm)	L (mm)	Weight (kg)	Fusion Time* (Sec)	Cooling Time (mins)	Black Code	Old Black Code
90	115	202	1.0	90	10	PF 612 103	PL 104 313
110	138	234	1.6	140	10	PF 612 105	PL 104 314
125	157	254	2.0	180	15	PF 612 107	PL 104 315
160	207	329	4.9	360	20	PF 615 276	PL 104 317
180	228	354	5.8	440	20	PF 615 689	PL 104 318

* Manual fusion times are based on 39.5 volt fusion boxes. 4.0mm Terminal Pins.

45° Elbows (W45°)



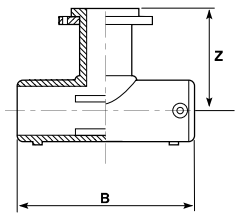


Size (mm)	D (mm)	L (mm)	Weight (kg)	Fusion Time* (Sec)	Cooling Time (mins)	Black Code	Old Black Code
90	115	232	0.8	90	10	PF 612 102	PL 105 313
110	138	265	1.3	140	10	PF 612 104	PL 105 314
125	157	279	1.8	180	15	PF 612 106	PL 105 315
160	207	377	4.4	360	20	PF 615 275	PL 105 317
180	228	382	4.6	440	20	PF 615 687	PL 105 318

* Manual fusion times are based on 39.5 volt fusion boxes. 4.0mm Terminal Pins.

Flanged Tees – 39.5 Volt





Supplied factory-wrapped to ensure complete barrier perfomance.
Dimension Z is an approximate value, based on the dimensions of the component parts. The nature of the fabrication process is such that the final dimension may be slightly less than the Z value quoted.
Drilled to BS EN 1092-1:2007 Table 13.

Size (mm)	B (mm)	Z (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)	Black Code	Old Black Code
90 x 80 PN16	211	296	2.60	120	10	PF 301 313	PL 301 313
110 x 80 PN16	240	515	3.90	160	10	PF 301 314	PL 301 314
125 x 80 PN16	280	532	4.70	240	12	PF 301 315	PL 301 315
160 x 80 PN16	314	615	6.70	260	14	PF 301 317	PL 301 317
180 x 80 PN16	365	834	7.90	440	20	PF 301 318	PL 301 318
90 x 100 PN16	211	534	3.20	100	10	PF 302 313	PL 302 313
110 x 100 PN16	240	310	3.90	160	10	PF 302 314	PL 302 314
125 x 100 PN16	280	301	4.30	240	12	PF 302 315	PL 302 315
160 x 100 PN16	314	650	7.60	260	14	PF 302 317	PL 302 317
180 x 100 PN16	365	671	9.20	440	20	PF 302 318	PL 302 318
160 x 150 PN16	314	410	8.50	260	14	PF 303 317	PL 303 317
180 x 150 PN16	365	415	5.20	440	20	PF 303 318	PL 303 318

Flange Adaptor Kits



Adaptor Kit comprises of:-

1 x Stub Flange
1 x Gasket
1 X Coupler
1 x Backing Ring

Size (mm)	SDR	Black Code	Old Black Code
90 x 80	11	PF 251 313	PL 251 313
110 x 100	11	PF 251 314	PL 251 314
125 x 100	17	PF 250 315	PL 250 315
160 x 150	17	PF 250 317	PL 250 317
180 x 150	17	PF 250 318	PL 250 318
225 x 200	17	PF 250 320	PL 250 320
250 x 200	17	PF 250 534	PL 250 534

Size (mm)	SDR	Black Code	Old Black Code
250 x 250	17	PF 250 321	PL 250 321
280 x 250	17	PF 250 322	PL 250 322
315 x 250	17	PF 250 543	PL 250 543
315 x 300	17	PF 250 323	PL 250 323
355 x 300	17	PF 250 547	PL 250 547
355 x 350	17	PF 250 324	PL 250 324

Drilled to BS EN 1092-1:2007 Table 13.
Note: Sizes 250 and 315mm have sections of pipe butt-fused to the moulding.

Only Protecta-Line fittings shall be used with Protecta-Line pipe. The use of alternative fittings will have the following effects on your Protecta-Line system:

- Invalidation of WRAS approval and manufacturer's system performance warranty.
- Compromised permeation resistance (causing non-compliance with WIS 4-32-19 and possible risks to health).
- Danger of pipe-layer delamination, compromising system performance integrity and risking pipe bursts.
- It is illegal to install fittings non-compliant with the Water Fittings Regulations (or Byelaws in Scotland).

WIS 4-32-19
KM 514626

Tel: +44 (0)1480 442600 **Fax:** +44 (0)1480 458829 **Technical Support:** +44 (0)1480 442620

Protecta-Line Pupped Fittings

Features

- Pupped fittings featuring extended spigots in various sizes made from Protecta-Line (PE100) pipe
- Suitable for electrofusion and butt-fusion
- 0.5m length pups as standard
- Bespoke fabrications can be made

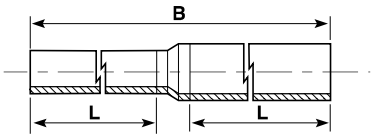
Benefits

- Full barrier performance
- Flexibility to construct a pipeline to individual project needs
- Fully homogeneous pipeline

Pupped fittings up to 630mm are also available. please contact Sales office for details.

Reducers



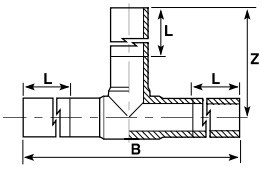


Size (mm) d^1 x d^2	B (mm)	L (mm)	SDR11 Weight (kg)	SDR17 Weight (kg)	SDR11* Code	SDR17* Code
110 x 90	1190	500	3.7	2.7	44 323 483	44 322 483
125 x 90	1200	500	4.4	3.2	44 323 484	44 322 484
160 x 90	1240	500	6.2	4.6	44 323 486	44 322 486
160 x 110	1240	500	7.0	5.0	44 323 495	44 322 495
160 x 125	1230	500	7.5	5.4	44 323 504	44 322 504
180 x 90	1440	500	7.0	5.0	44 323 487	44 322 487
180 x 125	1240	500	8.9	6.3	44 323 505	44 322 505
225 x 160	1298	500	-	10.0	-	44 322 507
250 x 125	1530	500	13.5	10.4	44 323 508	44 322 508
250 x 180	1290	500	16.0	12.8	44 323 529	44 322 529
315 x 180	1620	500	30.1	24.6	44 323 531	44 322 531
315 x 250	1330	500	29.7	21.7	44 323 543	44 322 543
355 x 180	1420	500	28.9	21.6	44 323 532	44 322 532
355 x 250	1245	500	30.5	22.8	44 323 544	44 322 544
355 x 315	1245	500	34.7	25.5	44 323 547	44 322 547

Features a reducer pupped with Protecta-Line pipe. The reducer is factory wrapped to ensure complete barrier performance.

Equal Tees



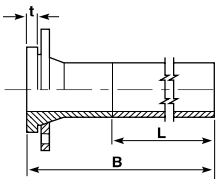


Size (mm)	L (mm)	B (mm)	Z (mm)	SDR11 Weight (kg)	SDR17 Weight (kg)	SDR11 Code	SDR17 Code
90	500	1310	656	4.9	3.9	44 321 313	44 320 313
110	500	1326	670	7.3	5.5	44 321 314	44 320 314
125	500	1372	687	9.5	7.1	44 321 315	44 320 315
160	500	1419	708	15.5	11.2	44 321 317	44 320 317
180	500	1509	765	20.8	15.3	44 321 318	44 320 318
225	500	1550	775	32.7	24.5	-	44 320 320
250	500	1540	840	37.0	26.5	44 321 321	44 320 321
280	500	1680	840	50.4	34.4	-	44 320 322
315	500	1820	910	63.1	43.5	44 321 323	44 320 323
355	500	1690	845	84.4	58.2	44 321 324	44 320 324

Features a black tee pupped with Protecta-Line pipe. The tee is factory wrapped to ensure complete barrier performance.

Stub Flange Assemblies PN16





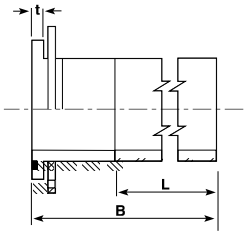
Size (mm)	B (mm)	t (mm) SDR11	t (mm) SDR17	SDR11 Weight (kg)	SDR17 Weight (kg)	SDR11 Code	SDR17 Code
90 x DN80	630	17	17	3.0	2.0	44 327 313	44 326 313
110 x DN100	630	18	18	4.0	2.9	44 327 314	44 326 314
125 x DN100	675	25	25	4.9	3.5	44 327 315	44 326 315
160 x DN150	675	25	25	7.4	6.0	44 327 317	44 326 317
180 x DN150	675	30	30	9.4	6.8	44 327 318	44 326 318
225 x DN200	675	32	32	12.2	9.7	-	44 326 320
250 x DN250	675	35	35	17.7	13.8	44 327 321	44 326 321
280 x DN250	602	35	29	19.8	15.0	-	44 326 322
315 x DN300	575	35	35	24.5	19.0	44 327 323	44 326 323
355 x DN350	610	41	30	31.5	27.7	44 327 324	44 326 324

Features a black stub pupped with Protecta-Line pipe.

Bespoke fabricated fittings up to 630mm are now available to order. Please contact our Sales Office for information.

SlimFlange Assemblies



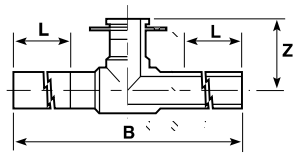


Size (mm)	L (mm)	B (mm)	t (mm) SDR11	t (mm) SDR17	SDR11 Weight (kg)	SDR17 Weight (kg)	SDR11 Code	SDR17 Code
250 x DN200	500	610	31	27	9.8	8.8	44 453 321	44 452 321
315 x DN250	500	610	35	30	16.0	13.0	44 453 323	44 452 323
355 x DN300	500	610	40	35	21.1	20.1	44 453 324	44 452 324

Features a black SlimFlange pupped with Protecta-Line pipe.

Flanged Short Branch Tees



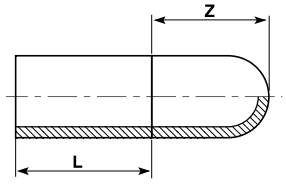


Size (mm)	L (mm)	B (mm)	Z (mm)	SDR11 Weight (kg)	SDR17 Weight (kg)	SDR11 Code	SDR17 Code
90 x DN80	500	1310	165	5.2	3.9	44 341 313	44 310 313
110 x DN80	500	1326	259	5.7	4.3	44 341 314	44 310 314
125 x DN80	500	1372	260	9.1	6.3	44 341 315	44 310 315
160 x DN80	500	1419	330	10.1	7.1	44 341 317	44 310 317
180 x DN80	500	1509	335	18.9	12.8	44 341 318	44 310 318
225 x DN80	500	1550	492	-	15.8	-	44 310 320
250 x DN80	500	1430	580	33.5	22.1	44 341 321	44 310 321
280 x DN80	500	1692	1140	-	31.7	-	44 310 322
315 x DN80	500	1530	740	55.9	36.4	44 341 323	44 310 323
355 x DN80	500	1955	770	59.0	38.7	44 341 324	44 310 324
90 x DN100	500	1310	240	6.0	3.8	44 342 313	44 311 313
110 x DN100	500	1326	175	5.7	4.4	44 342 314	44 311 314
125 x DN100	500	1372	215	9.1	6.4	44 342 315	44 311 315
160 x DN100	500	1419	332	11.7	8.3	44 342 317	44 311 317
180x DN100	500	1509	290	19.0	12.0	44 342 318	44 311 318
225 x DN100	500	1550	494	-	16.0	-	44 311 320
250 x DN100	500	1430	520	33.5	22.2	44 342 321	44 311 321
280 x DN100	500	1692	1142	-	32.7	-	44 311 322
315 x DN100	500	1530	680	66.4	39.6	44 342 323	44 311 323
355 x DN100	500	1955	1515	75.2	45.2	44 342 324	44 311 324
160 x DN150	500	1310	340	13.7	10.0	44 343 317	44 312 317
180 x DN150	500	1326	230	19.8	13.8	44 343 318	44 312 318
225 x DN150	500	1372	363	-	17.6	-	44 312 320
250 x DN150	500	1419	410	34.4	23.3	44 343 321	44 312 321
280 x DN150	500	1509	430	-	34.0	-	44 312 322
315 x DN150	500	1550	570	66.9	40.7	44 343 323	44 312 323
355 x DN150	500	1955	1058	76.2	46.2	44 343 324	44 312 324

Features a black flanged branch tee pupped with Protecta-Line pipe.
The tee is factory wrapped to ensure complete barrier performance.

End Caps





Size (mm)	L (mm)	Z (mm)	SDR11 Weight (kg)	SDR17 Weight (kg)	SDR11 Code	SDR17 Code
90	500	124	2.2	1.9	44 332 313	44 331 313
110	500	138	2.7	2.4	44 332 314	44 331 314
125	500	155	5.1	3.5	44 332 315	44 331 315
160	500	179	5.2	3.6	44 332 317	44 331 317
180	500	200	10.5	7.3	44 332 318	44 331 318
225	500	180	-	9.1	-	44 331 320
250	500	330	20.8	14.2	44 332 321	44 331 321
280	500	117	-	11.0	-	44 331 322
315	500	358	34.0	23.0	44 332 323	44 331 323
355	500	120	44.1	30.1	44 332 324	44 331 324

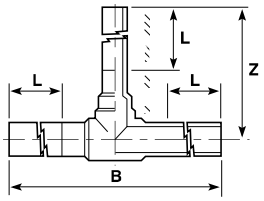
Features a black end cap pupped with Protecta-Line pipe.
The cap is factory wrapped to ensure complete barrier performance.

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Reduced Branch Tees





Size (mm)		L (mm)	B (mm)	Z (mm)	SDR11 Weight (kg)	SDR17 Weight (kg)	SDR11 Code	SDR17 Code
90mm branch	110	500	1326	850	11.4	5.4	44 347 314	44 356 314
	125	500	1372	875	9	6.5	44 347 315	44 356 315
	160	500	1419	1120	9.4	6.6	44 347 317	44 356 317
	180	500	1509	1180	19.4	13.9	44 347 318	44 356 318
	225	500	1550	1550	-	15.3	-	44 356 320
	250	500	1440	1440	35.4	23.5	44 347 321	44 356 321
	280	500	980	980	-	40	-	44 356 322
	315	500	1820	1820	64.5	46	44 347 323	44 356 323
	355	500	1910	1910	78.4	51.9	44 347 324	44 356 324
125mm branch	180	500	1509	990	19.9	14.2	44 348 318	44 357 318
	225	500	1450	1270	-	23.1	-	44 357 320
	250	500	1430	1240	35.8	25.7	44 348 321	44 357 321
	280	500	1600	1680	-	41.2	-	44 357 322
	315	500	1530	1620	64.9	46.3	44 348 323	44 357 323
	355	500	1690	1290	54.2	52.2	44 348 324	44 357 324
180mm branch	225	500	1550	960	-	25.1	-	44 358 320
	250	500	1430	1000	36.6	26.3	44 349 321	44 358 321
	280	500	1600	1170	-	41.8	-	44 358 322
	315	500	1530	1380	65.6	46.9	44 349 323	44 358 323
	355	500	1790	1160	68.4	52.8	44 349 324	44 358 324
250mm branch	315	500	1530	1200	65.8	47.3	44 335 323	44 336 323
	355	500	1690	975	86.6	53.3	44 335 324	44 336 324

Features a black tee pupped with Protecta-Line pipe.
The tee is factory wrapped to ensure complete barrier performance.

Bespoke fabricated fittings up to 630mm are now available to order. Please contact our Sales Office for information.

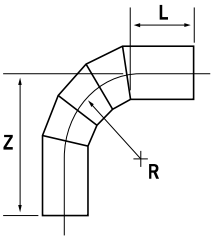
Only Protecta-Line fittings shall be used with Protecta-Line pipe. The use of alternative fittings will have the following effects on your Protecta-Line system:

- Invalidation of WRAS approval and manufacturer's system performance warranty.
- Compromised permeation resistance (causing non-compliance with WIS 4-32-19 and possible risks to health).
- Danger of pipe-layer delamination, compromising system performance integrity and risking pipe bursts.
- It is illegal to install fittings non-compliant with the Water Fittings Regulations (or Byelaws in Scotland).

WIS 4-32-19
KM 514626

90° Mitred Elbows



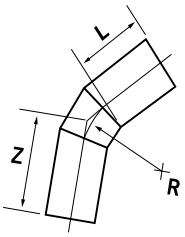


Size (mm)	L (mm)	Z (mm)	SDR11 Weight (kg)	SDR17 Weight (kg)	SDR11 Code	SDR17 Code
90	500	617	3.6	2.6	44 244 313	44 243 313
110	500	643	5.3	3.9	44 244 314	44 243 314
125	500	663	6.9	5.0	44 244 315	44 243 315
160	500	708	11.6	8.2	44 244 317	44 243 317
180	500	734	14.9	10.7	44 244 318	44 243 318
225	500	793	-	17.1	44 244 320	44 243 320
250	500	825	30.2	21.2	44 244 321	44 243 321
280	500	864	-	27.2	44 244 322	44 243 322
315	500	907	50.6	35.4	44 244 323	44 243 323
355	500	962	66.7	46.6	44 244 324	44 243 324

The joints are factory wrapped to ensure complete barrier performance.

45° Mitred Elbows



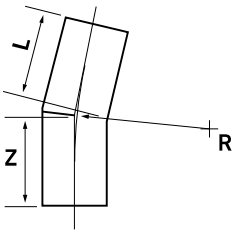


Size (mm)	L (mm)	Z (mm)	SDR11 Weight (kg)	SDR17 Weight (kg)	SDR11 Code	SDR17 Code
90	500	538	3.1	2.2	44 242 313	44 241 313
110	500	546	4.4	3.2	44 242 314	44 241 314
125	500	553	5.7	4.1	44 242 315	44 241 315
160	500	568	9.4	6.7	44 242 317	44 241 317
180	500	576	11.9	8.5	44 242 318	44 241 318
225	500	596	-	13.3	44 242 320	44 241 320
250	500	606	23.2	16.2	44 242 321	44 241 321
280	500	618	-	20.5	44 242 322	44 241 322
315	500	632	37.5	26.2	44 242 323	44 241 323
355	500	650	48.4	33.8	44 242 324	44 241 324

The joints are factory wrapped to ensure complete barrier performance.

22.5° Mitred Elbows

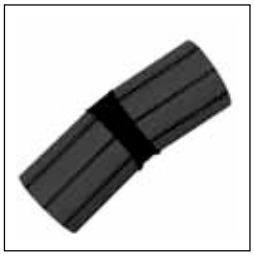


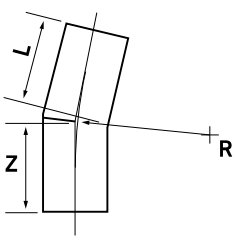


Size (mm)	L (mm)	Z (mm)	SDR11 Weight (kg)	SDR17 Weight (kg)	SDR11 Code	SDR17 Code
90	500	509	2.8	2.0	44 317 313	44 316 313
110	500	511	4.0	2.9	44 317 314	44 316 314
125	500	513	5.1	3.7	44 317 315	44 316 35
160	500	516	8.3	5.9	44 317 317	44 316 317
180	500	518	10.4	7.5	44 317 318	44 316 318
225	500	523	-	11.4	44 317 320	44 316 320
250	500	525	19.6	13.8	44 317 321	44 316 321
280	500	528	-	17.2	44 317 322	44 316 322
315	500	531	31.0	21.7	44 317 323	44 316 323
355	500	536	39.3	27.5	44 317 324	44 316 324

The joints are factory wrapped to ensure complete barrier performance.

11.25° Mitred Elbows





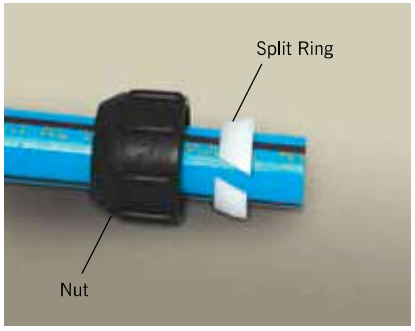
Size (mm)	L (mm)	Z (mm)	SDR11 Weight (kg)	SDR17 Weight (kg)	SDR11 Code	SDR17 Code
90	500	505	2.8	2.1	44 298 313	44 297 313
110	500	506	4.0	2.9	44 298 314	44 297 314
125	500	506	5.0	3.6	44 298 315	44 297 315
160	500	508	8.2	5.8	44 298 317	44 297 317
180	500	509	10.2	7.3	44 298 318	44 297 318
225	500	511	-	11.1	44 298 320	44 297 320
250	500	512	19.2	13.4	44 298 321	44 297 321
280	500	514	-	16.7	44 298 322	44 297 322
315	500	516	30.1	21.1	44 298 323	44 297 323
355	500	518	38.1	26.6	44 298 324	44 297 324

The joints are factory wrapped to ensure complete barrier performance.

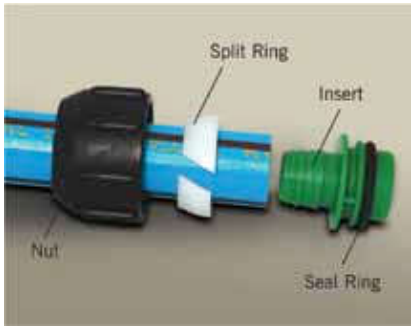
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Jointing Instructions for 25mm-63mm Protecta-Line Mechanical Compression Fittings (Service Pipes)

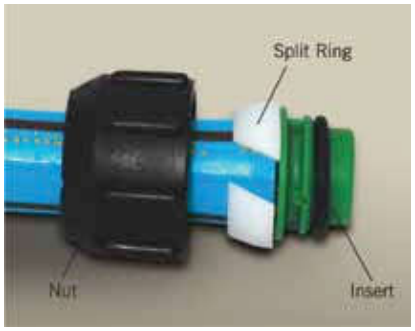
For use on GPS Protecta-Line pipe only.



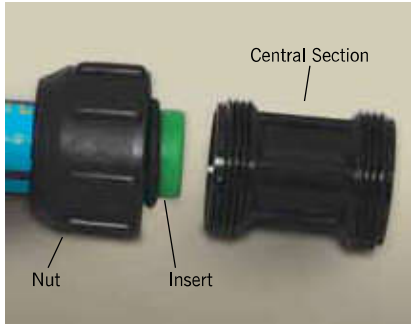
1. Cut the pipe square. Unscrew the Protecta-Line fitting and remove the nut and white split ring. Slide these on to the Protecta-Line pipe, first ensuring that the taper of the split ring faces towards the nut.



2. Tap the insert into the end of the Protecta-Line pipe with a flat wooden object. Ensure that the seal ring is correctly positioned on the pipe insert.

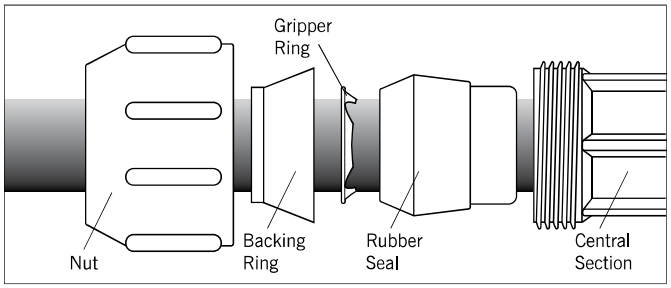


3. Slide the split ring along the Protecta-Line pipe until it is up against the insert. Snap the nut over the split ring.



4. Offer the body of the fitting to the Protecta-Line pipe end and screw the nut on to the fitting body. Continue to tighten the nut until the thread on the body is no longer visible.

Protecta-Line to copper joint (incorporates insert set for Copper Type A for above ground use on Table X tube).



1. Cut copper pipe square, preferably with cutters, and deburr.
2. Degrease pipe and roughen with wire wool or similar.
3. Unscrew nut from copper side of Protecta-Line fitting and slide this nut and plastic backing ring along copper pipe – with taper of backing ring towards nut.
4. Then slide metal gripper ring on to pipe and position it 10–15mm from end, ensuring flat face of gripper ring is facing towards backing ring/nut (i.e. slots in the gripper ring must face towards fitting body).
5. Next slide rubber seal on to copper pipe all the way up to internal stop – taper facing towards other parts already on pipe.
6. This will make certain that the metal gripper ring is pushed to correct location along pipe.
7. Slide backing ring forward to meet gripper ring/rubber seal.
8. Push assembly into body of Protecta-Line fitting and engage nut.
9. Tighten nut firmly with a wrench.
10. Ensure all pipework is securely anchored to counteract end loading.

Do not use heat near plastics and do not re-use gripper ring.

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Connecting Protecta-Line mechanical compression fittings to iron fittings
When screwing Protecta-Line Mechanical Compression Fittings onto iron fittings it is important not to use excessive amounts of **thread** sealing tape or other material **because** this can result in unreasonable force needed to complete the joint. Thread sealing tape should be WRc approved.

Jointing Instructions for 25mm and 32mm Protecta-Line Gunmetal Self-Tapping Ferrule Off-Takes

For use on GPS Protecta-Line pipe only.
Gloves and safety glasses must be worn during the whole assembly process.
Do not remove cutter or sleeve from this product before use.
The ferrule strap cutter includes a sealing sleeve that prevents water contact with the aluminium barrier layer.

1. Clean the surface of the Protecta-Line main where the self-tapping ferrule strap is to be installed, avoiding areas which appear damaged. Ensure that the sealing "O" ring is in place under the upper ferrule strap and take care not to damage this on the protruding sleeve.



2. Fit the self-tapping ferrule squarely around the main and tighten the two strap bolts evenly and symmetrically.



Caution: Do not remove cutter or sleeve from this product before use.

3. Fit the Protecta-Line service pipe into the compression fitting on the outlet, as described in the instructions overleaf.
After aligning the outlet to the desired position, tighten the securing collar and compression fitting.



4. Remove the plug from the top of the ferrule cap, and, using an 8 or 11mm square section key (depending on service pipe size), wind down the cutter assembly all the way until hard and solid resistance is felt. Note that before the solid resistance is felt there may be a temporary drop in resistance, followed by an increase as the sleeve around the cutter enters the main.



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5. Withdraw the cutter all the way up to the top of the stem, employing a final counter-clockwise torque of approximately 15Nm to ensure a good seal. Some leakage through the plughole is normal before the cutter has been fully unscrewed.

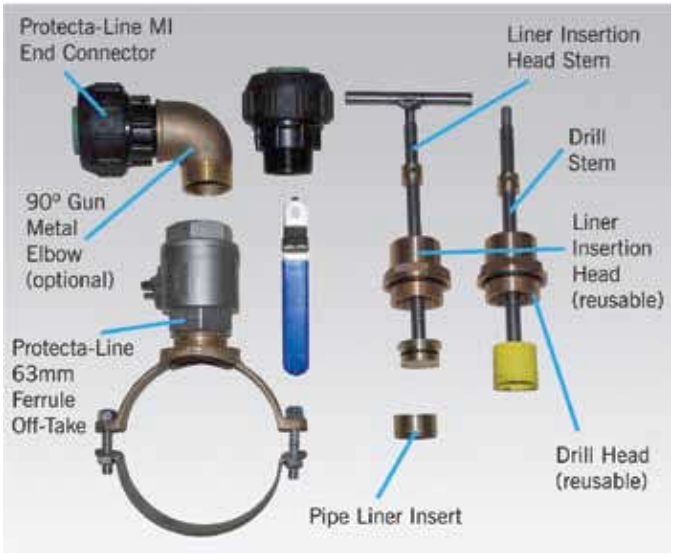


6. Replace the plug.



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Jointing Instructions for 63mm Protecta-Line Gunmetal Ferrule Off-Takes



Accessory	Code
* Protecta-Line 2" Drill Head	44 794 003
**Protecta-Line 2" Liner Head	44 794 004
***Protecta-Line Drill/Liner Head O-Ring Kit	44 996 062

* Drill Head setting: fix stop at 230mm from base to drill tip

** Drill Liner setting: fix stop at 180mm from stop base to bottom of tip on liner head

*** Includes four O-rings for replacement in either Drill Head or Liner Head

Gloves and safety glasses must be worn during the whole assembly process.

1. Ensuring that the sealing O-ring is in place under the upper ferrule strap, fit the ferrule squarely around the main in the required position and tighten the two strap bolts evenly and symmetrically. Ensure that ball valve operates correctly before fitting.



2. After assembling the drill stem with a 48mm hole cutter, withdraw the drill stem fully into the drill head.



3. Ensure that the ball valve is in the fully open position (anticlockwise rotation). Fit the drill head to the outlet of the ferrule.



4. Attach the chuck of an electric drill to the top of the drill stem (ensuring that the power supply is disconnected). Re-connect the power supply to the electric drill and operate the drill with downward pressure until the stop on the drill stem contacts the top of the drill head.



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5. Disconnect the power supply to the electric drill and remove the drill from the drill stem. Withdraw the drill stem, until the cutter is fully returned into the drill head and fully close the ball valve (clockwise rotation) before removing the drill head from the outlet of the ferrule.



6. Position the liner insert onto the carrier of the liner insertion head.



7. Fully withdraw the carrier and pipe liner insert into the liner insert head (indicated by the lower depth mark on the stem).



8. Fit the liner insertion head to the outlet of the ferrule. Open the ball valve (anti-clockwise rotation) and fully insert the liner insert, by applying downward pressure on the tee-bar handle on the shaft of the liner insertion head until the stop on the liner insertion head stem contacts the top of the liner insertion head.



9. Withdraw the liner insertion head stem until the carrier is fully withdrawn into the liner insert head (indicated by the lower depth mark on the stem). Close the ball valve (clockwise rotation) and remove the liner insertion head.



10. The communication pipe can now be fitted to the outlet of the ferrule utilising a Protecta-Line 63mm x 2" MI mechanical end connector, either directly to the ferrule outlet (side connection) or in conjunction with 2" MI/FI 90° elbow (top connection).



11. Open the ball valve (anti-clockwise rotation).

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Jointing Instructions for Protecta-Line Mechanical Fittings

These fittings are designed for use on GPS Protecta-Line pipes only and their performance on other piping systems is not approved or guaranteed.

Gloves and safety glasses must be worn during the whole assembly process.

A torque wrench is required: with a 10mm allen (hex) socket for sizes 63mm – 125mm and a 14mm allen (hex) socket for 160mm – 180mm fittings.

1. **DO ensure that the pipe ends are cut square.**
2. **DO ensure that the pipe is correctly aligned onto the fitting spigot.**
3. **DO ensure that the pipe is butted up to the insert spigot's pipe stop.**
4. **DO ensure that the shell is flush with the pipe end on the spigot.**
5. **DO remember to re-torque the bolts.**
6. **DON'T remove the fitting and try to reinstall on the same section of pipe, this may create a leak path due to the grooves previously formed on the pipe bore.**

1. Ensure the pipe ends are cut square. With the insert in place in the pipes to be joined, or with a 5mm gap between them, centre the shells over the pipe ends and mark the penetration depth.



2. Slide the shell over one of the pipe ends to be joined.



3. Push the insert into the pipe end.



4. Offer up the second pipe end onto the insert and push the pipes together, ensuring both pipes are up against the pipe stops of the insert and correctly aligned on the pipe.



5. Ensure the shells are flush with the pipe ends or for the straight coupler, centre the shell between the depth penetration marks. The fitting is ready to be tightened. Set the torque wrench to the value indicated on the label of the shell.



6. Tighten the hex socket head bolts until the set torque is achieved in each bolt. The pipe will relax after the set torque is achieved, so after a minute or more, retighten the bolts to the set torque. Repeat until less than a quarter turn is needed to reach the set torque*.

7. For the straight couplers, which have two bolts on a double width shell, tighten the bolts alternately and evenly until set torque is achieved in each bolt. The pipe will relax after the set torque is achieved, so after a minute or more, retighten the bolts to the set torque. Repeat until less than a quarter turn is needed to reach the set torque*.

* Repeated tightening of the bolts up to the set torque is necessary and important to compensate for relaxation in the polyethylene. It's normal for the re-torquing process to be conducted three to four times over the course of 5 minutes, but a longer allowance for relaxation between re-torquing may be needed in extremely cold weather where 10 to 15 minutes may be needed for the complete installation process.

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Repair Section Using 90mm – 180mm Protecta-Line Mechanical Repair Couplers

These fittings are designed for use on GPS Protecta-Line pipes only and their performance on other piping systems cannot be guaranteed.

Gloves and safety glasses must be worn during the whole assembly process.

A torque wrench is required: with a 10mm allen (hex) socket for sizes 63mm – 125mm and a 14mm allen (hex) socket for 160mm – 180mm fittings.

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1. Cut out the damaged pipe section. The minimum length of the cut is shown in the table below.

Pipe Size (mm)	Minimum Cut Out Length (mm)	Length of the Repair Piece (mm)
63	440	240
90	440	240
110	470	270
125	470	270
160	470	270
180	470	270

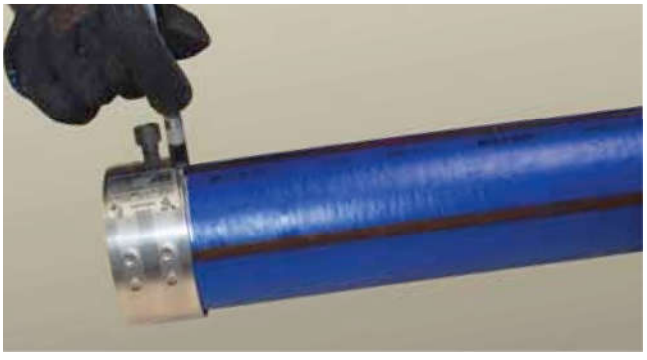
2. From an undamaged pipe length cut out a repair piece. The length of the repair piece should be equal to the length of the cut out less 200mm.



3. Fit the half shells to the ends of the cut out section and mark the penetration depths.



4. The penetration depths is shown in the table on the right. The table is in a separate document and to be added here.



5. Push the repair coupler inserts into the repair piece and position into the cut section.



6. Slide the repair coupler inserts into the cut pipe ends, so all of the depth marks are visible.



7. Tighten the hex socket head bolts until the set torque is achieved in each bolt. The pipe will relax after the set torque is achieved, so after a minute or more, retighten the bolts to the set torque. Repeat until less than a quarter turn is needed to reach the set torque.*



Nominal Pipe Size (mm)	Insertion depth (mm)	Bolt Hexagon (mm)	Torque Nm
63	45	10	50
90	45	10	60
110	52.5	10	60
125	52.5	10	60
160	52.5	14	160
180	52.5	14	160

* Repeated tightening of the bolts up to the set torque is necessary and important to compensate for relaxation in the polyethylene. It's normal for the re-torquing process to be conducted three to four times over the course of 5 minutes, but a longer allowance for relaxation between re-torquing may be needed in extremely cold weather where 10 to 15 minutes may be needed for the complete installation process.

Procedures for Butt-Fusion and Electrofusion of Protecta-Line Pipes (90mm-630mm)

When made in accordance with GPS PE Pipe Systems' recommended procedures, butt-fusion and electrofusion joints of the Protecta-Line system have been independently shown to meet the requirements of WIS 4-32-19 without any need for subsequent wrapping. This does not exempt installers from local regulations and the local Water Company preferences must be adhered to.

Standard butt-fusion and electrofusion procedures must be adhered to, but note the following additional points:

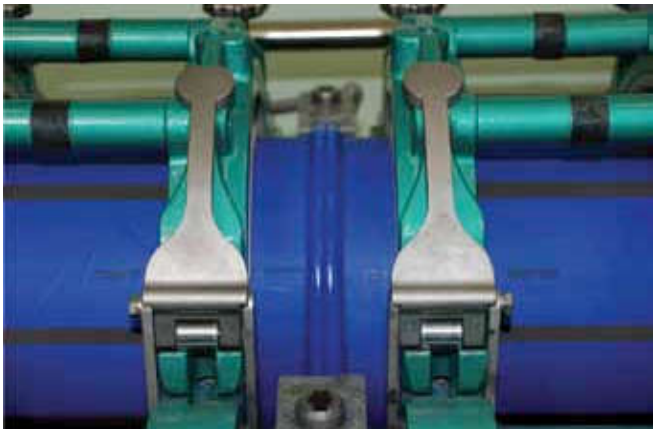
Butt-Fusion

Where this is permitted by the local water company, it is important that the outer PE and aluminium layers are removed far enough back, using the Protecta-Line Surprep tool (see the next pages), to prevent the aluminium from coming into contact with the butt-fusion machine trimmer or heater plates.

In addition, the outer PE and aluminium layers should be removed far enough back to permit normal debeading of the completed joint for normal quality control purposes.

It is recommended that the layers should be removed to a length equal to the width of the debeading tool on the end of each pipe. This should be increased by 50% when carrying out dummy weld procedures prior to final jointing.

Butt-fusion clamps should be checked for suitability before commencing work, particularly in larger sizes. Care should be taken not to damage the outer layers of Protecta-Line pipe when clamping it in the butt-fusion machine. In the case of some machines this may necessitate gently radiusing the edges of the jaw shutlines.



Electrofusion

It is essential that the Protecta-Line pipe is properly prepared prior to electrofusion jointing. It is necessary first to remove the outer PE layer, aluminium layer and any residual adhesive layer material.

It is potentially dangerous to carry out electrofusion jointing where the aluminium layer is still in place.

The Protecta-Line Surprep Scraper must be used for pipe end preparation, as it not only removes the outer layers, but it also prepares the core pipe for electrofusion jointing.

Electrofusion clamps should be checked for suitability before commencing work, particularly in larger sizes. All electrofusion joint assemblies must be held in clamps throughout the fusion and cooling periods.

Protecta-Line Jointing End Preparation for Electrofusion Procedures

Pipe Size (mm)	Length (B) (mm)	Register (Z) (mm)	Min preparation insertion depth (mm)	Max preparation depth (mm)
90	127	3	62	67
110	135	3	66	71
125	147	3	72	77
160	164	3	81	86
180	167	3	82	87
225	220	8	106	111
250	224	8	108	113
280	256	8	124	129
315	291	8	142	147
355	295	8	144	149

For diameters above 355mm, please contact GPS Technical Support on +44 (0)1480 442620 or enquiries@gpsuk.com

Only Protecta-Line fittings shall be used with Protecta-Line pipe. The use of alternative fittings will have the following effects on your Protecta-Line system:

- Invalidation of WRAS approval and manufacturer's system performance warranty.
- Compromised permeation resistance (causing non-compliance with WIS 4-32-19 and possible risks to health).
- Danger of pipe-layer delamination, compromising system performance integrity and risking pipe bursts.
- It is illegal to install fittings non-compliant with the Water Fittings Regulations (or Byelaws in Scotland).

WIS 4-32-19
KM 514626

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Repair Using Electrofusion (for Protecta-Line pipe sizes from 225mm to 630mm)

The pipe stops incorporated in the Protecta-Line electrofusion couplers are shearable and have been provided for the specific purpose of using the fittings for making repairs or breaking into existing pipelines.

1. Cut out the damaged section of the Protecta-Line pipe at least four times the length of the electrofusion repair couplers and ensure the pipe ends are cut square.
2. Measure the distance between the exposed pipe ends and cut a length of plain PE100 pipe of the same diameter and wall thickness as the existing Protecta-Line pipe, equal to the measured distance less 10mm ensuring that the pipe ends are cut square
3. Clean the ends of the cut section of plain pipe, for a distance slightly greater than the overall length of the repair couplers.
4. Using the pipe end preparation tool, remove the entire surface of the pipe over the marked area, preferably as a continuous ribbon or strip. Note: The use of mechanical end preparation tools is preferred as hand scraping requires great care and can be time-consuming especially on larger diameter pipes. It is essential that material is removed by scraping or peeling; scratching or abrading is not sufficient.
5. Remove the pipe stops in the coupler. This can be most satisfactorily achieved by placing one end of a thoroughly cleaned short length of pipe into the coupler and striking the other end onto a hard surface. The pipe stops can also be removed using a sharp knife, but care must be taken not to damage the bore of the fitting.
6. Clean the ends of the Protecta-Line pipe for repair and prepare for electrofusion jointing using the Protecta-Line Suprep Scraper as described on pages 34 and 35.
7. Using a suitable marker pen, draw circumferential lines half the length of the repair coupler on the prepared Protecta-line pipe ends which will be used to indicate the location of each repair coupler prior to fusion.
8. Care should be taken to ensure any residual water in the mains is not allowed to come into contact with the electrofusion area.
9. Insert the new plain section of pipe with repair couplers and then slide the repair couplers onto the Protecta-Line pipe ends, ensuring that they are positioned up to the marks on the prepared Protecta-Line pipe ends. Ensure that the surfaces are clean and dry.
10. Carry out the electrofusion jointing procedure as described in the GPS Installation & Technical Guide.
11. After welding, the plain pipe should be wrapped with Protecta-Line aluminium tape followed by a proprietary waterproof petrolatum tape (equivalent to Denso™). A brief wrapping guideline is on page 38 and a full procedure can be obtained from our Sales Support.

Alternative Method

Alternatively, stub flange assemblies may be fitted to the ends of the Protecta-Line pipe (after preparation with the Protecta-Line Surprep Scraper) and then connected with a double flanged ductile iron spacer.

This method may be used where there is a risk of water in the pipe contaminating electrofusion joints during installation.

Foam pigs can be used to temporarily seal the pipe bore. When electrofusion jointing of the stub flange assemblies has been completed, they can be removed before installation of the double flanged ductile iron spacer.









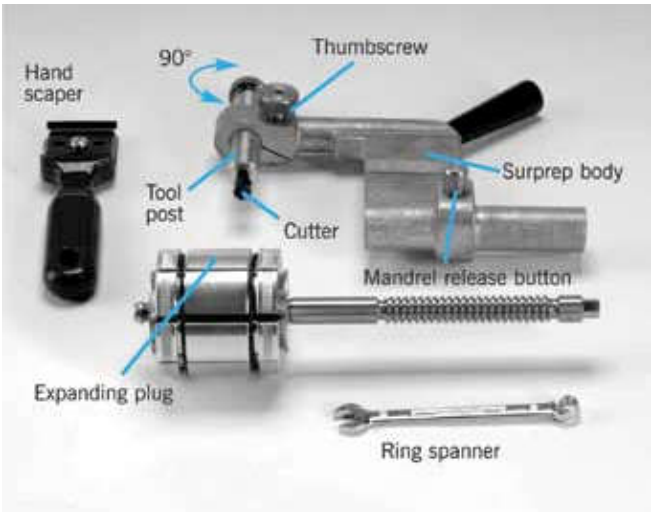
Squeezing Off

Protecta-Line pipe can be squeezed off in the industry-approved way, as summarised in the GPS Installation and Technical Guide.

However, as a precaution after re-rounding previously squeezed off areas should be wrapped with Protecta-Line aluminium tape followed by a proprietary waterproof petrolatum tape (equivalent to Denso™), in addition to any reinforcement bands that may be required to be fitted.

For information on acceptable usage conditions refer to Table 9.2 in the WRc PE Pipe Systems Manual version 01/02.

Procedure for Using the Protecta-Line Surprep Scraper (90mm-180mm)



The Protecta-Line Surprep Kit has been designed to allow the correct scraping of Protecta-Line barrier pipe prior to electrofusion jointing.

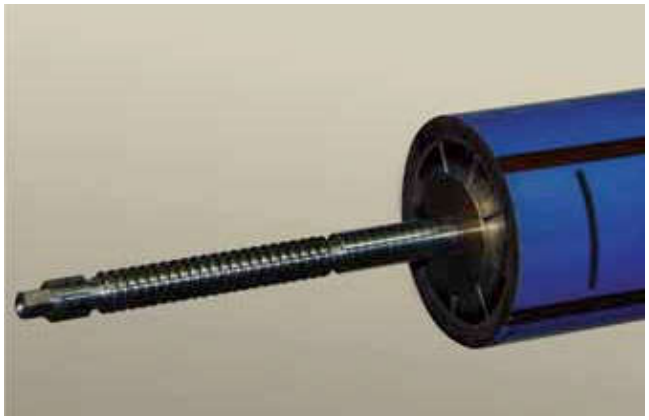
Code	90mm	110mm	125mm SDR11	125mm SDR17	160mm	180mm
01-07-081	●	●	●			
01-07-083				●	●	●

To order, please contact Caldervale directly on 01924 469571 or sales@caldertech.co.uk

The Surprep Kit is available for hire through MCA Hire Services www.mcahire.com and Plant & Site Services Ltd. www.psshire.com

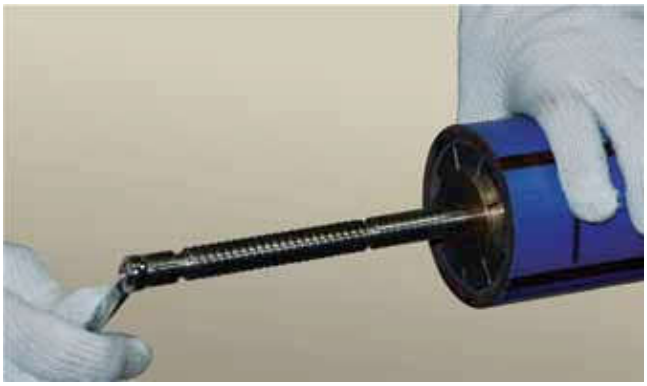


1. Measure the insertion depth of the electrofusion fitting to be used. Place a mark on both pipes to show the position where the edge of the fitting will be.
2. Clamp the pipe to be prepared taking care to avoid damage to the pipe's outer covering.
3. Separate the mandrel from the body of the Protecta-Line Surprep Scraper.

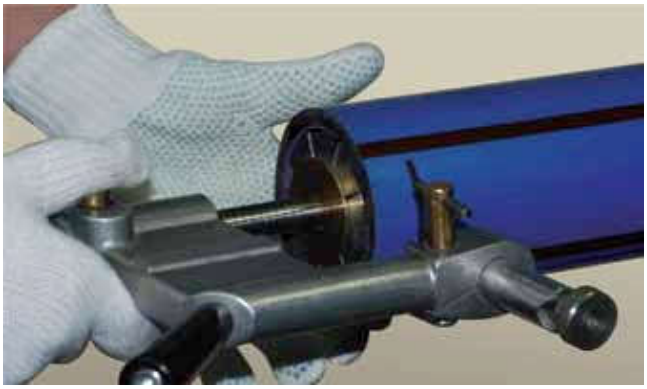


4. Hold the expanding plug and rotate the mandrel anticlockwise until the plug is a light interference fit in the pipe bore.
5. Push into pipe until edge of plug is level with edge of pipe. Expand plug further using the 10mm ring spanner.

   Do not over-tighten in order to avoid pipe distortion.



6. Slide the body of the Protecta-Line Surprep Scraper onto the mandrel, depress the release button and position the cutter close to the edge of the pipe.



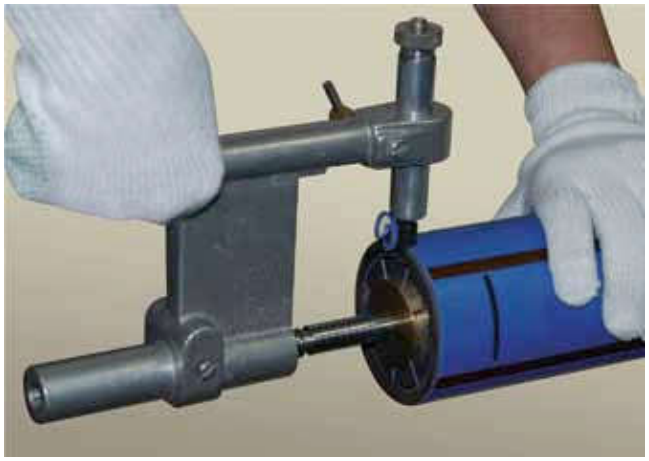
Note: Protecta-Line Surprep Scraper cuts in an anti-clockwise direction, beginning at the end of the pipe.

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7. Rotate the knob on the top of the tool post through 90°, against the spring tension, such that the cutter is in its raised position.



8. Loosen the body thumbscrew and position the cutter shoe on the edge of the pipe. Tighten the thumbscrew.



9. Rotate the knob on top of the post through 90° so that spring pressure is applied to the cutter.
10. Rotate the tool anti-clockwise in a smooth continuous motion to remove the outer layers in a continuous strip.
11. Stop cutting when the socket depth mark is reached.



12. Rotate the knob on top of the tool post so that the spring pressure is released.
13. Use the hand scraper to remove the peeled strip from the pipe.

    Caution: Do not attempt to break the peeled strip by pulling with bare hands, it has a sharp edge!

    Remove the tool in the reverse order of assembly (steps 3-6).



14. Inspect the prepared surface to ensure:

    i) All of the metallic layer has been removed.
    ii) All of the adhesive which bonds the metallic layer to the core has been removed.

15. If, for any reason, the prepared surface is not a uniform colour all over, use the hand scraper to complete the preparation process.

    Never attempt a second pass with the Protecta-Line Surprep Scraper.

When made in accordance with GPS PE Pipe Systems' recommended procedures, butt-fusion and electrofusion joints of the Protecta-Line system have been independently shown to meet the requirements of WIS 4-32-19 without any need for subsequent wrapping. This does not exempt installers from local regulations and the local Water Company preferences must be adhered to.

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Procedure for Using the Large Diameter Protecta-Line Scraper (above 180mm)



For Protecta-Line sizes above 180mm, the Surprep Scraper is a dedicated tool for each pipe size, with the cutter set to produce the required outside diameter. Adjustments must be done by a competent person and should not be carried out on site.

	225mm	250mm	280mm	315mm	355mm
Pipe insert collet					
01-07-255	●				
01-07-256		●			
01-07-257			●		
01-07-258				●	
01-07-259					●
Rotary tool c/w mandrill shaft*					
01-07-251	●	●	●	●	●

* Includes 2 collet expanding cones

To order, please contact Caldervale directly on 01924 469571 or sales@caldertech.co.uk. The Large Diameter Scraper is available upto 355mm for hire through MCA Hire Services www.mcahire.com and Plant & Site Services Ltd www.psshire.com.

For information about the Scraper for Protecta-Line sizes above 355mm, please contact GPS Technical Support on + 44 (0)1480 442620 or enquiries@gpsuk.com.



1. First mark the required length of pipe to be scraped (see table on page 32).

   Ensure that the correct size collet for the pipe to be scraped is fitted to the mandrel.

   Adjust the collet by twisting the mandrel shaft anti-clockwise until it achieves its smallest outside diameter.

   Slide the collet into the bore of the pipe, allowing 20mm of pipe to show after the collet, to allow for the barrelling effect found at the end of the pipe.



2. Adjust the collet by twisting the mandrel shaft clockwise until the mandrel becomes secure in the bore of the pipe and tighten with the mandrel spanner.

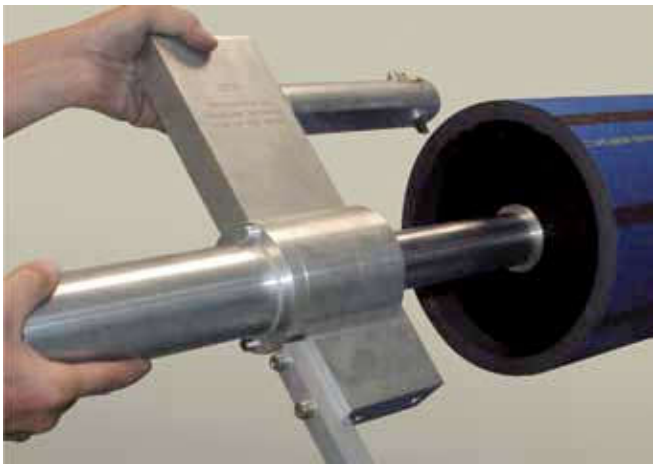
   To achieve the correct alignment parallel to the pipe bore, a joggling action in all directions is required.

   The collet also acts to re-round the pipe so check for gaps between the collet and the bore of the pipe.



3. Once the mandrel is secure and is parallel with the pipe bore, screw down the quick release screw to its full extent (about one and a half turns) using the adjuster, which is stored at the base of the tip arm support block.

   Note: Remember the position of the quick release screw.

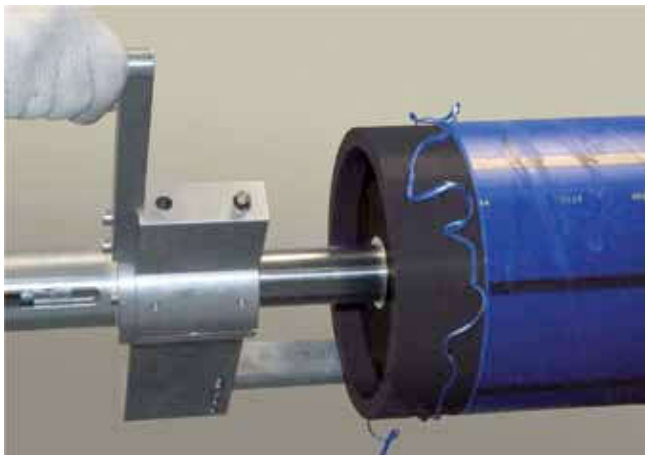


4. Ensure that the tip holder arm has been located in the hole corresponding to the pipe size in the tip holder support block.

   Locate the tool onto the mandrel shaft taking care not to damage the bore of the tool.

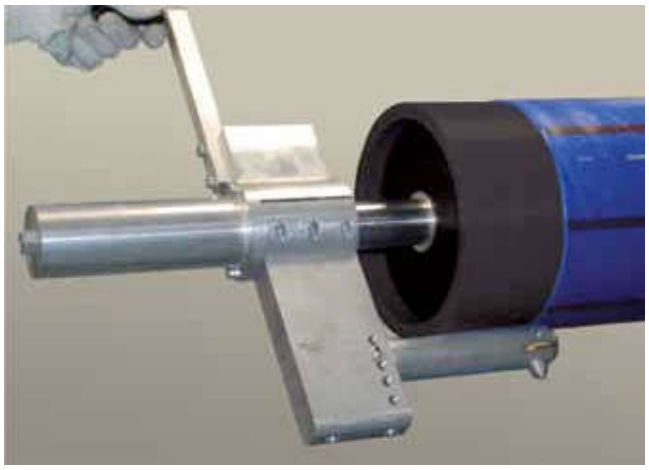
   Slowly slide the tool along the mandrel shaft using a twisting action, until the feed screw touches the quick release feed screw nut.

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5. Taking care to avoid damaging the quick release nut and feed screw, rotate the tool in a clockwise direction with a slight force pushing forward.

   Once the feed screw has engaged with the quick release nut, it will now proceed to travel along the length of the mandrel shaft, removing the outer barrier layers and preparing the pipe for electrofusion jointing.



6. When the required length of pipe has been prepared, raise the quick release screw to its top position (about one and a half turns).

   The quick release screw can be accessed through the slot in the feed screw housing tube.



7. The tool can now be removed from the mandrel shaft.

   Note: The tool should be removed to a clean dry and safe area.



8. Loosen the collet using the mandrel spanner on the mandrel shaft in an anti-clockwise direction until free.



9. Remove the collet and mandrel from the pipe.

   The collet should be removed to a clean dry and safe area. If there are any areas of pipe that have not been prepared properly, then the hand scraper should be used to complete the preparation process.

   Note: The barrelling effect found at the end of the pipe may result in the barrier layers remaining on the pipe surface for a short distance in from the end of the pipe.

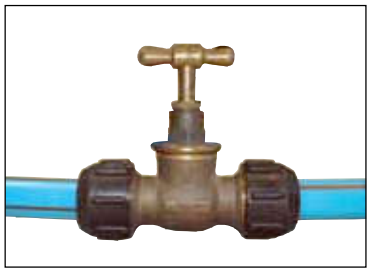
When made in accordance with GPS PE Pipe Systems' recommended procedures, butt-fusion and electrofusion joints of the Protecta-Line system have been independently shown to meet the requirements of WIS 4-32-19 without any need for subsequent wrapping. This does not exempt installers from local regulations and the local Water Company preferences must be adhered to.

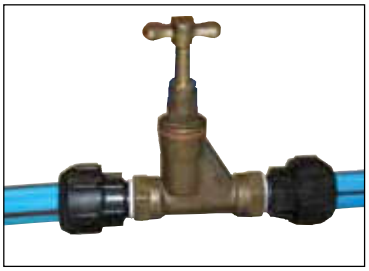
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Enabling Products

Stop cocks (BS 5433 type) are available with integral Protecta-Line Mechanical Compression Couplers in sizes 25mm and 32mm.

For larger sizes and as an alternative to the above, stop cocks with threaded connections can be used in conjunction with Protecta-Line Mechanical Compression End Connectors.

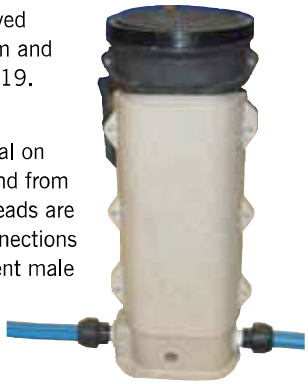




Boundary boxes may be used provided they are manufactured in accordance with the required standards, listed in the WRAS Approved Water Fittings directory (section 1520 or 1525) and comply with the requirements of WIS 4-37-01.

Connecting couplers must be approved for use with the Protecta-Line system and pass the requirements of WIS 4-32-19.

The pipe inserts of Protecta-Line Mechanical Compression Fittings seal on the pipe bore and isolate the pipe end from any water pressure. The fittings' threads are BSP taper (male or female) and connections should only be made to the equivalent male or female threaded connections of the boundary box.



Above ground mounted/built-in meter boxes should be considered when the internal components of a boundary box (manifold and/or meter) are of a polymeric material and there is a risk of contaminant ingress where Protecta-Line pipe feeds straight into the box.

Connections to the meter manifold inlet should only be made with fittings approved for use with the Protecta-Line System.



Connecting to Alternative Barrier Pipes Systems

To connect Protecta-Line to alternative barrier pipe systems, a mechanical connection should be used: either a threaded connection in the case of the service pipe sizes or a flange connection in the case of larger sizes. Contact our Technical Support for further details.

Capping Off

An appropriate Protecta-Line Mechanical Compression Fitting can be used to cap off Protecta-Line pipes as shown below.



Testing and Commissioning

The sequence of events for Protecta-Line includes the same basic testing procedures as for conventional PE pipes, but taking extra care appropriate for a contaminated environment as set out by the Local Water Undertaking.

As for standard PE pipes, these procedures will normally require as a minimum the adequate flushing of the services and the testing of all pipes and joints to the maximum head to which the system is to be subjected.

Wrapping

When made in accordance with GPS PE Pipe Systems' recommended procedures, butt-fusion and electrofusion joints of the Protecta-Line System have been independently shown to meet the requirements of WIS 4-32-19 without any need for subsequent wrapping. This does not exempt installers from local regulations and the local Water Company preferences must be adhered to.

Should wrapping be required, the following table can be used for guidance. The full wrapping procedure can be obtained from our Technical Support.

Aluminium Foil Wrapping Lengths – Foil width 50mm

Size (mm)	E/F fittinglength (mm)	Amount of foil required (metres)	Joints per roll
90	127	3.4	15
110	135	4.5	11
125	147	5.2	10
160	164	7.4	7
180	210	10.2	5
225	236	13.8	4
250	246	15.9	3
280	285	19.3	3
315	300	24.5	2
355	300	27.8	2
400	320	32.5	2
450	340	37.9	1
500	360	44.0	1
560	380	47.1	1
630	420	56.6	1

Size (mm) E/F fitting length (mm)	Amount of foil required (metres)	Code
Aluminium wrapping tape (45m long x 50mm wide)	0.5	44 996 008

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Notes:

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The product range displayed in this catalogue does not automatically indicate stock availability. Contact our Sales Office on +44 (0)1480 442600 for specific details. Note that calls may be recorded for training and quality purposes.

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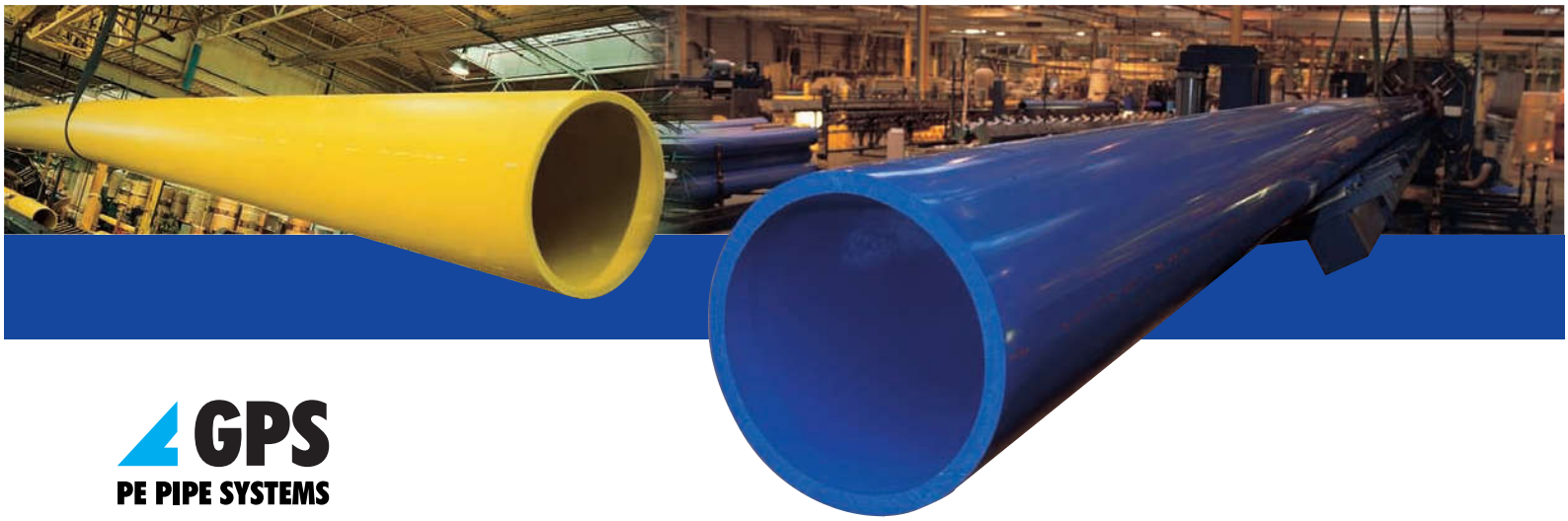
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BARRIER PIPE AND FITTINGS SYSTEMS

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Installation and Technical Guidelines





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Our Company

GPS PE Pipe Systems is a member of the international Aliaxis Group of Companies who manufacture and sell pipe systems and related products for residential and commercial construction, industrial and public utilities.

We specialise in the research, development and manufacture of polyethylene and multi-layer pipe systems including fittings for gas and water transportation in the utilities, offshore and industrial markets.

Resulting from the amalgamation of two market leading companies, GPS PE Pipe Systems brings together over one hundred years of experience and knowledge in plastic pipe systemss.

The Environment

We actively and consistently strive to reduce our impact on the environment. We have measured our performance against various environmental indicators since 1997 and operated an environmental management system accredited to ISO 14001 since 1999. We are currently working towards an independent verification of our carbon footprint under the Certified Emissions Measurement And Reduction Scheme (CEMARS).

Market Oriented

GPS PE Pipe Systems products have a broad range of applications in the industrial and utilities markets on a worldwide basis. The utilities of water and gas distribution are important sectors for high integrity products where the maintenance of water quality and the safe transport of gaseous fuels are of paramount importance. Industrial applications include: alternative energy installations in landfill gas systems; effluent transportation and mineral slurries.

Many of the brands in the GPS portfolio have a long record of innovation in meeting the needs of the water and gas utilities. One of the foremost pioneers in polyethylene pipe systems, GPS is continually improving and updating its offering to meet the ever growing needs of the distribution engineer, ensuring they stay at the forefront of world gas and water distribution/treatment systems.

Manufactured in the UK, our products are sold to more than 60 countries worldwide.

Customer Focus

The key to our success lies in the commitment we pledge to provide the highest quality service and support to our customers and industry end-users. We are a team of highly motivated and experienced individuals who are dedicated to helping our customers achieve their goals.

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

Quality

Designed, manufactured and supplied under a BS EN ISO 9001:2008 accredited Quality Management System, GPS products comply with relevant national, European and international product standards to ensure peace of mind for our customers.

Certificate No. FM 34819

Certificate No. E 51385

Business in the Community AWARDS 2010








World leaders in the design, manufacture, marketing and sales of high performance, high integrity plastic and composite piping systems.

Contents

Page

Introduction to Protecta-Line	2
Protecta-Line Pipe	3
Protecta-Line Mechanical Compression Fittings	4-6
Jointing Instructions for 25mm-63mm Protecta-Line Mechanical Compression Fittings (Service Pipes)	7
Installation Instructions for Protecta-Line Ductile Iron Ferrule	8
Protecta-Line Ferrule Off-Takes	9
Installation Instructions for Protecta-Line Gunmetal Self Tapping Ferrule Straps	10
Installation Instructions for Protecta-Line Gunmetal Ferrule Off-Takes	11-12
Protecta-Line Fluid Compression Fittings	13-16
Installation Instructions for Protecta-Line Fluid Compression Fittings - Pressurising the Joint	17
How to Bleed the Pump	18
Jointing Instructions for 63mm-180mm Protecta-Line Fluid Compression Fittings (Mains Pipes)	19
Jointing Instructions for Protecta-Line Fluid Compression Repair Fittings	20
Protecta-Line Electrofusion Fittings	21-22
Procedures for Butt-Fusion and Electrofusion of Protecta-Line Pipelines above 90mm in Diameter	23
Procedure for Using Protecta-Line Surprep Scraper	24-25
Procedure for Using the Large Diameter Protecta-Line Scraper	26-27
Jointing Instructions for Repairs Using Electrofusion (225mm-355mm)	28



Introduction

Previously used contaminated land is increasingly being reused for new developments where drinking water is needed. Such land, in particular former industrial land, must either be remediated to reduce contamination to acceptable levels, or a pipe system must be installed which can guarantee the long term safety and quality of the water supply. Without remediation, conventional metal and polyethylene (PE) piping systems are not recommended in such land as certain residual chemicals can permeate or corrode the pipe wall causing unpleasant tastes and shortening the life of the pipe. For further details refer to the WRc Polyethylene Pipe Systems Manual - version 01/02 - Ref: ED11 and UKWIR 10/MW/03/21.

The fully integrated barrier pipe and fittings system for safely transporting water through contaminated land

Protecta-Line is an award winning fully integrated barrier pipe and fittings system in sizes from 25mm to 355mm. The five-layer pipe comprises: an internal standard PE host pipe for carrying the water; an aluminium barrier layer to stop the ingress of contaminants; an outer polyethylene protection layer; and two adhesive tie-layers.

Protecta-Line prevents the tainting that can be caused by through-wall permeation by hydrocarbons and related chemicals that might be present in contaminated land. Introduced in 1996 to the UK market, Protecta-Line won the IWEX Innovation Award in 1997. Due to its structure any chemicals left in the land cannot damage the pipe wall, ensuring preservation of long-term strength, many years of usage and whole-life cost savings. The double bonded construction incorporates an impermeable metallic barrier wrapped onto a standard central core of PE80 or PE100 (Excel) pipe conforming to BS 6572 or WIS 4-32-17/BS EN 12201.

The Protecta-Line Advantages

- WRAS and Regulation 31/27 approval for total peace of mind to the highest standards of safety demanded by water companies and other installers.
- The whole Protecta-Line system is Kitemarked to WIS 4-32-19, the only industry standard for pipe systems for potable water in contaminated land.
- Protecta-Line has all the installation benefits of conventional PE pipe - a lightweight, flexible material that is fast and easy to install.
- Protecta-Line system encompasses the most complete and fully integrated range of compatible pipe and fittings, approved for safe transportation of drinking water through contaminated land.
- Protecta-Line allows for a lower cost of installation than metallic pipe and is significantly less disruptive.
- Protecta-Line pipes may be subjected to cold bending as for standard polyethylene pipes (see GPS Installation & Technical Guidelines Brochure - GP-IT005).

Approvals

- Approved by the Secretary of State
- WRAS **(complete system approved)**
- BS 6572 (25mm - 63mm pipes)
- WIS 4-32-17 (25mm - 355mm pipes)
- BS EN 12201 (90mm - 355mm pipes)
- WIS 4-32-19 **(complete system is Kitemarked).** System permeation tests independently verified

Protecta-Line is an approved system. Only Protecta-Line fittings shall be used with Protecta-Line pipe. The use of alternative fittings will have the following effects on your Protecta-Line system:



- Invalidation of WRAS approval and manufacturers system performance warranty.
- Compromised permeation resistance (causing non-compliance with WIS 4-32-19 and possible risks to health).
- Danger of pipe-layer delamination, compromising system performance integrity and risking pipe bursts. It would be illegal to install non-WRAS approved fittings.

WRAS
0609132
0702502
0902519
0902515
0703510

07472
56151
508224

WIS 4-32-19
KM 514626

The most complete system

The Protecta-Line range consists of:

- Protecta-Line Pipe from 25mm to 110mm in SDR11 and 125mm to 355mm in SDR17. Available in 6m and 12m sticks; 25m, 50m and 100m coils, depending on diameter.
- Protecta-Line Mechanical Compression Fittings from 25mm to 63mm including Couplers, Reducing Couplers, Transition Fittings, Equal Tees, 90° Elbows, End Connectors and Reducing Sets.
- Protecta-Line Stop Cocks at 25mm & 32mm.
- Protecta-Line Self-Tapping Ferrule Off-Takes in mains sizes 63mm to 355mm with 25mm or 32mm outlets.
- Protecta-Line Ferrule Off-Takes in mains sizes 90mm to 355m with 63mm outlets.
- Protecta-Line Ductile Iron Ferrule in 3/4" x 25mm.
- Protecta-Line Fluid Compression Fittings from 63mm to 180mm including Couplers, Reducers, 90° Elbows, 45° Elbows, Equal Tees, Flanged Branch Tees, Repair Couplers, Stub Flange Adaptors and Duck Foot Bends.
- Protecta-Line Electrofusion Fittings from 90mm to 355mm including Couplers, Reducers, 90° Elbows, 45° Elbows, Equal Tees, Flanged Branch Tees and Flange Adaptors.
- A range of fabricated fittings for butt-fusion in sizes from 90mm to 355m, without need to wrap in the field.

Sizes 90mm to 355mm of Protecta-Line can be joined using Electrofusion or Butt-fusion. When made in accordance with GPS PE Pipe Systems' recommended procedures, butt-fusion and electrofusion joints of the Protecta-Line system have been independently shown to meet the requirements of WIS 4-32-19 without any need for subsequent wrapping. This does not exempt installers from local regulations and the local Water Company preferences must be adhered to.

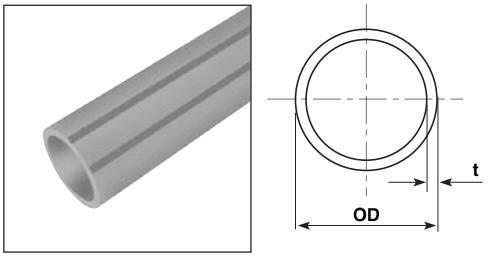
Protecta-Line systems should be pressure tested after installation using the standard industry procedures employed for PE pipelines, taking extra care when working in a contaminated environment as set out by the Local Water Undertaking.

View Protecta-Line installation videos online.
Use your mobile to scan this code.

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Protecta-Line Pipe

- Kitemarked to WIS 4-32-19.
- Standard blue PE100 (Excel) or PE80 (MDPE) core pipe with aluminium barrier layer and protective outer PE skin.
- In 6m and 12m sticks and 25m, 50m or 100m coils.
- For use with Protecta-Line mechanical compression fittings up to 63mm and fluid compression fittings from 63mm up to 180mm.
- Suitable for butt-fusion or electrofusion jointing where specified, in sizes 90mm and above.
- Brown stripes provide easy identification and comply with NJUG regulations.



Straight Lengths

Size* (mm)	Std Length (m)	Material	Pressure Rating (bar)	SDR	Min OD (mm)	Max OD (mm)	Mean Bore (mm)	Min Wall Thickness (mm)	Max Wall Thickness (mm)	Mean Weight (kg/m)	6M Code	12M Code
63	6	PE80 (MDPE)	12.5	11	64.3	65.6	51	6.5	7.6	1.3	44 512 311	-
90	6/12	PE100 (Excel)	16	11	92.2	93.5	73	9.3	10.7	2.6	44 512 313	44 527 313
110	6/12	PE100 (Excel)	16	11	112.2	113.5	89	11.1	12.7	3.7	44 512 314	44 527 314
125	6/12	PE100 (Excel)	16	11	127.2	128.5	101.2	12.5	14.2	4.7	44 512 315	44 652 315
	6/12	PE100 (Excel)	10	17	127.2	128.5	110	8.5	9.8	3.4	44 653 315	44 654 315
160	6/12	PE100 (Excel)	10	17	163.2	165.1	140	10.7	12.4	5.4	44 653 317	44 654 317
180	6/12	PE100 (Excel)	16	11	183.3	185.4	146.8	17.6	20	9.5	44 512 318	44 652 318
	6/12	PE100 (Excel)	10	17	183.3	185.4	158	11.9	13.7	6.8	44 653 318	44 654 318
225	6/12	PE100 (Excel)	10	17	227.3	229.8	197	14.6	16.6	10.2	44 653 320	44 654 320
250	6/12	PE100 (Excel)	10	17	252.3	254.9	220	16	18.3	12.4	44 653 321	44 654 321
280	6/12	PE100 (Excel)	10	17	282.3	285.1	246	17.8	20.1	15.3	44 653 322	44 654 322
315	6/12	PE100 (Excel)	10	17	317.3	320.2	277	19.9	22.4	19.2	44 653 323	44 654 323
355	6/12	PE100 (Excel)	10	17	357.3	360.6	312	22.3	25.1	24.2	44 653 324	44 654 324

Coils

Size* (mm)	Coil Lengths Available (m)	Material	Pressure Rating (bar)	SDR	Min OD (mm)	Max OD (mm)	Mean Bore (mm)	Min Wall Thickness (mm)	Max Wall Thickness (mm)	Approx Weight (kg/m)	Code
25	25/50	PE80 (MDPE)	12.5	11	26.3	27.5	20	3.0	3.7	0.26	44 658 308/44 659 308
32	25/50	PE80 (MDPE)	12.5	11	33.3	34.5	26	3.7	4.4	0.39	44 658 308/44 659 308
63	25/50/100	PE80 (MDPE)	12.5	11	64.3	65.6	51	6.5	7.6	1.3	44 658 311/44 659 311/44 660 311
90	50/100	PE100 (Excel)	16	11	92.2	93.5	73	9.3	10.7	2.6	44 659 313/44 660 313
110	50/100	PE100 (Excel)	16	11	112.2	113.5	89	11.1	12.7	3.7	44 659 314/44 660 314
125	50/100	PE100 (Excel)	16	11	127.2	128.5	101.2	12.5	14.2	4.7	44 659 315/44 660 315
	50/100	PE100 (Excel)	10	17	127.2	128.5	110	8.5	9.8	3.4	44 655 315/44 656 315
160	50/100	PE100 (Excel)	10	17	163.2	165.1	141	10.7	12.4	5.4	44 655 317/44 656 317
180	50/100	PE100 (Excel)	16	11	183.3	185.4	146.8	17.6	20	9.5	44 659 318/44 660 318
	50/100	PE100 (Excel)	10	17	183.3	185.4	158	11.9	13.7	6.8	44 655 318/44 656 318

* The nominal size is the nominal core pipe outside diameter.

Other lengths and SDRs may be available to order subject to a minimum order value. Please contact our Sales Office for further information.

To connect Protecta-Line to alternative barrier pipe systems, a mechanical connection should be used: either a threaded connection in the case of the service pipe sizes or a flange connection in the case of larger sizes. Contact our Technical Support for further details.

Testing and Commissioning

The sequence of events for Protecta-Line includes the same basic testing procedures as for conventional PE pipes, but taking extra care appropriate for a contaminated environment as set out by the Local Water Undertaking.

As for normal PE pipes these procedures will normally require, as a minimum, the adequate flushing of the services and the testing of all pipes and joints to the maximum head to which the system is to be subjected.

Only Protecta-Line fittings shall be used with Protecta-Line pipe. The use of alternative fittings will have the following effects on your Protecta-Line system:
- Invalidation of WRAS approval and manufacturers system performance warranty.
- Compromised permeation resistance (causing non-compliance with WIS 4-32-19 and possible risks to health).
- Danger of pipe-layer delamination, compromising system performance integrity and risking pipe bursts.
- It would be illegal to install non-WRAS approved fittings.

Protecta-Line Mechanical Compression Fittings

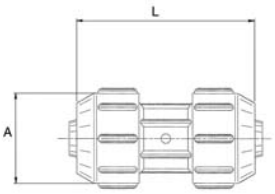
Protecta-Line Mechanical Compression Fittings are supplied for use with pipe sizes between 25mm and 63mm.

These acetal fittings are WRAS approved fittings for use with 25mm to 63mm Protecta-Line pipe as they are proven to WIS 4-32-19 to offer barrier protection against contaminants. They also carry a unique pipe insert to totally seal against the pipe bore ensuring there can be no contact between the drinking water and the pipe's aluminium layer.

- Proven barrier protection against contamination.
- No pipe end preparation required.
- No wrapping required.
- No risk of joint corrosion.
- No contact between the pipe's protective aluminium layer and drinking water.
- Easy and rapid installation.
- No specialist equipment required.
- All weather installation.
- Employs O-ring seal, in body of fitting only.
- Suitable for connecting Protecta-Line to a standard PE pipe.

PE to PE Couplers

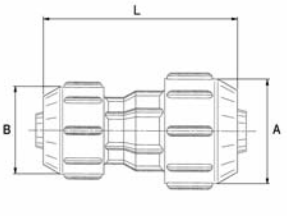




Size (mm)	A (mm)	L (mm)	Weight (kg)	Code
25 x 25	51	93	0.12	44 100 307
32 x 32	60	99	0.19	44 100 308
63 x 63	105	155	0.70	44 100 311

PE to PE Reducing Couplers

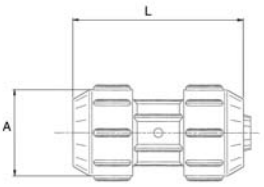




Size (mm)	A (mm)	B (mm)	L (mm)	Weight (kg)	Code
32 x 25	60	51	100	0.15	44 114 409
63 x 25	105	81	155	0.58	44 114 412
63 x 32	105	105	155	0.78	44 114 415

PE to Copper Coupler





Size (mm)	A (mm)	L (mm)	Weight (kg)	Code
25 x 15	51	93	0.12	44 996 005
25 x 22	51	93	0.13	44 996 006
32 x 28	60	93	0.21	44 996 007

Fittings for Protecta-Line in Brownfield and Contaminated Land

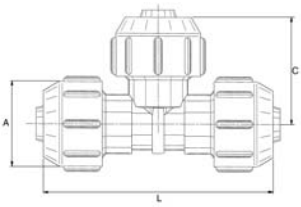
Protecta-Line Pipe Sizes (mm)													
25	32	63	90	110	125	160	180	225	250	280	315	355
Mechanical Compression Fittings													
			Fluid Compression Fittings										
			25mm and 32mm Self-Tapping Ferrule Off-Takes										
			63mm Ferrule Off-Takes										
			Electrofusion or Butt-Fusion										

A range of fabricated fittings for butt-fusion in sizes 90mm to 355mm is available to order – please contact Sales Office for further information.

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Equal Tees

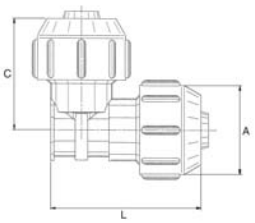




Size (mm)	A (mm)	C (mm)	L (mm)	Weight (kg)	Code
25 x 25	51	64	134	0.18	44 122 307
32 x 32	60	68	146	0.30	44 122 308
63 x 63	105	100	216	1.25	44 122 311

90° Elbows

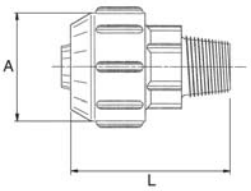




Size (mm)	A (mm)	C (mm)	L (mm)	Weight (kg)	Code
25	51	68	93	0.13	44 115 307
32	60	71	97	0.22	44 115 308
63	105	105	158	0.90	44 115 311

End Connectors - PE x Male Iron BSP Tapered

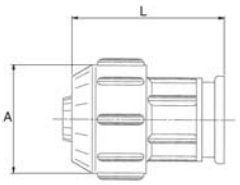




Size (mm x inch)	A (mm)	L (mm)	Weight (kg)	Code
25 x ¾	51	64	0.07	44 151 608
32 x ¾	60	74	0.08	44 151 611
32 x 1	60	77	0.11	44 151 612
63 x 1½	105	100	0.39	44 151 628
63 x 2	105	105	0.39	44 151 629

End Connectors - PE x Female Iron BSP Tapered

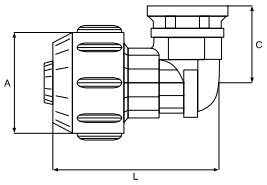




Size (mm x inch)	A (mm)	L (mm)	Weight (kg)	Code
25 x ¾	51	67	0.08	44 101 608
32 x 1	60	75	0.12	44 101 612
63 x 2	105	100	0.43	44 101 629

90° Elbows - PE x Female Iron BSP Tapered

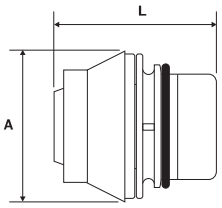




Size (mm x inch)	A (mm)	C (mm)	L (mm)	Weight (kg)	Code
25 x ¾	51	35	73	0.08	44 396 608
32 x ¾	60	39	80	0.18	44 396 612
63 x 2	105	62	145	0.57	44 396 629

Reducing Sets - to allow easy Protecta-Line diameter changes

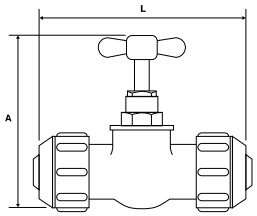




Size (mm)	A (mm)	L (mm)	Weight (kg)	Code
32 x 25	44	42	0.03	44 105 409
63 x 32	80	51	0.15	44 105 415

Stop Cocks - BS 5433 Type



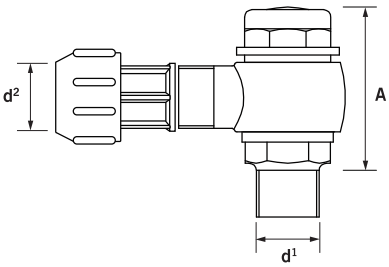


Size (mm)	A (mm)	L (mm)	Weight (kg)	Code
25*	140	135	0.9	44 142 307
32**	165	170	1.7	44 142 308

* Now includes 22mm copper Type A insert
** Now includes 28mm copper Type A insert

Ductile Iron Ferrule - PE x Male Iron BSP Tapered



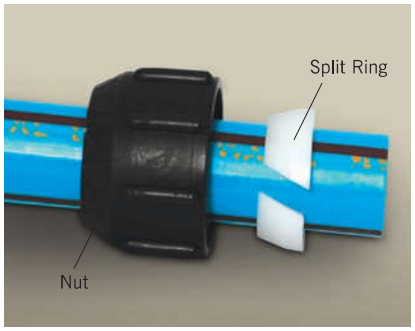


Size (inch x mm) d¹ x d²	A (mm)	Weight (kg)	Code
¾ x 25	60	0.45	44 762 407

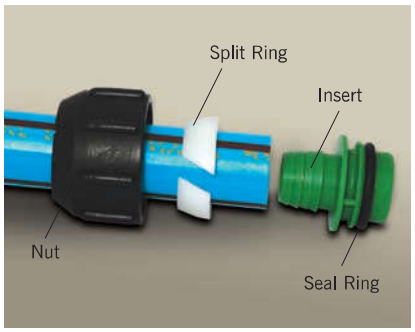
Tel: +44 (0)1480 52121 Fax: +44 (0)1480 458829 Technical Support: +44 (0)1480 442620

Jointing Instructions for 25mm-63mm Protecta-Line Mechanical Compression Fittings (Service Pipes)

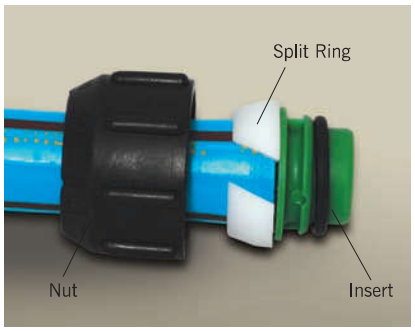
For use on GPS Protecta-Line pipe only.



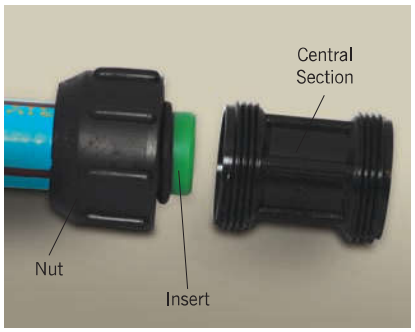
1. Cut the pipe square. Unscrew the Protecta-Line fitting and remove the nut and white split ring. Slide these on to the Protecta-Line pipe, nut first ensuring that the taper of the split ring faces towards the nut.



2. Tap the insert into the end of the Protecta-Line pipe with a flat wooden object. Ensure that the seal ring is correctly positioned on the pipe insert.

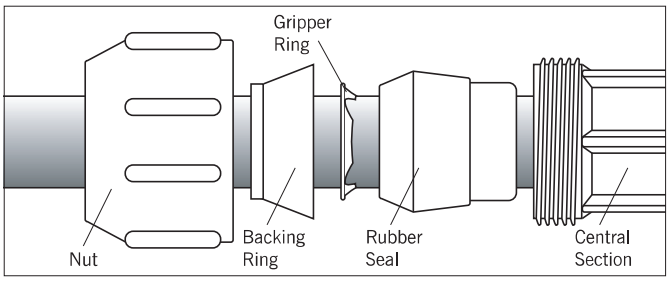


3. Slide the split ring along the Protecta-Line pipe until it is up against the insert. Snap the nut over the split ring.



4. Offer the body of the fitting to the Protecta-Line pipe end and screw the nut on to the fitting body. Continue to tighten the nut until the thread on the body is no longer visible.

Protecta-Line to copper joint (incorporates insert set for Copper Type A for above ground use on Table X tube).



1. Cut copper pipe square, preferably with cutters, and deburr.
2. Degrease pipe and roughen with wire wool or similar.
3. Unscrew nut from copper side of Protecta-Line fitting and slide this nut and plastic backing ring along copper pipe – with taper of backing ring towards nut.
4. Then slide metal gripper ring on to pipe and position it 10–15mm from end, ensuring flat face of gripper ring is facing towards backing ring/nut (i.e. slots in the gripper ring must face towards fitting body).
5. Next slide rubber seal on to copper pipe all the way up to internal stop - taper facing towards other parts already on pipe.
6. This will make certain that the metal gripper ring is pushed to correct location along pipe.
7. Slide backing ring forward to meet gripper ring/rubber seal.
8. Push assembly into body of Protecta-Line fitting and engage nut.
9. Tighten nut firmly with a wrench.
10. Ensure all pipework is securely anchored to counteract end loading.

Caution: Do not use heat near plastics and do not re-use gripper ring.

Connecting Protecta-Line mechanical compression fittings to iron fittings
When screwing Protecta-Line Mechanical Compression Fittings onto iron fittings it is important not to use excessive amounts of **thread** sealing tape or other material **because** this can result in unreasonable force needed to complete the joint. Thread sealing tape should be WRc approved.

Installation Instructions for Protecta-Line Ductile Iron Ferrule

1. Drill and tap the ductile iron main and insert the ferrule nipple in the usual way.





2. Fit the Protecta-Line end connector compression fitting to the outlet of the ferrule banjo, employing sufficient PTFE tape to ensure a good seal. Fit the Protecta-Line service pipe into the compression fitting on the outlet as described on page 7.



3. Fit the banjo onto the ferrule nipple and replace the securing collar. After aligning the outlet to the desired position, tighten the securing collar.



4. Remove the plug from the top of the securing collar and withdraw the nipple plug all the way up to the top of the stem to achieve a good seal and then replace the plug.





5. Reinstate any protective wrappings to the ductile iron pipe.

Note: The ductile iron ferrule may have a gunmetal rather than an acetal top cap on some fittings.

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Protecta-Line Ferrule Off-Takes

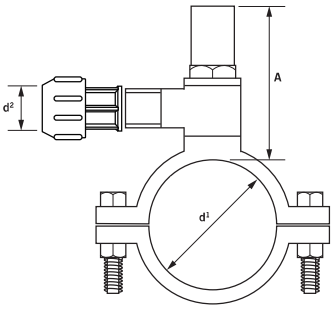
- 25mm and 32mm Protecta-Line self-tapping ferrule off-take for 63mm to 355mm Protecta-Line mains.
- 63mm Protecta-Line ferrule off-take for 90mm to 355mm Protecta-Line mains.
- Each ferrule off-take incroporates a self-locking insert sleeve that grips into drilled/tapped hole in the mains pipe and securely seals the pipe crown to the underside of the fittings base.
- The insert sleeve features a captive seal that positively isolates the barrier pipe aluminium layer from the drinking water.
- Ground contaminants and pipe aluminium barrier layer are isolated from water supply.
- Simple all weather installation and use.

Note: Protecta-Line gunmetal ferrule off-takes should always be used in preference to PE electrofusion saddles.

25mm and 32mm Self Tapping Ferrule Off-Takes



Fitting includes 1 x PE x Female Iron BSP Tapered End Connector.

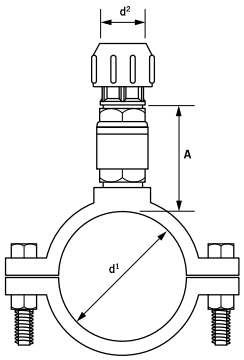


Size (mm) d¹ x d²	A (mm)	Weight (kg)	Code
63 x 25	95	0.92	44 762 412
90 x 25	95	1.07	44 762 393
110 x 25	95	1.10	44 762 394
125 x 25	95	1.19	44 762 395
160 x 25	95	1.28	44 762 397
180 x 25	95	1.35	44 762 398
225 x 25	95	1.90	44 762 400
250 x 25	95	2.30	44 762 401
280 x 25	95	2.50	44 762 402
315 x 25	95	3.20	44 762 403
355 x 25	95	3.30	44 762 404
63 x 32	100	1.24	44 762 415
90 x 32	100	1.31	44 762 417
110 x 32	100	1.37	44 762 418
125 x 32	100	1.42	44 762 419
160 x 32	100	1.52	44 762 421
180 x 32	100	1.60	44 762 422
225 x 32	100	2.10	44 762 424
250 x 32	100	2.50	44 762 425
280 x 32	100	2.70	44 762 426
315 x 32	100	3.40	44 762 427
355 x 32	100	3.50	44 762 428

63mm Ferrule Off-Takes



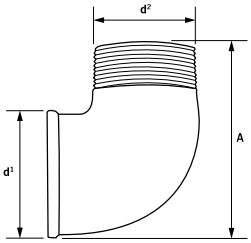
Fitting includes 1 x 63mm PE x Male Iron BSP Tapered End Connector.



Size (mm) d¹ x d²	A (mm)	Weight (kg)	Code
90 x 63	155	3.38	44 762 459
110 x 63	155	3.77	44 762 460
125 x 63	155	3.79	44 762 461
160 x 63	155	3.73	44 762 463
180 x 63	155	3.88	44 762 464
225 x 63	155	5.01	44 762 466
250 x 63	155	5.12	44 762 467
280 x 63	155	5.29	44 762 468
315 x 63	155	4.97	44 762 469
355 x 63	155	6.12	44 762 470

90° Gunmetal Elbow, FI/MI (for use with 63mm Ferrule Off-Takes)





Size (mm x inch) d¹ x d²	A (mm)	Weight (kg)	Code
63 x 2	72	0.89	44 996 050

Installation Instructions for 25mm and 32mm Protecta-Line Gunmetal Self-Tapping Ferrule Straps

For use on GPS Protecta-Line pipe only.

Gloves and safety glasses must be worn during the whole assembly process.

The ferrule strap cutter includes a sealing sleeve that prevents water contact with the aluminium barrier layer.

1. Fit the Protecta-Line end connector compression fitting to the ferrule strap male outlet, employing sufficient PTFE tape to ensure a good seal. (It is advisable to rotate the ferrule outlet having first slackened the securing collar).



2. Clean the surface of the Protecta-Line main where the self-tapping ferrule strap is to be installed, avoiding areas which appear damaged.



3. Ensuring that the sealing "O" ring is in place under the upper ferrule strap (and taking care not to damage this on the protruding sleeve), fit the self-tapping ferrule squarely around the main and tighten the two strap bolts evenly and symmetrically.



4. Fit the Protecta-Line service pipe into the compression fitting on the outlet, as described in the separate instructions. After aligning the outlet to the desired position, tighten the securing collar.



5. Remove the plug from the top of the ferrule cap, and, using an 8 or 11mm (depending on service pipe size) square section key, wind down the cutter assembly all the way until hard and solid resistance is felt. Note that before the solid resistance is felt there may be a temporary drop in resistance, followed by an increase as the sleeve around the cutter enters the main.



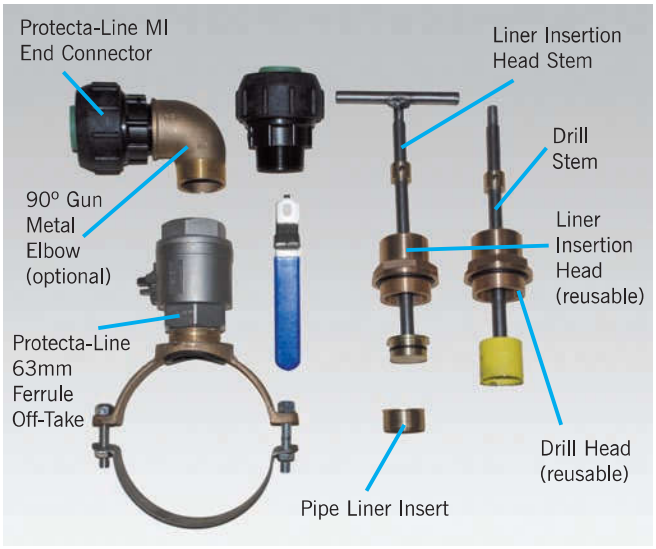
6. Withdraw the cutter all the way up to the top of the stem, employing a final counter-clockwise torque of approximately 15Nm to ensure a good seal and replace the plug. Some leakage through the plughole is normal before the cutter has been fully unscrewed.



Caution: Do not remove cutter or sleeve from this product before use.

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Installation Instructions for 63mm Protecta-Line Gunmetal Ferrule Off-Takes



Accessory	Code
* Protecta-Line 2" Drill Head	44 794 003
**Protecta-Line 2" Liner Head	44 794 004
***Protecta-Line Drill/Liner Head O-Ring Kit	44 996 062

*Drill Head setting: fix stop at 230mm from base to drill tip
**Drill Liner setting: fix stop at 180mm from stop base to bottom of tip on liner head
*** Includes four O-rings for replacement in either Drill Head or Liner Head

1. Ensuring that the sealing O-ring is in place under the upper ferrule strap, fit the ferrule squarely around the main in the required position and tighten the two strap bolts evenly and symmetrically. Ensure that ball valve operates correctly before fitting.



2. After assembling the drill stem with a 48mm hole cutter, withdraw the drill stem fully into the drill head.



3. Ensure that the ball valve is in the fully open position (anti-clockwise rotation). Fit the drill head to the outlet of the ferrule.



4. Attach the chuck of an electric drill to the top of the drill stem (ensuring that the power supply is disconnected). Re-connect the power supply to the electric drill and operate the drill with downward pressure until the stop on the drill stem contacts the top of the drill head.



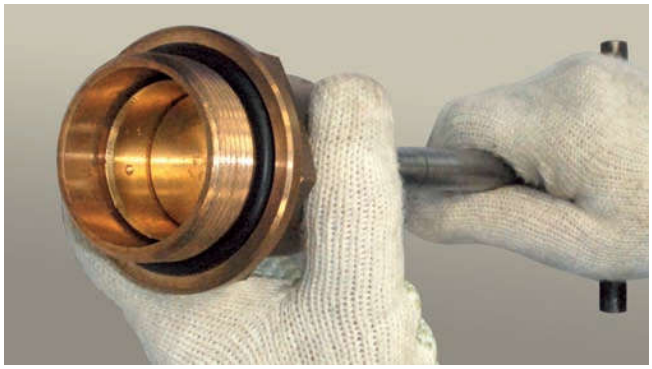
5. Disconnect the power supply to the electric drill and remove the drill from the drill stem. Withdraw the drill stem, until the cutter is fully returned into the drill head and fully close the ball valve (clockwise rotation) before removing the drill head from the outlet of the ferrule.



6. Position the liner insert onto the carrier of the liner insertion head.



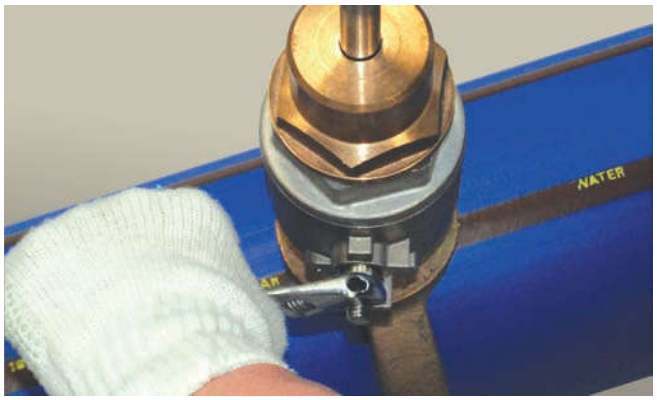
7. Fully withdraw the carrier and pipe liner insert into the liner insert head (indicated by the lower depth mark on the stem).



8. Fit the liner insertion head to the outlet of the ferrule. Open the ball valve (anti-clockwise rotation) and fully insert the liner insert, by applying downward pressure on the tee-bar handle on the shaft of the liner insertion head until the stop on the liner insertion head stem contacts the top of the liner insertion head.



9. Withdraw the liner insertion head stem until the carrier is fully withdrawn into the liner insert head (indicated by the lower depth mark on the stem). Close the ball valve (clockwise rotation) and remove the liner insertion head.



10. The communication pipe can now be fitted to the outlet of the ferrule utilising a Protecta-Line 63mm x 2" MI mechanical end connector, either directly to the ferrule outlet (side connection) or in conjunction with 2" MI/FI 90° elbow (top connection).



11. Open the ball valve (anti-clockwise rotation).

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Protecta-Line Fluid Compression Fittings

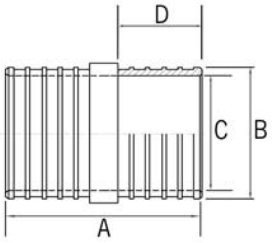
Protecta-Line fluid compression fittings are available for pipe sizes from 63mm to 180mm, to suit the SDR and PE class employed. The fittings comprise of a shell, or one or more half-shells, made from epoxy coated steel featuring an integral inner copper membrane. A simple pipe support liner is provided, again made from Rilsan coated steel. Fluid Compression Fittings are available as Couplers, Repair Couplers, Reducers, 90° Elbows, 45° Elbows, Equal Tees, Stub Flanges, Flanged Branch Tees and Duck Foot Bends. No pipe preparation or subsequent joint wrapping is required.

- Easy all weather installation.
- 100% barrier protection without wrapping.
- WIS 4-24-01 Type 1 approved fitting (fully end load bearing).
- PE core pipe swages closely into the insert liner grooves to give a perfect seal without the need for any elastomeric seals.
- Compatible with pipe rating.
- Uses environmentally friendly Protecta-Line hydraulic fluid.
- Outer shell and sleeve are Rilsan and epoxy coated for maximum corrosion resistance.

Couplers

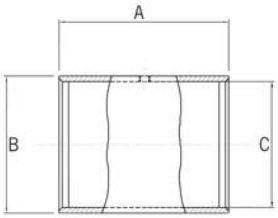


Consists of 1 x liner and 1 x standard full sized shell. Weight shown is for complete product.



Full Shell Dimensions

Size (mm)	A (mm)	B (mm)	C (mm)
63	102	84	66
90	136	111	94
110	161	133	114
125	180	196	130
160	200	184	166
180	230	207	188

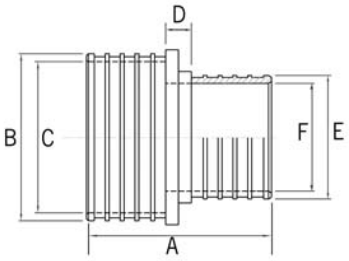


Size (mm)	SDR 11 Liner Dimensions						SDR 17 Liner Dimensions					
	A (mm)	B (mm)	C (mm)	D (mm)	Weight (kg)	SDR 11 Code	A (mm)	B (mm)	C (mm)	D (mm)	Weight (kg)	SDR 17 Code
63	82	50	43	36	1.3	44 110 311	-	-	-	-	-	-
90	116	71	62	53	2.7	44 100 313	-	-	-	-	-	-
110	141	87	74	60	4.8	44 100 314	-	-	-	-	-	-
125	-	-	-	-	-	-	160	107	95	70	6.2	44 109 315
160	-	-	-	-	-	-	180	138	122	80	11.2	44 109 317
180	-	-	-	-	-	-	210	155	137	95	15.5	44 109 318

Reducers

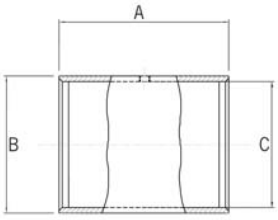


Consists of 1 x reducing liner and 2 x half sized shells. Weight shown is for complete product.



Half Shell Dimensions

Size (mm)	A (mm)	B (mm)	C (mm)
63	102	79	66
90	111	110	94
110	125	133	114
125	125	196	130
160	150	184	166
180	172	207	188

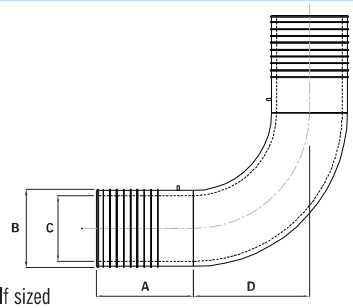


Size (mm)	SDR 11 Liner Dimensions								SDR 17 Liner Dimensions							
	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	Weight (kg)	SDR 11 Code	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	Weight (kg)	SDR 17 Code
90 x 63	260	71	62	81	50	43	4.3	44 441 459	-	-	-	-	-	-	-	-
110 x 90	290	87	75	100	71	62	7.3	44 441 483	-	-	-	-	-	-	-	-
125 x 110*	-	-	-	-	-	-	-	-	428	107	95	152	86	74	8.4	44 440 493
160 x 125	-	-	-	-	-	-	-	-	335	138	125	87	95	83	15.9	44 440 504
180 x 125	-	-	-	-	-	-	-	-	340	156	142	114	108	96	18.7	44 440 505

Please note that both ends of all reducers are for the stated SDR.
* 125mm SDR17 reducing down to 110mm SDR11.

90° Elbows

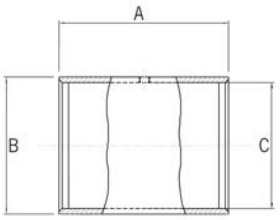




Consists of 1 x elbow liner and 2 x half sized shells. Weight shown is for complete product.

Half Shell Dimensions

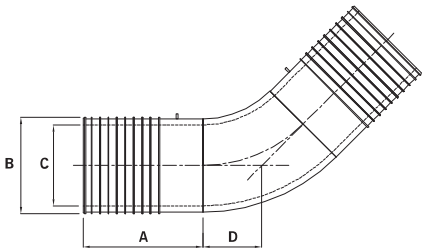
Size (mm)	A (mm)	B (mm)	C (mm)
63	102	79	66
90	111	110	94
110	125	133	114
125	125	196	130
160	150	184	166
180	172	207	188



Size (mm)	SDR 11 Liner Dimensions						SDR 17 Liner Dimensions					
	A (mm)	B (mm)	C (mm)	D (mm)	Weight (kg)	SDR 11 Code	A (mm)	B (mm)	C (mm)	D (mm)	Weight (kg)	SDR 17 Code
63	115	50	43	81	3.0	44 209 311	-	-	-	-	-	-
90	124	71	61	100	5.4	44 210 313	-	-	-	-	-	-
110	138	87	74	119	9.5	44 210 314	-	-	-	-	-	-
125	-	-	-	-	-	-	138	107	95	87	11.3	44 208 315
160	-	-	-	-	-	-	167	137	122	114	22.2	44 208 317
180	-	-	-	-	-	-	192	155	137	130	27.7	44 208 318

45° Elbows

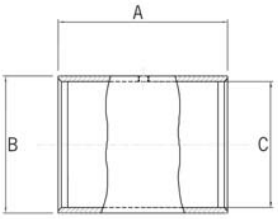




Consists of 1 x elbow liner and 2 x half sized shells. Weight shown is for complete product.

Half Shell Dimensions

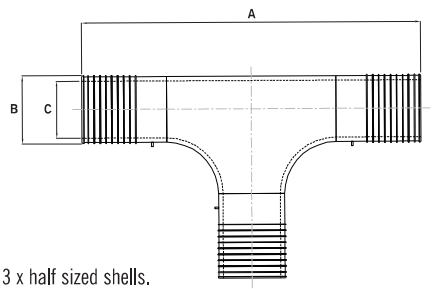
Size (mm)	A (mm)	B (mm)	C (mm)
63	102	79	66
90	111	110	94
110	125	133	114
125	125	196	130
160	150	184	166
180	172	207	188



Size (mm)	SDR 11 Liner Dimensions						SDR 17 Liner Dimensions					
	A (mm)	B (mm)	C (mm)	D (mm)	Weight (kg)	SDR 11 Code	A (mm)	B (mm)	C (mm)	D (mm)	Weight (kg)	SDR 17 Code
63	115	50	43	40	2.9	44 215 311	-	-	-	-	-	-
90	124	71	61	49	5.2	44 216 313	-	-	-	-	-	-
110	138	87	74	56	9.2	44 216 314	-	-	-	-	-	-
125	-	-	-	-	-	-	138	107	95	74	10.7	44 214 315
160	-	-	-	-	-	-	167	137	122	89	21.1	44 214 317
180	-	-	-	-	-	-	192	155	137	105	25.9	44 214 318

Equal Tees

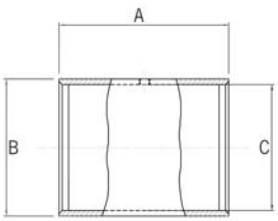




Consists of 1 x equal tee liner and 3 x half sized shells. Weight shown is for complete product.

Half Shell Dimensions

Size (mm)	A (mm)	B (mm)	C (mm)
63	102	79	66
90	111	110	94
110	125	133	114
125	125	196	130
160	150	184	166
180	172	207	188

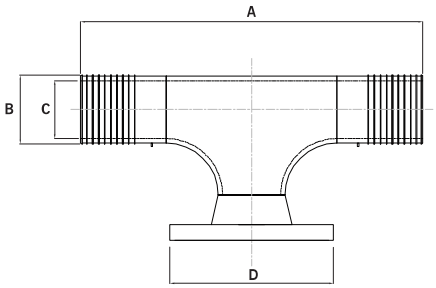


Size (mm)	SDR 11 Liner Dimensions					SDR 17 Liner Dimensions				
	A (mm)	B (mm)	C (mm)	Weight (kg)	SDR 11 Code	A (mm)	B (mm)	C (mm)	Weight (kg)	SDR 17 Code
63	362	50	43	5.3	44 221 311	-	-	-	-	-
90	404	71	61	9.5	44 222 313	-	-	-	-	-
110	452	87	74	15.9	44 222 314	-	-	-	-	-
125	-	-	-	-	-	500	107	95	19.6	44 220 315
160	-	-	-	-	-	596	137	122	36.7	44 220 317
180	-	-	-	-	-	634	155	137	47.2	44 220 318

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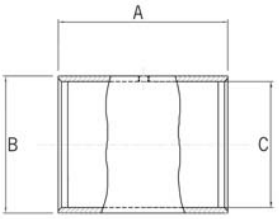
Flanged Branch Tees





Half Shell Dimensions

Size (mm)	A (mm)	B (mm)	C (mm)
90	111	110	94
110	125	133	114
125	125	196	130
160	150	184	166
180	172	207	188



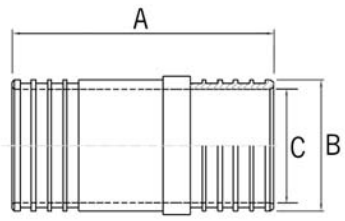
Consists of 1 x flanged branch tee liner and 2 x half sized shells. Weight shown is for complete product. (Bolt set not supplied).

Size (mm x PN)	Bolting	Torque (Nm+/- 10%)	PCD	SDR 11 Liner Dimensions						SDR 17 Liner Dimensions					
				A (mm)	B (mm)	C (mm)	D (mm)	Weight (kg)	SDR 11 Code	A (mm)	B (mm)	C (mm)	D (mm)	Weight (kg)	SDR 17 Code
90 x DN80 PN16	M16 X 8	70	160	404	71	62	200	11.0	44 351 313	-	-	-	-	-	-
110 x DN80 PN16	M16 X 8	70	160	448	86	74	200	NA	44 351 314	-	-	-	-	-	-
125 x DN80 PN16	M16 X 8	70	160	-	-	-	-	-	-	436	108	96	200	19.0	44 363 315
160 x DN80 PN16	M16 X 8	70	160	-	-	-	-	-	-	590	138	121	200	NA	44 363 317
180 x DN80 PN16	M16 X 8	70	160	-	-	-	-	-	-	634	156	142	200	42.5	44 363 318
90 x DN100 PN16	M16 X 8	80	180	404	71	62	220	11.9	44 352 313	-	-	-	-	-	-
110 x DN100 PN16	M16 X 8	80	180	448	86	74	220	NA	44 352 314	-	-	-	-	-	-
125 x DN100 PN16	M16 X 8	80	180	-	-	-	-	-	-	500	108	96	220	19.9	44 364 315
160 x DN100 PN16	M16 X 8	80	180	-	-	-	-	-	-	590	138	121	220	NA	44 364 317
180 x DN100 PN16	M16 X 8	80	180	-	-	-	-	-	-	634	156	142	220	41.5	44 364 318
160 x DN150 PN16	M20 X 8	120	240	-	-	-	-	-	-	590	138	121	285	NA	44 365 317
180 x DN150 PN16	M20 X 8	120	240	-	-	-	-	-	-	634	156	142	285	43.9	44 365 318

The information given for bolting torque values are for metal to metal connections. Drilled to BS EN 1092-1:2007 Table 13.

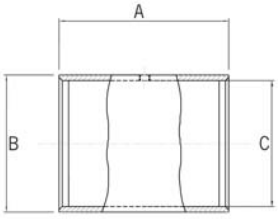
Repair Couplers





Repair Shell Dimensions

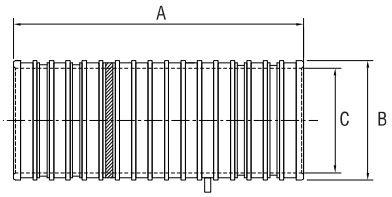
Size (mm)	A (mm)	B (mm)	C (mm)
63	145	79	66



Consists of 1 x repair coupler liner and 1 x repair coupler sized shell. Weight shown is for complete product.

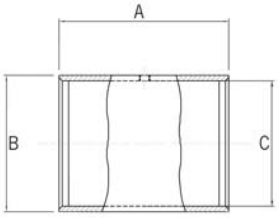
Size (mm)	SDR 11 Liner Dimensions					SDR 17 Liner Dimensions				
	A (mm)	B (mm)	C (mm)	Weight (kg)	SDR 11 Code	A (mm)	B (mm)	C (mm)	Weight (kg)	SDR 17 Code
63	126	50	43	1.7	44 246 311	-	-	-	-	-





Repair Half Shell Dimensions

Size (mm)	A (mm)	B (mm)	C (mm)
90	111	110	66
110	125	133	114
125	125	196	130
160	150	184	166
180	172	207	188



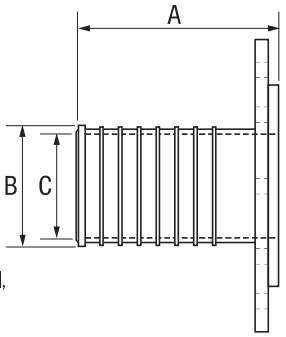
Consists of 1 x repair coupler liner and 2 x half sized shells.

Size (mm)	SDR 11 Liner Dimensions					SDR 17 Liner Dimensions				
	A (mm)	B (mm)	C (mm)	Weight (kg)	SDR 11 Code	A (mm)	B (mm)	C (mm)	Weight (kg)	SDR 17 Code
90	177	71	61	3.5	44 246 313	-	-	-	-	-
110	203	86	74	6.0	44 246 314	-	-	-	-	-
125	-	-	-	-	-	236	107	95	7.7	44 245 315
160	-	-	-	-	-	269	122	122	12.5	44 245 317
180	-	-	-	-	-	319	155	137	20.4	44 245 318

Stub Flange Adaptors

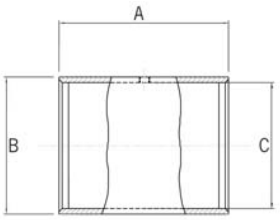


Consists of 1 x stub flange liner, 1 x half sized shell, backing ring and gasket. (Bolt set not supplied)



Half Shell Dimensions

Size (mm)	A (mm)	B (mm)	C (mm)
63	102	79	66
90	111	110	94
110	125	133	114
125	125	196	130
160	150	184	166
180	172	207	188



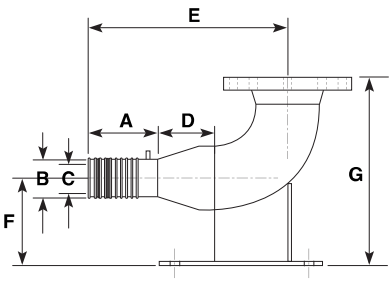
Size (mm x PN)	Bolting	Torque (Nm+/- 10%)	PCD	SDR 11 Liner Dimensions					SDR 17 Liner Dimensions				
				A (mm)	B (mm)	C (mm)	Weight (kg)	SDR 11 Code	A (mm)	B (mm)	C (mm)	Weight (kg)	SDR 17 Code
63 x DN50 PN16	M16 X 4	60	125	115	50	43	3.1	44 227 311	-	-	-	-	-
63 x DN80 PN16	M16 X 8	70	160	115	50	43	3.4	44 228 311	-	-	-	-	-
90 x DN80 PN16	M16 X 8	70	160	124	71	62	6.0	44 228 313	-	-	-	-	-
110 x DN100 PN16	M16 X 8	80	180	138	87	75	8.9	44 228 314	-	-	-	-	-
125 x DN100 PN16	M16 X 8	80	180	-	-	-	-	-	138	108	96	10.9	44 226 315
160 x DN150 PN16	M20 X 8	120	240	-	-	-	-	-	167	138	125	17.9	44 226 317
180 x DN150 PN16	M20 X 8	120	240	-	-	-	-	-	192	156	142	21.9	44 226 318

The information given for bolting torque values are for metal to metal connections.
Drilled to BS EN 1092-1:2007 Table 13.

Duck Foot Bends

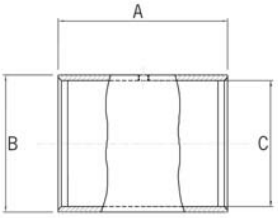


Consists of 1 x flanged bend, 1 x half sized shell and gasket. (Bolt set not supplied)



Half Shell Dimensions

Size (mm)	A (mm)	B (mm)	C (mm)
63	102	79	66
90	111	110	94
110	125	133	114
125	125	196	130
160	150	184	166
180	172	207	188



Size (mm x PN)	Bolting	Torque (Nm+/- 10%)	PCD	Weight (kg)	SDR 11 Liner Dimensions								SDR 17 Liner Dimensions							
					A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	SDR 11 Code	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	SDR 17 Code
63 x DN80 PN16	M16 x 8	70	160	9.0	115	50	43	89	320	135	300	44 384 459	-	-	-	-	-	-	-	-
90 x DN80 PN16	M16 x 8	70	160	9.0	124	71	62	89	320	135	300	44 384 313	-	-	-	-	-	-	-	-
110 x DN80 PN16	M16 x 8	70	160	9.5	138	87	75	N/A	240	135	300	44 384 483	-	-	-	-	-	-	-	-
125 x DN80 PN16	M16 x 8	70	160	13.5	-	-		-	-	-	-	-	138	108	96	N/A	245	135	300	44 385 484
160 x DN80 PN16	M16 x 8	70	160	-	-	-		-	-	-	-	-	167	138	125	102	370	135	300	44 385 486
180 x DN80 PN16	M16 x 8	70	160	16.5	-	-		-	-	-	-	-	192	156	142	127	420	135	300	44 385 487

The information given for Bolting Torque Values are for metal to metal connections.
Drilled to BS EN 1092-1:2007 Table 13.

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Accessories



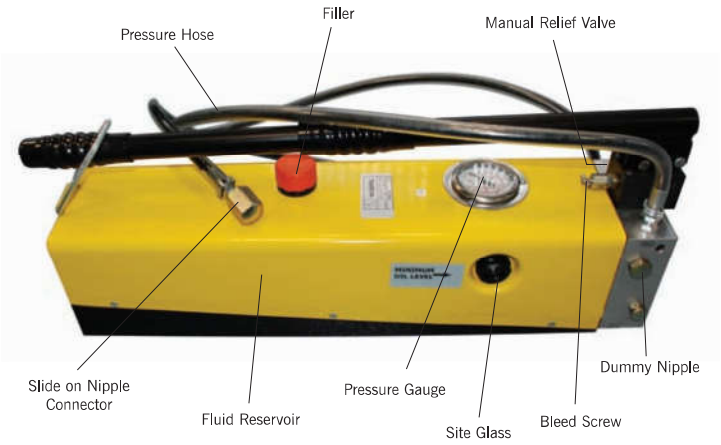
Hydraulic pump available for hire through the following outlets:
MCA Hire Services
www.mcahire.com
Plant & Site Services Ltd.
www.psshire.com

Accessory	Weight (kg)	Code
Aluminium wrapping tape (45m long x 50mm wide).	0.5	44 996 008
Hydraulic Pump	12.0	44 996 009
Protecta-Line hydraulic fluid (5 litres)	5.0	44 996 010

Only Protecta-Line hydraulic fluid should be used with the pump as any other type of fluid can damage it.

Installation Instructions for Protecta-Line Fluid Compression Fittings - Pressurising the Joint

Gloves and safety glasses must be worn during the whole assembly process. Residual pressure within the fitting may be released while removing the connector, causing a momentary spurt of fluid.



1. A calibrated hydraulic pump must be used for all pressurisation of the Protecta-Line fluid compression fitting range. The pump must be filled with Protecta-Line hydraulic fluid.

2. Slide the nipple connector over the nipple on the Protecta-Line fluid compression fitting. Please note that the nipple connector is a slide fit over the nipple, not a push fit. An alternative nipple connector, secured in position by a knurled nut may be fitted. Care should be taken not to overtighten the connector and damage the seal.

3. Gently raise and lower the pump handle, watching the pressure gauge. As the pressure gauge approaches 260 bar, the pressure breaker valve will activate. This indicates that the required pressure has been achieved. Wait 10 seconds and repeat the pumping action until the pressure breaker valve activates. Wait 10 seconds and repeat again. The pressure gauge should now show a steady reading of approximately 260 bar. The joint is now made.

4. **The pressure must be released before removing the slide-on fitting connector from the Protecta-Line Fluid Compression shell.** Depress the manual relief valve on the pump for 2 seconds then slide off the nipple connector from the Protecta-Line fluid compression fitting.

5. If for any reason the nipple needs to be removed, the pressure in the fitting **must** be released first by using the pressure release tool, i.e. depressing the centre part of the fitting nipple. (N.B. Care should be taken as a momentary spurt of fluid may occur).

6. Check that the marks on the pipe still line up with the end of the fitting.

7. The joint is now complete.

Fluid Quantities

Approximate fluid quantities to pressure the fitting shell (full shell):

Shell Size	Fluid Quantity (cc)	Number of Shells/Litre
63	40	25 Approx
90	90	11 Approx
110	150	6 Approx
125	190	5 Approx
160	320	3 Approx
180	375	2 Approx

Only Protecta-Line hydraulic fluid should be used with the pump as any other type of fluid can damage it.

Alternative Nipple Connector

1. An alternative style nipple connector is fitted to some hydraulic pumps.

2. The nipple connector slides over the nipple of the Protecta-Line Fluid Compression fitting and is secured in position by screwing the knurled nut at the top. Care should be taken not to overtighten the connector and damage the seal.

3. After the pressure is released (Stage 4) the nipple connector is removed by first unscrewing the knurled nut at the top of the connector sufficiently to slide the connector off of the nipple.



How to Bleed the Pump

Gloves and safety glasses must be worn during the whole assembly process.



Pumps fitted with a bleed screw



1. The bleed screw is positioned below the pump handle at the rear of the block.
2. Park the nipple connector onto the dummy nipple positioned on the pump block.
3. Raise handle to fullest extent.
4. Turn bleed screw anti-clockwise approximately one quarter of a turn.
5. Lower handle applying gentle pressure, oil will dribble out of the bleed valve.
6. Once the handle has reached the end of its stroke turn the bleed valve clockwise until solid.
7. Wipe any excess oil from around the bleed valve.
8. Check for pressurisation and repeat the bleed operation sequence if necessary.

   Note: Residual pressure within the system may be released while removing the nipple connector, causing a momentary spurt of fluid.

9. If unit still fails to pressurise after bleeding, return to supplier.

Pumps not fitted with a bleed screw

1. Park the nipple connector onto the dummy nipple positioned on the pump block.
2. Activate the manual relief valve and hold down.
3. Raise and lower the pump handle ten times, in each case achieving maximum stroke.
4. Release the manual relief valve.
5. Check for pressurisation and repeat bleed operation sequence if necessary.
6. Operate the manual relief valve and remove the nipple connector from the dummy nipple.

   Note: Residual pressure within the system may be released while removing the nipple connector, causing a momentary spurt of fluid.

7. If unit still fails to pressurise after bleeding, then return to supplier.

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Jointing Instructions for 63mm-180mm Protecta-Line Fluid Compression Fittings (Mains Pipes)

For use on GPS Protecta-Line pipe only.

Gloves and safety glasses must be worn during the whole assembly process.

1. Inspect the end of the pipes to be joined for any obstruction, removing any large burrs or ridges. Check the pipe ends are reasonably square.



2. Using a tape measure and a suitable marker pen mark the appropriate dimension "X" from the ends of the pipes to be joined.

63 - 47mm	110 - 71mm	160 - 91mm
90 - 64mm	125 - 81mm	180 - 106mm



3. Slide the outer shell over the pipe end (where there is evidence that the pipe has some degree of ovality then the pipe end should be re-rounded).
   Push the insert into the pipe end making sure that the pipe end is firmly against the shoulder of the insert.



For all fittings other than the coupler and repair coupler, the marking dimensions are as follows:

63 – 102mm	110 – 125mm	160 – 150mm
90 – 111mm	125 – 125mm	180 – 172mm

Note: The insert should be pushed into the pipe spigot until the stop is reached. The outer shell should be positioned so that one edge is aligned with the mark on the pipe and the other aligned with the end of the pipe. The spigots of stub flanges should be fully inserted into the pipe end upto the flange.

4. Connect the pipe and insert on to the free pipe end and push home fully, ensuring that both pipe spigot ends are in contact with the central stop of the insert.



5. Slide the outer shell over the assembly until the two marks on each end of the pipe are visible at each end of the outer shell.



6. The joint is now ready to be pressurised. Follow the pressurisation procedure.

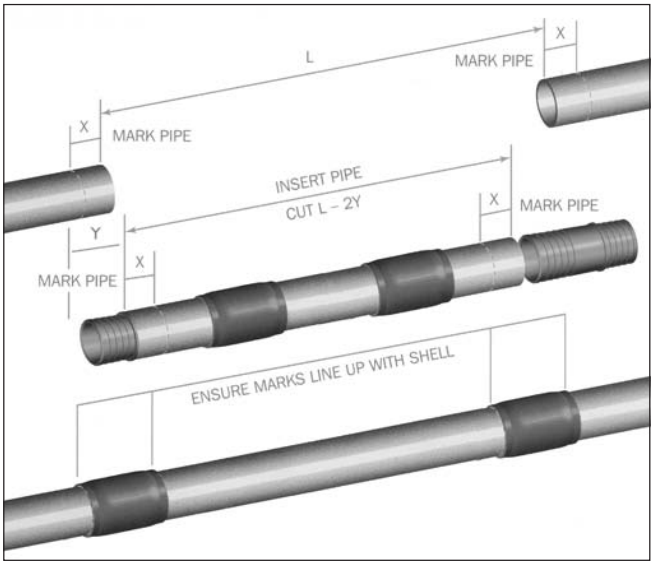




Jointing Instructions for Protecta-Line Fluid Compression Repair Fittings

63mm Repair Couplers

Gloves and safety glasses must be worn during the whole assembly process



Pipe Diameter	X	2Y	Min 'L'
63	47	108	400

- Remove damaged Protecta-Line pipe section. The length removed, L, must be at least as long as stated in the table.
- Mark pipe ends left in the ground 'X' mm from ends using the repair gauge and marker pen.
- Cut length of new Protecta-Line pipe L - 2Y long and also mark 'X' mm in from each end. Note Y = insert liner spigot shorter length + shoulder.
- Slide 2 repair shells over the new pipe section and push the longer spigots of the associated insert liners into both ends of this section.
- Position the new pipe section in line with the existing pipe in the ground and move both the insert liners outwards until their shoulders are hard against the cut ends of the existing pipe.
- Slide the two repair shells outwards so that the four marks previously made line up with the ends of the shells.
- Both repair fittings are now ready to be pressurised as per above.

90–180mm Repair Couplers

Gloves and Safety Glasses must be worn during the whole assembly process



1. Cut out the damaged pipe section. The minimum length of the cut is shown in the table below.



2. The pipe should be internally deburred with a polyethylene deburring tool.



3. Where there is evidence that the pipe spigot has some degree of ovality, then the pipe spigot should be re-rounded.



4. From an undamaged pipe length cut out a repair piece. The length of the repair piece should be equal to the length of the cut out less the dimension 'Y' (see table below).



5. Clearly mark the penetration depth (dimension 'Z') on spigot ends (see table below).



6. Clearly mark dimensions on the new pipe.



7. Push the repair coupler inserts into the pipe with the short end of the repair couplers protruding. Ensure that the pipe ends are firmly against the stops on the inserts. Slide the repair coupler half shells on to the new pipe.



8. Slide the remaining half shells onto the pipe where the repair coupler inserts are to be fitted and insert the repair section with inserts into the pipeline. Slide the repair couplers and shells into position.



9. Ensure that the shells line up with the marks on the pipe. The joint is now ready to be pressurised. Please follow pressurisation procedure.

Pipe Diameter	Cut out Length (Min)	Dimension Y	Dimension Z
90	390	128	66
110	440	145	75
125	525	168	85
160	570	182	92
180	690	235	117

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Protecta-Line Electrofusion Fittings

Protecta-Line Electrofusion Fittings are supplied for use with pipe sizes in sizes 90mm to 355m.

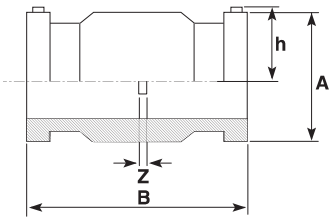
Each fitting has a barcode to allow Electrofusion Control Units (ECU's) to read information such as Product Type and Size, Fusion Time and Cooling Time to ensure quick and easy installation. Fittings can be jointed either in manual mode or by scanning their integral barcode label.

- Easy and rapid installation.
- Can be carried out in a trench, especially useful for repairs or tie-ins.
- Proven barrier protection against contamination.
- No risk of joint corrosion.
- No contact between the pipe's protective aluminium layer and drinking water.

Couplers - 39.5 Volt


90mm-180mm

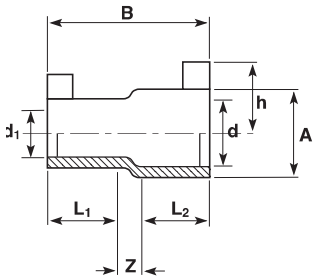

225mm-355mm



Size (mm)	A (mm)	B (mm)	h (mm)	Z (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)	Code
90	119	127	74	3	0.60	120	8	PL100313
110	141.5	135	82	3	0.80	160	10	PL100314
125	158.5	147	92	3	1.10	180	12	PL100315
160	198	164	113	3	1.60	300	14	PL100317
180	221	167	123	3	2.10	400	16	PL100318
225	278	220	145	8	3.90	500	18	PL100320
250	310	224	155	8	5.10	600	20	PL100321
280	341	256	175	8	7.10	700	28	PL100322
315	389	291	192	8	9.50	980	30	PL100323
355	405	295	218	4	9.00	980	28	PL100324

Reducer - 39.5 Volt

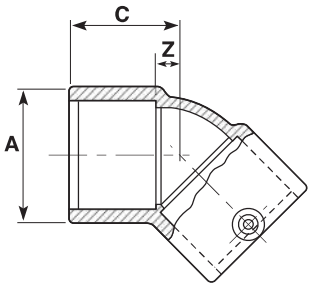




Size (mm) d x d_1	A (mm)	B (mm)	L_1 (mm)	L_2 (mm)	h (mm)	Z (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)	Code
110 x 90	136	189	72	85	83	32	0.9	200	12	PL402483
125 x 90	155	210	67	90	91	53	1.2	180	14	PL402484
125 x 110	156	201	73.5	95	93	32.5	1.3	240	14	PL402493
160 x 110	195	254	72	101	114	81	2.2	300	14	PL402495
180 x 125	214	276	83	110	124	83	2.6	300	16	PL402505

45° Elbows - 39.5 Volt

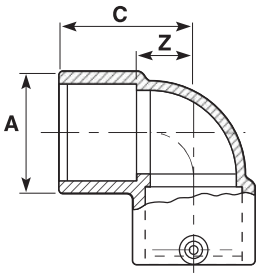




Size (mm)	A (mm)	C (mm)	Z (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)	Code
90	115	89	20	0.8	120	10	PL105313
110	136	97	27	1.0	160	10	PL105314
125	156	105	30	1.4	180	12	PL105315
160	198	120	36	2.6	300	16	PL105317
180	223	128	40	3.4	400	18	PL105318

90° Elbows - 39.5 Volt

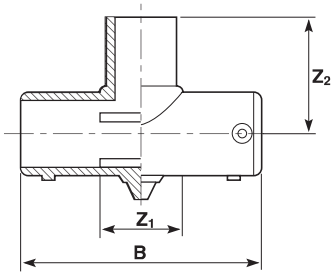




Size (mm)	A (mm)	C (mm)	Z (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)	Code
90	114.5	118	49	0.9	120	10	PL104313
110	137	130	60	1.3	160	10	PL104314
125	155.5	143	67	1.8	180	12	PL104315
160	199	171	87	2.6	300	16	PL104317
180	222	185	98	4.4	400	18	PL104317

Equal Tees - 39.5 Volt



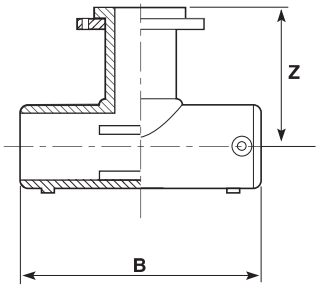


Size (mm)	B (mm)	Z_1 (mm)	Z_2 (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)	Code
90	211	83.5	150	1.1	120	10	PL408313
110	240	108	171	1.7	160	10	PL408314
125	280	119	177	2.3	240	12	PL408315
160	314	150	227	4.4	260	14	PL408317
180	365	161	225	5.8	440	20	PL408318

Supplied factory-wrapped to ensure complete barrier performance.

Flanged Branch Tees - 39.5 Volt





Size (mm)	B (mm)	Z (mm)	Weight (kg)	Fusion Time (Sec)	Cooling Time (mins)	Code
90 x 80 PN16	211	296	2.6	12	10	PL301313
110 x 80 PN16	240	515	3.9	160	10	PL301314
125 x 80 PN16	280	532	4.7	240	12	PL301315
160 x 80 PN16	314	615	6.7	260	14	PL301317
180 x 80 PN16	365	834	7.9	440	20	PL301318
90 x 100 PN16	211	534	3.2	100	10	PL302313
110 x 100 PN16	240	310	3.9	160	10	PL302314
125 x 100 PN16	280	301	4.3	240	12	PL302315
160 x 100 PN16	314	650	7.6	260	14	PL302317
180 x 100 PN16	365	671	9.2	440	20	PL302318
160 x 150 PN16	314	410	8.5	260	14	PL303317
180 x 150 PN16	365	415	5.2	440	20	PL303318

Supplied factory-wrapped to ensure complete barrier performance.

Flange Adaptor Kits



Adaptor Kit comprises of:-

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

Size (mm)	SDR 11 Code	SDR 17 Code
90 x 80 PN16	PL251313	
110 x 100 PN16	PL251314	
125 x 100 PN16		PL250315
160 x 150 PN16		PL250317
180 x 150 PN16		PL250318
225 x 200 PN16		PL250320
250 x 200 PN16		PL250534
250 x 250 PN16		PL250321
280 x 250 PN16		PL250542
315 x 250 PN16		PL250543
315 x 300 PN16		PL250323
355 x 300 PN16		PL250547
355 x 350 PN16		PL250324

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Procedures for Butt-Fusion and Electrofusion of Protecta-Line Pipelines of 90mm and above in Diameter

When made in accordance with GPS PE Pipe Systems' recommended procedures, butt-fusion and electrofusion joints of the Protecta-Line system have been independently shown to meet the requirements of WIS 4-32-19 without any need for subsequent wrapping. This does not exempt installers from local regulations and the local Water Company preferences must be adhered to.

Standard butt-fusion and electrofusion procedures must be adhered to, but please note the following additional points:.

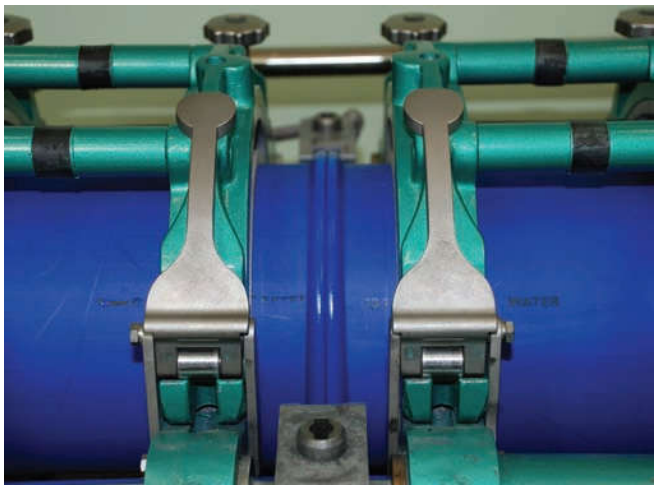
Butt-Fusion

Where this is permitted by the local water company, it is important that the outer PE and aluminium layers are removed far enough back, using the Protecta-Line Surprep tool (see next pages), to prevent the aluminium from coming into contact with the butt-fusion machine trimmer or heater plates.

In addition, the outer PE and aluminium layers should be removed far enough back to permit normal debeading of the completed joint for normal quality control purposes.

It is recommended that the layers should be removed to a length equal to the width of the debeading tool on the end of each pipe. This should be increased by 50% when carrying out dummy weld procedures prior to final jointing.

Butt-fusion clamps should be checked for suitability before commencing work, particularly in larger sizes. Care should be taken not to damage the outer layers of Protecta-Line pipe when clamping it in the butt-fusion machine. In the case of some machines this may necessitate gently radiusing the edges of the jaw shutlines.



Electrofusion

It is essential that the Protecta-Line pipe is properly prepared prior to electrofusion jointing. It is necessary first to remove the outer PE layer, aluminium layer and any residual adhesive layer material.

Note: It is potentially dangerous to carry out electrofusion jointing where the aluminium layer is still in place.

The Protecta-Line Surprep Scraper must be used for pipe end preparation, as it not only removes the outer layers, but it also prepares the core pipe for electrofusion jointing.

Electrofusion clamps should be checked for suitability before commencing work, particularly in larger sizes. All electrofusion joint assemblies must be held in clamps throughout the fusion and cooling periods.

Protecta-Line Jointing End Preparation for Electrofusion Procedures

Pipe Size (mm)	Length (B) (mm)	Register (Z) (mm)	Min preparation insertion depth (mm)	Max preparation depth (mm)
90	127	3	62	67
110	135	3	66	71
125	147	3	72	77
160	164	3	81	86
180	167	3	82	87
225	220	8	106	111
250	224	8	108	113
280	256	8	124	129
315	291	8	142	147
355	295	8	144	149

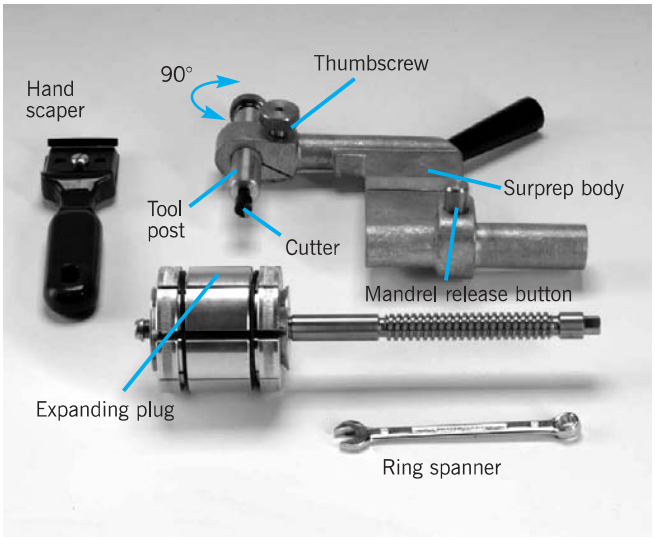
Aluminium Foil Wrapping Lengths - Foil width 50mm

Size (mm)	E/F fitting length (mm)	Amount of foil required (metres)	Joints per roll
25	76	0.38	132
32	83	0.69	72
63	111	2.04	25
90	130	3.37	15
110	135	4.46	11
125	150	5.06	10
160	165	7.41	7
180	165	8.22	6
225	220	14.05	4
250	225	15.71	3
280	260	19.58	3
315	290	25.42	2
355	300	27.12	2

Only Protecta-Line fittings shall be used with Protecta-Line pipe. The use of alternative fittings will have the following effects on your Protecta-Line system:

- Invalidation of WRAS approval and manufacturers system performance warranty.
- Compromised permeation resistance (causing non-compliance with WIS 4-32-19 and possible risks to health).
- Danger of pipe-layer delamination, compromising system performance integrity and risking pipe bursts.
- It would be illegal to install non-WRAS approved fittings.

Procedure for Using the Protecta-Line Surprep Scraper (90mm-180mm)



The Protecta-Line Surprep Kit has been designed to allow the correct scraping of Protecta-Line barrier pipe prior to electrofusion jointing.

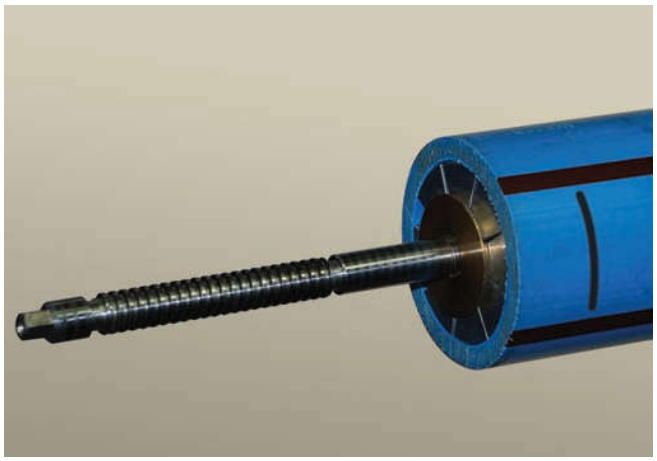
Code	90mm	110mm	125mm	160mm	180mm
01-07-081	●	●			
01-07-083			●	●	●

To order, please contact Caldervale directly on 01924 469571 or sales@caldertech.co.uk

The Surprep Kit is available for hire through MCA Hire Services www.mcahire.com and Plant & Site Services Ltd www.psshire.com

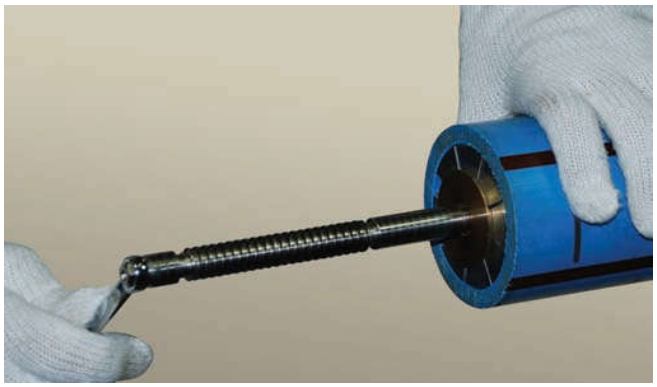


1. Measure the insertion depth of the electrofusion fitting to be used. Place a mark on both pipes to show the position where the edge of the fitting will be.
2. Clamp the pipe to be prepared taking care to avoid damage to the pipe's outer covering.
3. Separate the mandrel from the body of the Protecta-Line Surprep Scraper.

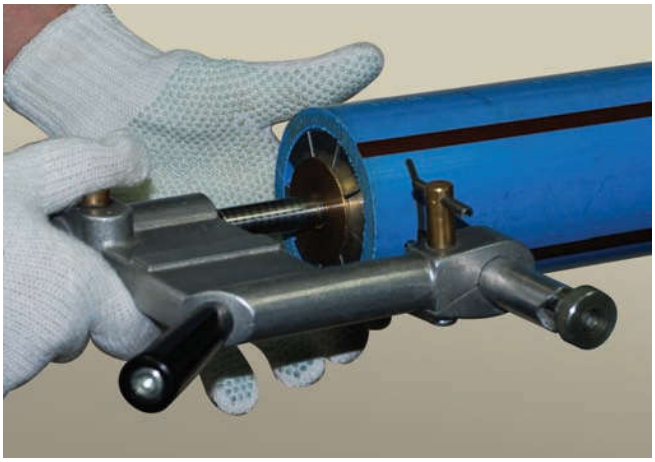


4. Hold the expanding plug and rotate the mandrel anti-clockwise until the plug is a light interference fit in the pipe bore.
5. Push into pipe until edge of plug is level with edge of pipe. Expand plug further using the 10mm ring spanner.

   Do not over-tighten in order to avoid pipe distortion.



6. Slide the body of the Protecta-Line Surprep Scraper onto the mandrel, depress the release button and position the cutter close to the edge of the pipe.



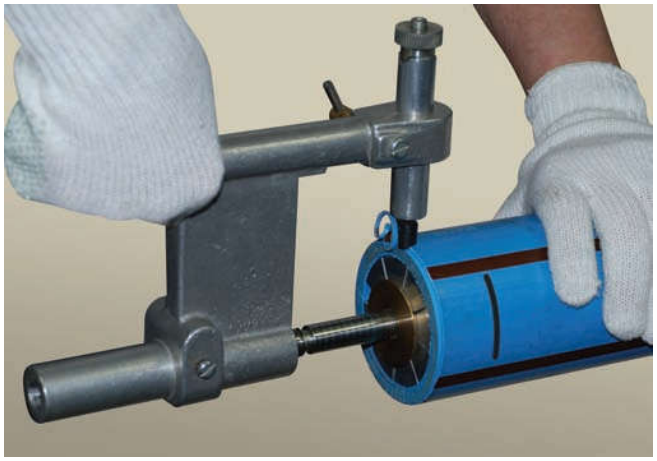
Note: Protecta-Line Surprep Scraper cuts in an anti-clockwise direction, beginning at the end of the pipe.

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7. Rotate the knob on the top of the tool post through 90°, against the spring tension, such that the cutter is in its raised position.



8. Loosen the body thumbscrew and position the cutter shoe on the edge of the pipe. Tighten the thumbscrew.



9. Rotate the knob on top of the post through 90° so that spring pressure is applied to the cutter.
10. Rotate the tool anti-clockwise in a smooth continuous motion to remove the outer layers in a continuous strip.
11. Stop cutting when the socket depth mark is reached.



12. Rotate the knob on top of the tool post so that the spring pressure is released.
13. Use the hand scraper to remove the peeled strip from the pipe.

    Caution: Do not attempt to break the peeled strip by pulling with bare hands, it has a sharp edge!

    Remove the tool in the reverse order of assembly (steps 3-6).

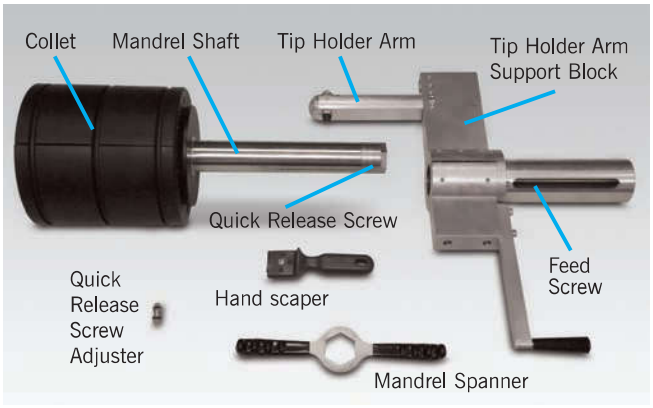


14. Inspect the prepared surface to ensure:
    i) All of the metallic layer has been removed.
    ii) All of the adhesive which bonds the metallic layer to the blue core has been removed.
15. If, for any reason, the prepared surface is not a uniform blue colour all over, use the hand scraper to complete the preparation process.

    Never attempt a second pass with the Protecta-Line Surprep Scraper.

When made in accordance with GPS PE Pipe Systems' recommended procedures, butt-fusion and electrofusion joints of the Protecta-Line system have been independently shown to meet the requirements of WIS 4-32-19 without any need for subsequent wrapping. This does not exempt installers from local regulations and the local Water Company preferences must be adhered to.

Procedure for Using the Large Diameter Protecta-Line Scraper (above 180mm)



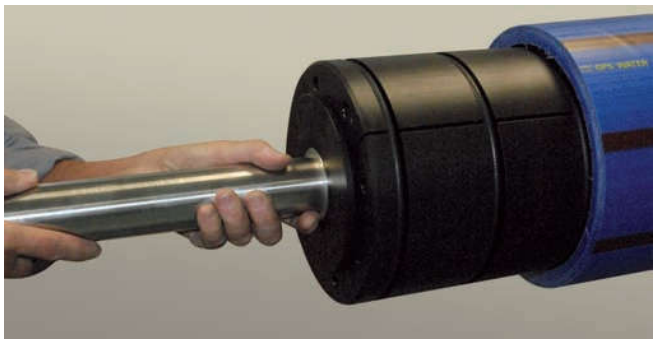
	225mm	250mm	280mm	315mm	355mm
Pipe insert collet					
01-07-255	●				
01-07-256		●			
01-07-257			●		
01-07-258				●	
01-07-259					●
Rotary tool c/w mandrill shaft*					
01-07-251	●	●	●	●	●

* Includes 2 collet expanding cones

To order, please contact Caldervale directly on 01924 469571 or sales@caldertech.co.uk

The Large Diameter Scraper is available for hire through MCA Hire Services www.mcahire.com and Plant & Site Services Ltd www.psshire.com

For Protecta-Line sizes above 180mm, the Surprep Scraper is a dedicated tool for each pipe size, with the cutter set to produce the required outside diameter. Adjustments must be done by a competent person and should not be carried out on site.

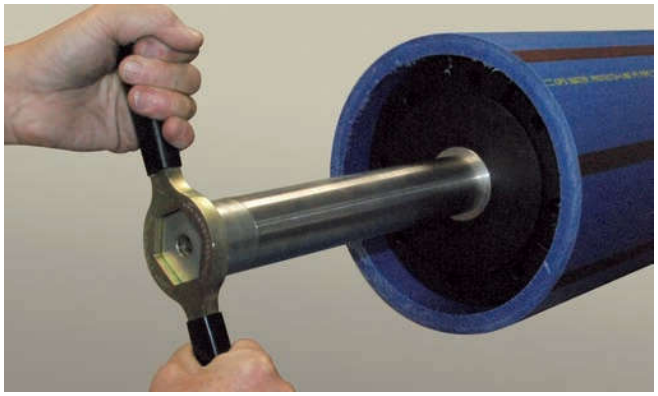


1. First mark the required length of pipe to be scraped (see table on page 23).

   Ensure that the correct size collet for the pipe to be scraped is fitted to the mandrel.

   Adjust the collet by twisting the mandrel shaft anti-clockwise until it achieves its smallest outside diameter.

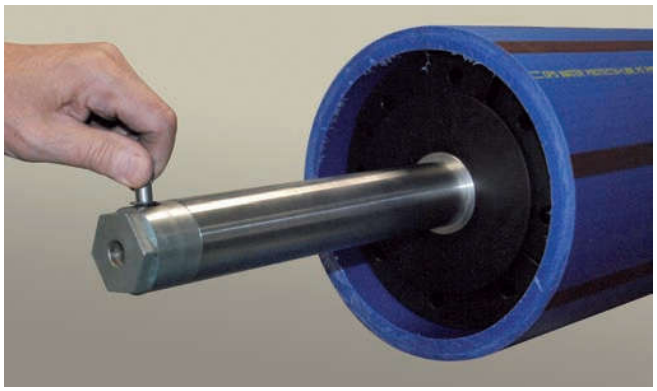
   Slide the collet into the bore of the pipe, allowing 20mm of pipe to show after the collet, to allow for the barrelling effect found at the end of the pipe.



2. Adjust the collet by twisting the mandrel shaft clockwise until the mandrel becomes secure in the bore of the pipe and tighten with the mandrel spanner.

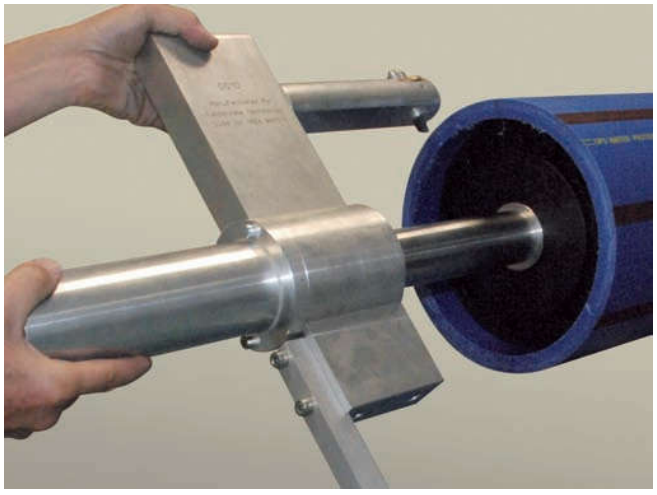
   To achieve the correct alignment parallel to the pipe bore, a joggling action in all directions is required.

   The collet also acts to re-round the pipe so check for gaps between the collet and the bore of the pipe.



3. Once the mandrel is secure and is parallel with the pipe bore, screw down the quick release screw to its full extent (about one and a half turns) using the adjuster, which is stored at the base of the tip arm support block.

   Note: Remember the position of the quick release screw.

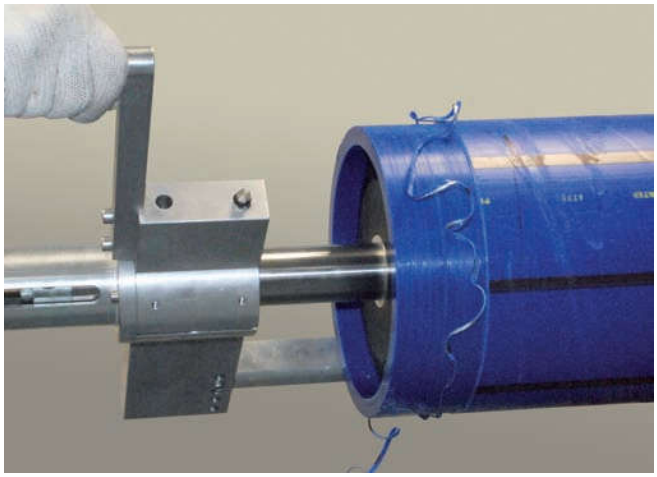


4. Ensure that the tip holder arm has been located in the hole corresponding to the pipe size in the tip holder support block.

   Locate the tool onto the mandrel shaft taking care not to damage the bore of the tool.

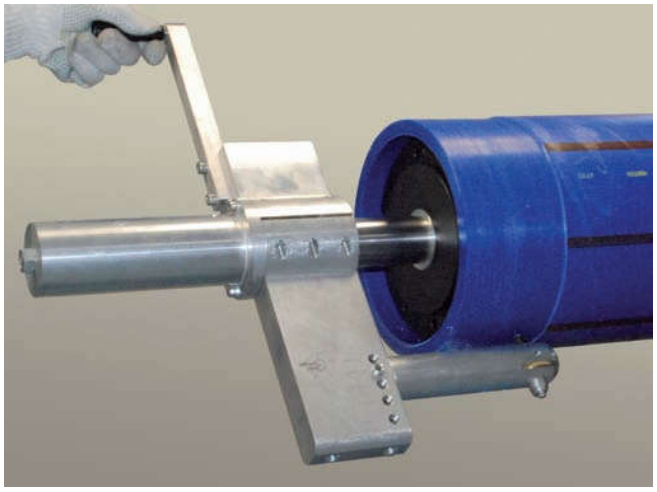
   Slowly slide the tool along the mandrel shaft using a twisting action, until the feed screw touches the quick release feed screw nut.

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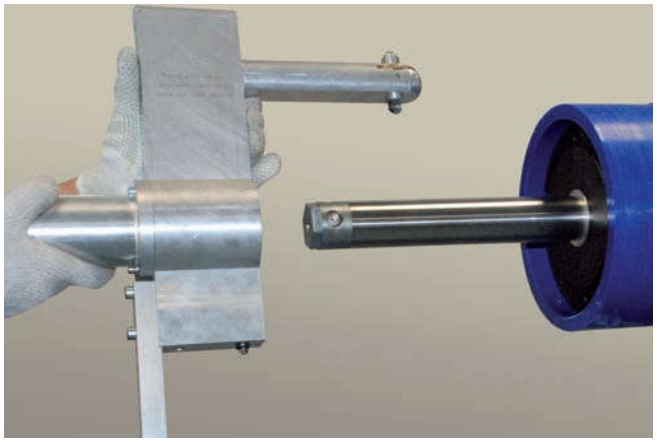
5. Taking care to avoid damaging the quick release nut and feed screw, rotate the tool in a clockwise direction with a slight force pushing forward.

   Once the feed screw has engaged with the quick release nut, it will now proceed to travel along the length of the mandrel shaft, removing the outer barrier layers and preparing the pipe for electrofusion jointing.



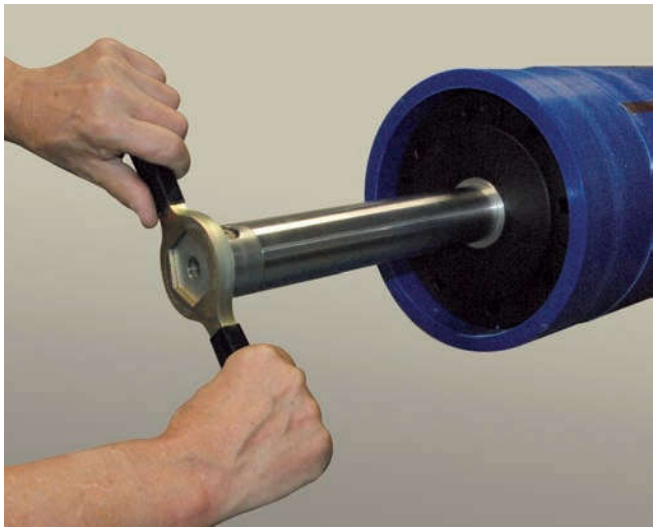
6. When the required length of pipe has been prepared, raise the quick release screw to its top position (about one and a half turns).

   The quick release screw can be accessed through the slot in the feed screw housing tube.

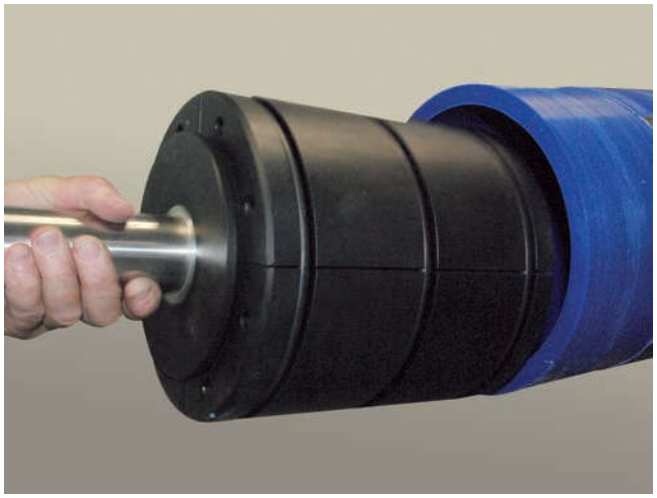


7. The tool can now be removed from the mandrel shaft.

   Note: The tool should be removed to a clean dry and safe area.



8. Loosen the collet using the mandrel spanner on the mandrel shaft in an anti-clockwise direction until free.



9. Remove the collet and mandrel from the pipe.

   The collet should be removed to a clean dry and safe area.

   If there are any areas of pipe that have not been prepared properly, then the hand scraper should be used to complete the preparation process.

   Note: The barrelling effect found at the end of the pipe may result in the barrier layers remaining on the pipe surface for a short distance in from the end of the pipe.

Repair Using Electrofusion (for Protecta-Line 225mm-355mm)

The pipe stops incorporated in the Protecta-Line or Durafuse couplers are shearable and have been provided for the specific purpose of using the fittings for making repairs or breaking into existing pipelines.

1. Cut out the damaged section of the Protecta-Line pipe at least four times the length of the electrofusion repair couplers and ensure the pipe ends are cut square.
2. Measure the distance between the exposed pipe ends and cut a length of plain PE100 pipe of the same diameter and wall thickness as the existing Protecta-Line pipe, equal to the measured distance less 10mm ensuring that the pipe ends are cut square
3. Clean the ends of the cut section of plain pipe, for a distance slightly greater than the overall length of the repair couplers.
4. Using the pipe end preparation tool, remove the entire surface of the pipe over the marked area, preferably as a continuous ribbon or strip. **Note: The use of mechanical end preparation tools is preferred as hand scraping requires great care and can be time-consuming especially on larger diameter pipes. It is essential that material is removed by scraping or peeling; scratching or abrading is not sufficient.**
5. Remove the pipe stops in the coupler. This can be most satisfactorily achieved by placing one end of a **thoroughly cleaned** short length of pipe into the coupler and striking the other end onto a hard surface. The pipe stops can also be removed using a sharp knife, but care must be taken not to damage the bore of the fitting.
6. Clean the ends of the Protecta-Line pipe for repair and prepare for electrofusion jointing using the Protecta-Line Suprep Scraper as described on pages 26 and 27.
7. Using a suitable marker pen, draw circumferential lines half the length of the repair coupler on the prepared Protecta-line pipe ends which will be used to indicate the location of each repair coupler prior to fusion.
8. Care should be taken to ensure any residual water in the mains is not allowed to come into contact with the electrofusion area.
9. Insert the new plain section of pipe with repair couplers and then slide the repair couplers onto the Protecta-Line pipe ends, ensuring that they are positioned up to the marks on the prepared Protecta-Line pipe ends. Ensure that the surfaces are clean and dry.
10. Carry out the electrofusion jointing procedure as described in the GPS Installation & Technical Guidelines brochure - GP-IT005.







Alternative Method

Alternatively, stub flange assemblies may be fitted to the ends of the Protecta-Line pipe (after preparation with the Protecta-Line Surprep Scraper) and then connected with a double flanged ductile iron spacer.



This method may be used where there is a risk of water in the pipe contaminating electrofusion joints during installation. Foam pigs can be used to temporarily seal the pipe bore. When electrofusion jointing of the stub flange assemblies has been completed, they can be removed before installation of the double flanged ductile iron spacer.

Squeeze-off of Protecta-Line pipe
Protecta-Line pipe can be squeezed off in the industry-approved way, as summarised in the GPS Installation and Technical Guidelines. However, as a precaution after re-rounding previously squeezed off areas should be wrapped with Protecta-Line aluminium tape followed by a proprietary waterproof petrolatum tape (equivalent to Denso™), in addition to any reinforcement bands that may be required to be fitted. For information on acceptable usage conditions refer to Table 9.2 in the WRc PE Pipe Systems Manual version 01/02.

When made in accordance with GPS PE Pipe Systems' recommended procedures, butt-fusion and electrofusion joints of the Protecta-Line system have been independently shown to meet the requirements of WIS 4-32-19 without any need for subsequent wrapping. This does not exempt installers from local regulations and the local Water Company preferences must be adhered to.

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PROTECTA-LINE

FAX BACK

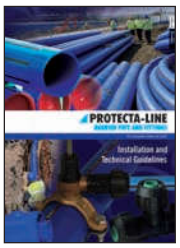
If you would like to receive further information regarding other GPS products, please photocopy this page, tick the information you require and fax back to us on **01480 458829**



GP-DP001/2

Product Dimensions/ Price List Brochure

☐



GP-PT003/2

Protecta-Line Installation and Technical Guidlines

☐



GP-IT005/2

Installation and Technical Guidlines

☐



G0003/1

SlimFlange

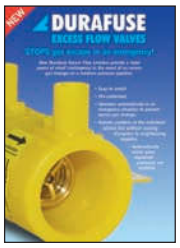
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G0021/2

Protecta-Line Self-tapping Ferrule Off-takes

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GP-XF006

DuraFuse Excess Flow Valves

☐



G0010/1

DuraFuse Duck Foot Bends

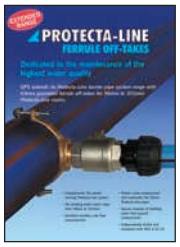
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GP-SF004/1

SlimFlanges for Gas

☐



G0022

Protecta-Line Ferrule Off-takes

☐



G0025

Protecta-Line Traceability

☐



G0020

Large Diameter Pipe Systems

☐



LS001

Push-Fast System

☐

Name .....

Company name.....

Address.....

..... Postcode .....

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Scan to view
Protecta-Line videos

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Please contact our Sales Office for specific details.

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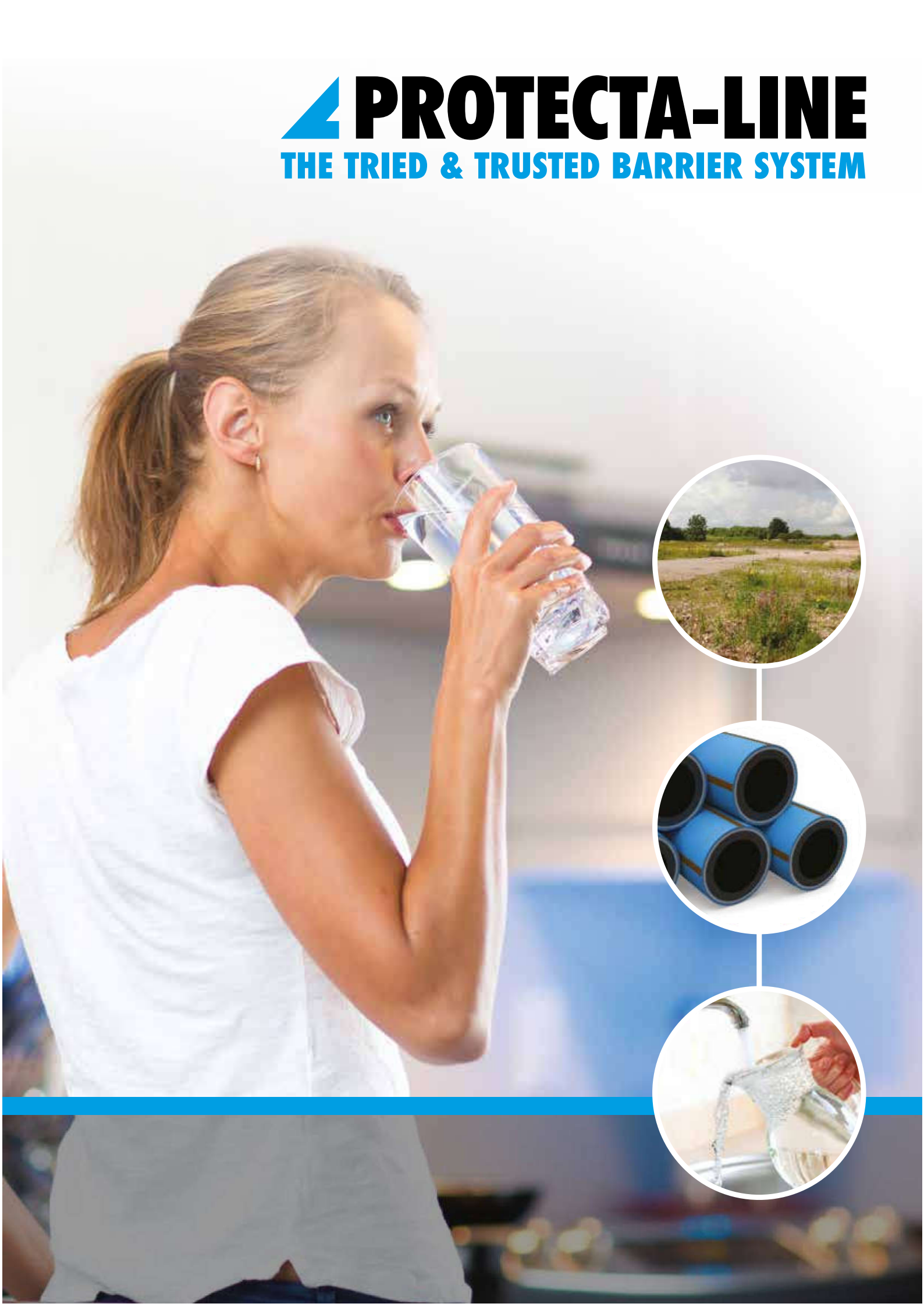
Distributor

GP-PT003/2 May 2011

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PROTECTA-LINE

THE TRIED & TRUSTED BARRIER SYSTEM



WHY RISK IT?



THE ORIGINAL, TRIED AND TRUSTED BARRIER PIPE SYSTEM

Protecta-Line is the original barrier pipe system that you can trust to transport drinking water through contaminated land. It has been tried and tested by water companies and housebuilders for more than 20 years.

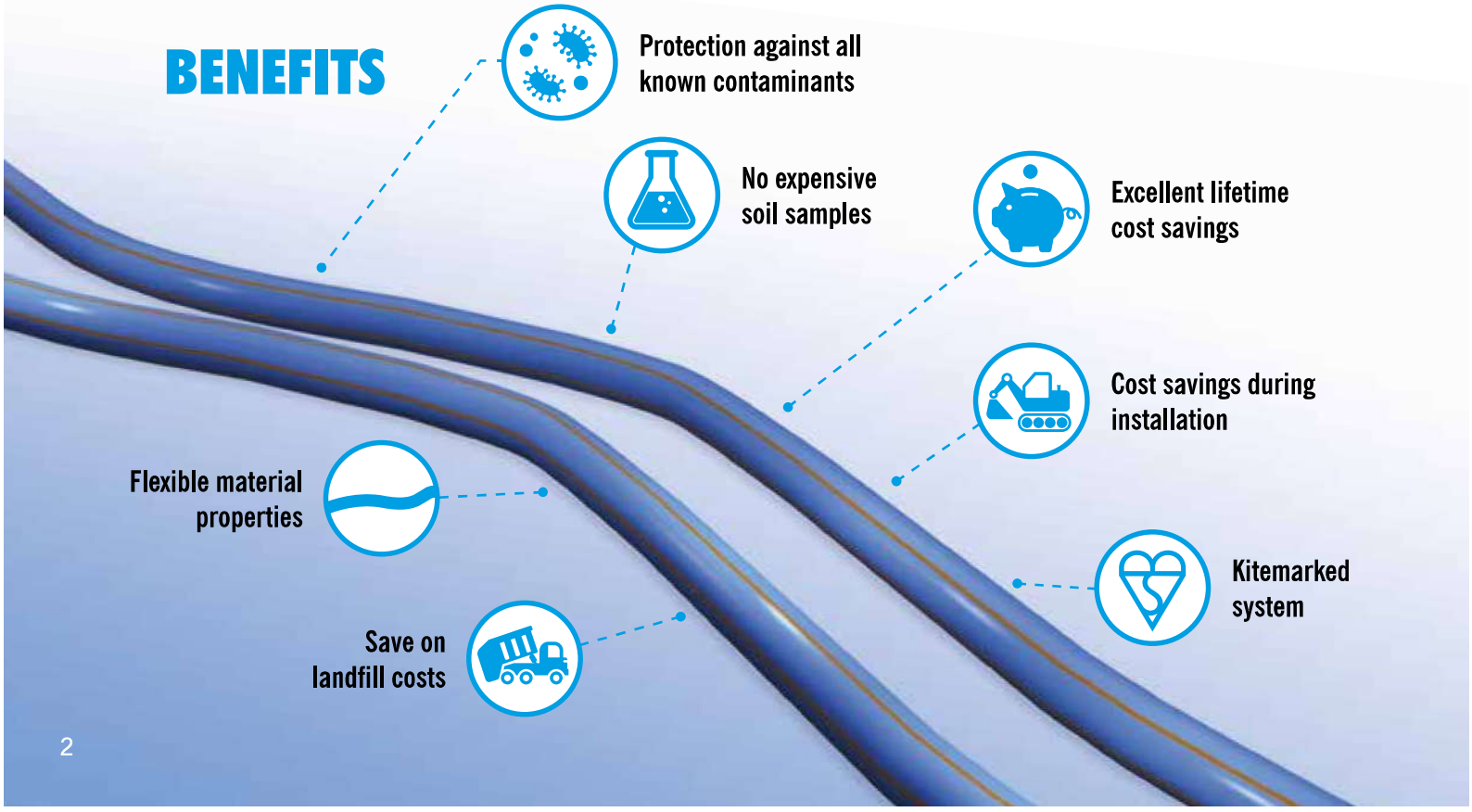
It has been proven over that time to maintain long term safety of supply and keep water safe from surrounding contaminants.

It is the most widely installed barrier pipe system in the UK.

There is no other system that has been developed hand-in-hand with contractors and installers over such a long term. The present day system has attained the highest standards of quality approval and represents a comprehensive barrier pipe solution, incorporating a full range of dedicated, approved fittings.

Put simply, why would you risk using anything else?

BENEFITS



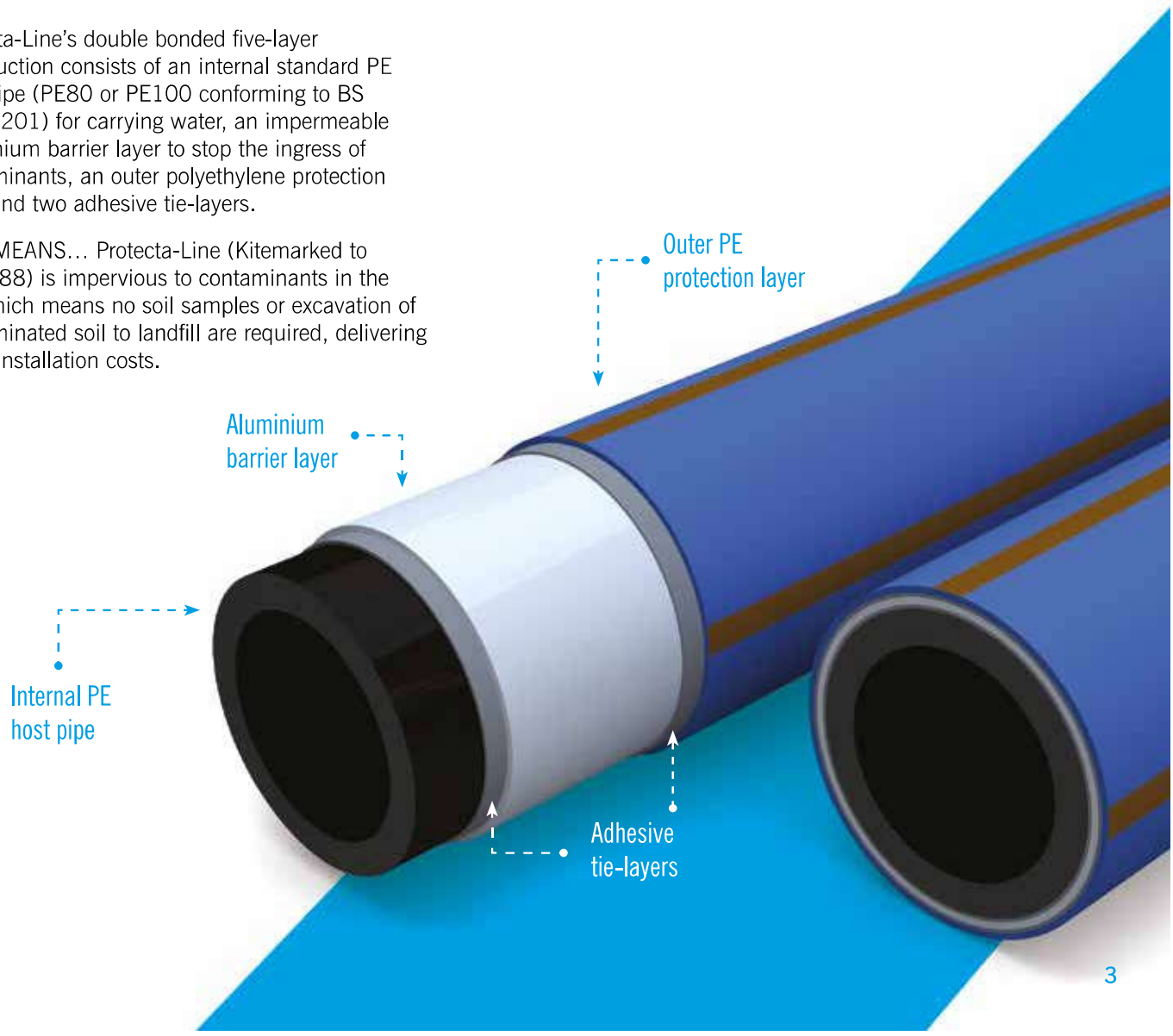
PROTECTA-LINE...

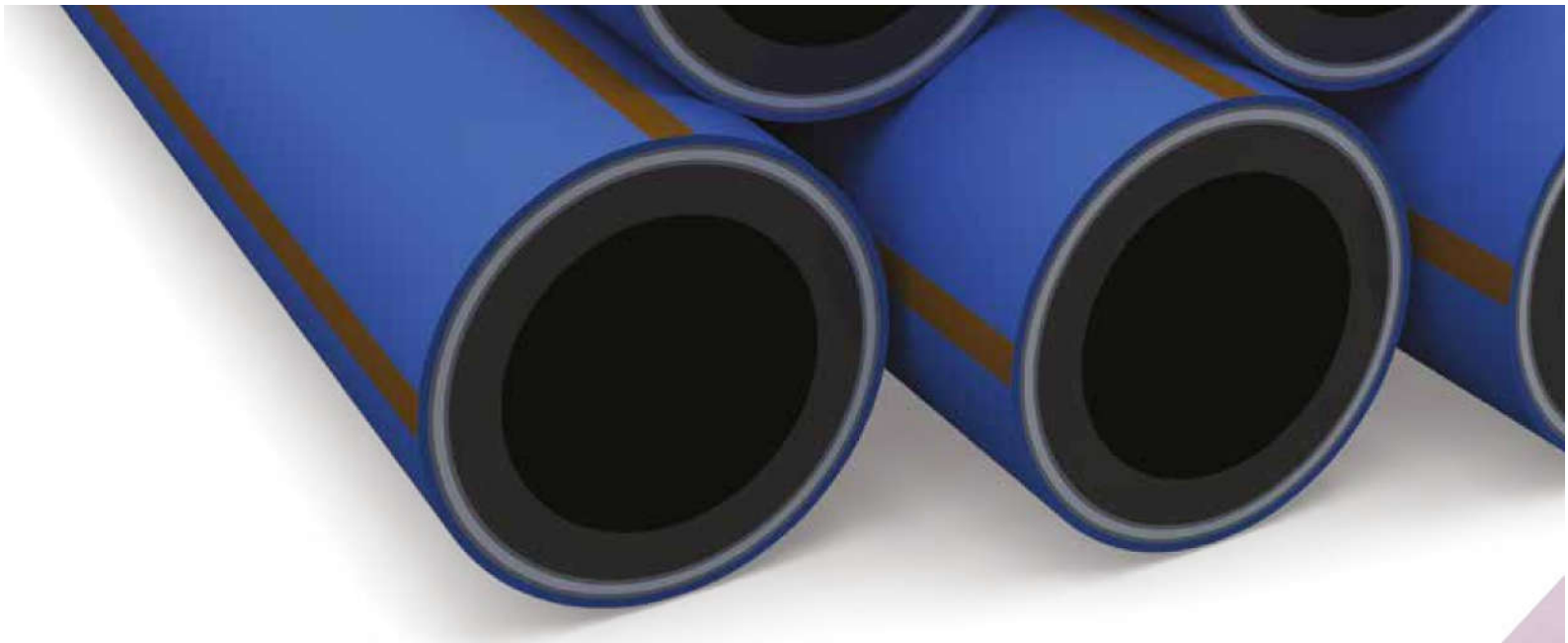
- provides proven protection against all recognised brownfield contaminants, both organic and inorganic, even in their maximum reported concentrations.
- is suitable for corrosive conditions.
- ensures peace of mind. As a proven solution for more than 20 years, water companies and other installers can be confident in its performance.
- includes a fully integrated range of pipe and approved dedicated fittings.
- may be used for trenchless installations or subjected to cold bending.

SAFE, EFFECTIVE AND PROVEN TO PROTECT

Protecta-Line's double bonded five-layer construction consists of an internal standard PE host pipe (PE80 or PE100 conforming to BS EN 12201) for carrying water, an impermeable aluminium barrier layer to stop the ingress of contaminants, an outer polyethylene protection layer and two adhesive tie-layers.

THIS MEANS... Protecta-Line (Kitemarked to BS 8588) is impervious to contaminants in the soil which means no soil samples or excavation of contaminated soil to landfill are required, delivering lower installation costs.





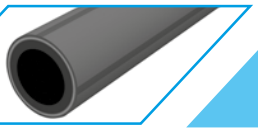
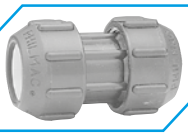
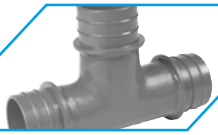
PRODUCT RANGE OVERVIEW



Protecta-Line Pipe is designed to safely transport drinking water in contaminated land. The approved pipe range is from 25mm to 630mm diameter with working pressures up to 16 bar.

It is a complete, approved system, used with confidence by installers for more than 20 years.

Over the following pages you can see the full range of pipe and fittings available.

		DESCRIPTION
PROTECTA-LINE PIPE		PE barrier pipe for water distribution through contaminated land
PROTECTA-LINE 3C & 3CTH COILS		Clean, capped and coiled PE barrier pipe for installation without pre-chlorination
MECHANICAL COMPRESSION FITTINGS		Mechanical compression fittings for service connections
FERRULE OFF-TAKES		Ferrules for live off-takes with minimal flow restrictions
MECHANICAL FITTINGS		Mechanical compression fittings for mechanical jointing without the need for pipe preparation or welding
ELECTROFUSION FITTINGS		Electrofusion fittings with a bar coding system for rapid and convenient jointing
PUPPED FITTINGS		Extended spigots suitable for electrofusion and butt-fusion jointing



STANDARDS/APPROVAL	MATERIAL	SIZE RANGE
BS 8588 WIS 4-32-19 Regulation 31/33 WRAS BS EN 12201 (core pipes)	Polyethylene Aluminium	25mm – 630mm (SDR11) 90mm – 630mm (SDR17)
BS 8588 WIS 4-32-19 Regulation 31/33 WRAS BS EN 12201 (core pipes)	Polyethylene Aluminium	90mm – 180mm
BS 8588 WIS 4-32-19 WRAS	Acetal	25mm – 63mm
BS 8588 WIS 4-32-19 WRAS	Gunmetal Acetal Stainless steel	25mm & 32mm (for 63mm – 355mm mains) 63mm (for 90mm - 355mm mains)
BS 8588 WIS 4-32-19 WRAS	Stainless steel Rilsan coated steel	63mm – 180mm
BS 8588* WIS 4-32-19* WRAS	Polyethylene	90mm – 630mm
WRAS (pipes and spigots)	Polyethylene	90mm – 630mm

*90mm - 355mm electrofusion fittings are Kitemarked

FITTINGS



MECHANICAL COMPRESSION FITTINGS

For 25mm to 63mm Protecta-Line



BENEFITS

- Proven barrier protection against contamination
- No contact between the pipe's protective aluminium layer and drinking water
- No risk of joint corrosion
- Easy and rapid all weather installation

FERRULE OFF-TAKES

For 63mm to 355mm Protecta-Line



BENEFITS

- No disruption to water supply
- Secure isolation of drinking water from ground contaminants
- Simple, all-weather installation with no scrapping or pipe preparation required
- Excellent headloss and flow characteristics
- Proven mechanical compression connections
- Innovative self-locking thimble design



MECHANICAL FITTINGS

For 63mm to 180mm Protecta-Line



BENEFITS

- Fast and easy all-weather jointing by a single installer
- No need for elastomeric seals, pipe-end preparation or welding.
- Only a torque wrench with an Allen (hex) bit socket is required
- No need for specialist tooling (eg. hydraulic pump) or external power supply – reduced health & safety risk
- Can be installed in the tightest of spaces

ELECTROFUSION FITTINGS

Electrofusion fittings for Protecta-Line



BENEFITS

- Easy and rapid installation
- Can be carried out in a trench, especially useful for repairs or tie-ins
- Proven barrier protection against contamination
- No risk of joint corrosion
- No contact between the pipe's protective aluminium layer and drinking water

PUPPED FITTINGS

Prefabricated fittings for Protecta-Line



BENEFITS

- Bespoke fabrications can be made
- Full barrier performance
- Flexibility to construct a pipeline to individual project needs
- Fully homogeneous pipeline (with fused joints)

CASE STUDIES



WIXAMS DEVELOPMENT

CHALLENGE

One of the largest developments created in the UK since World War 2 will house 4,500 families and include homes, amenities and educational facilities. The site was previously used as a munitions works and Anglian Water identified elevated levels of ground contamination.

Due to potential risks of water contamination, Anglian Water stipulated that barrier pipe must be installed for the water mains.



SOLUTION

Anglian Water has turned to us for help. As a result, more than 4km of Protecta-Line barrier pipe is being installed by Anglian Water's approved contractors, Achiva Limited, to cater for all of the water distribution needs for the development.

More than 3km of a mix of larger diameter 450mm and 355mm Protecta-Line has been installed through the spine of the development, with smaller spurs of 225mm and 180mm coming off into the housing estates, before dropping down to 90mm as it goes into the cul-de-sacs to supply each individual property.

Currently all open field land, there was no space or logistic restrictions with the installation, which has allowed the pipeline to be installed using an open cut installation and butt fusion jointing technique, which offered a quick and simple installation process.

Commenting on the scheme, Simon Pink, Project Engineer at Anglian Water, said: "We have used Protecta-Line successfully on other schemes, so we knew that it would provide a reliable and safe solution for Wixams. **The pipe system was much easier to handle on site, compared with ductile iron, and offered us a much quicker and simpler installation process.**"



PEMBROKE REFINERY

CHALLENGE

As with all industrial chemical sites, Valero's Pembroke Refinery faced the risk of soil contamination, which had health and safety implications for the supply of drinking water to the facility. In addition, many of the original metallic pipes had deteriorated and become prone to leaks and bursts. The refinery needed to implement a water network renewal programme.

SOLUTION

The refinery selected Protecta-Line barrier pipe system to replace existing metallic pipes. In some areas of the site, putting a bypass in place was simply not viable, therefore, the project team opted to slipline some of the existing metallic pipes with Protecta-Line which proved to be an efficient and cost-effective solution that minimised operational disruption.

On these sections, 110mm Protecta-Line pipe was inserted into the existing, corroded six inch carbon steel pipe using a cable to pull the new pipe into position. A range of Protecta-Line fluid compression fittings were also installed to ensure the integrity of the contamination barrier, without the need for any special procedures, including couplers, elbows, tees and stub flanges.

Protecta-Line stop cocks and self-tapping ferrule off-takes were also used, which enabled live off-takes of Protecta-Line service connections without any flow restrictions. **Alongside the need to renew the infrastructure, there was a clear focus on upgrading the pipeline to ensure it met the current regulatory requirements; fully WRAS and Regulation 31 approved for supply of drinking water, Protecta-Line was the ideal solution.**

MORRISONS BRIDGEWATER

CHALLENGE

This 75,000 square metre distribution centre serves the supermarket chain's network of stores in the South West and forms part of an £11 million regeneration scheme, including up to 2,000 new homes. The development is located on a mixed brownfield and greenfield site, which combines redundant industrial land with farmland.

The mains connection for the scheme is at the front of the site where there is a railway line and a chemical factory. Bob Wood from Wessex Water explained: "While stringent controls limit the contaminants from the factory now, historically they have been varied and significant. Trial holes across the site were tested for contamination and, while contaminants were not found over a large proportion of the site, the high water table did present the risk of migration of contaminants across a wider area."

SOLUTION

It was these concerns over the potential for contaminants to be carried to 'safe' soil areas by tidal waters on the flood plain site that prompted Wessex Water to specify 355mm Protecta-Line pipe system for a new main running across the distribution centre site, including the footprint of the building and access roads.

Around 1,200m of Protecta-Line was used in SDR17, providing up to 10 bar pressure capability which allows for additional capacity to be factored into the installation.

Wessex Water installed the pipe into open trenches, incorporating T-joints to allow take-offs of supply to be added at a future date. All joints were made by butt-fusion and the installation team prepared the pipes using the Protecta-Line Surprep tool to scrape away the outer layers. Wessex Water continued its practice of wrapping the joints using aluminium foil and Denso tape throughout the Protecta-Line installation.

Away from the Protecta-Line spine main, the site is not at risk of contamination so ordinary PE pipe was used with steel mechanical fittings to create the joints between the two materials. Bob adds: "**Even a small risk of contaminant migration makes it prudent to specify an effective barrier pipe. Protecta-Line safeguards against ingress of all known contaminants and is our preferred barrier pipe solution so this specification means that we can be confident of a safe water supply.**"

ADDED VALUE SERVICES



SPECIFICATION & DESIGN ADVICE



Our experienced pipeline engineers offer specification guidance and material estimates, and provide advice and recommendations during the design stage of a new pipeline scheme to ensure the most appropriate system is designed for each individual application.



CUSTOMER SERVICES

We pride ourselves on the high level of customer service we provide to each and every customer. Our Customer Service team offers support at every stage of a project, advising on lead-times, logistics and delivery requirements, managing the supply chain process from the point of order through to installation.

TECHNICAL SUPPORT



Providing assistance to the entire customer supply chain, our experienced technical support team offer product training, jointing demonstrations and installation advice to support the successful completion of every project.

ALL YOU NEED TO KNOW ABOUT HEALTH, SAFETY, QUALITY & ENVIRONMENT

STANDARD/APPROVAL	TITLE	APPLICABLE TO GPS PRODUCTS
Regulation 31/33	The Water Supply (Water Quality) Regulations (England/Wales/Scotland/NI)	All drinking water pipes
The (Water) Regulators Specification & The Water Supply (Water Fittings) Regulations 1999	The (Water) Regulators Specification & The Water Supply (Water Fittings) Regulations 1999	All pipe materials. All fitting materials. All PE100 fittings and matching pipes. All Protecta-Line fittings and matching Protecta-Line pipes
BS EN 12201	Plastics piping systems water supply, and for drainage and sewerage under pressure – Polyethylene (PE)	Blue and black PE80 and PE100 pipes and fittings in sizes up to 1200mm
WIS 4-32-19	Polyethylene pressure pipe systems with an aluminium barrier layer for potable water supply in contaminated land sizes	25mm to 630mm – Protecta-Line pipe and fittings
BS 8588	Polyethylene pressure pipe with an aluminium barrier layer and associated fittings for potable water supply in contaminated land	25mm to 630mm - Protecta-Line pipe and fittings
WIS 4-32-08	Specification for the fusion jointing of polyethylene pressure pipeline systems using PE80 and PE100 materials	Butt fusion and electrofusion jointing of blue and black PE80 and PE100 pipes and fittings
BS 6920 Part 1	Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on water – Part 1: Specification	All pipe materials. All fitting materials. All PE100 fittings and matching pipes. All Protecta-Line fittings and matching Protecta-Line pipes All pipe materials. All fitting materials.
BS 6920 Part 2	Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on water – Part 2: Methods of test	All PE100 fittings and matching pipes. All Protecta-Line fittings and matching Protecta-Line pipes. All pipes
BS 6920 Part 4	Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on water – Part 4: Method for the GCMS identification of water leachable organic substances	All pipes
ISO 4427	PE pipes for water supply	Blue and black PE80 and PE100 pipes and fittings
BS EN 15494	Specifications for polyethylene components and systems	Blue and black PE80 and PE100 pipes and fittings up to 1200mm
BS EN 805	Water supply – requirements for systems and components outside buildings	External water supply installations
BS 5306 – Part 2	Fire extinguishing installations and equipment on premises	Blue and black PE80 and PE100 for external buried fire mains
WIS 4-22-02	Specification for ferrules and ferrule straps for underground use	Protecta-Line ferrules
WIS 4-24-01	Specification for mechanical fittings and joints including flanges for polyethylene pipes for the conveyance of cold potable water for the size range 90 to 1000mm including those made of metal or plastics or a combination of both	Stub flanges, SlimFlange and Protecta-Line Mechanical Fittings

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.



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Infrastructure range guide



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Contents

PHILMAC 4

Compression fittings

3G Metric/Imperial	6-9
UTC	10
UTC connectors guide	11
Large bore PE metric	12
Stopcocks and valves	13
BSP threaded	14-15
Accessories	15

PROTECTA-LINE 16

Barrier system for contaminated land

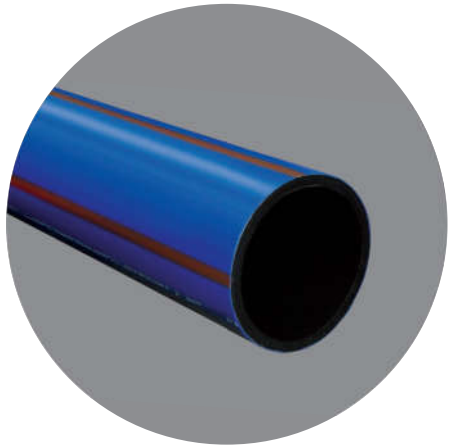
Pipe	18-19
Compression fittings	20-21
Electrofusion fittings	22
Fabrications	23-24
Mechanical fittings	25-26
Ferrule off-takes	26-27
Accessories	27

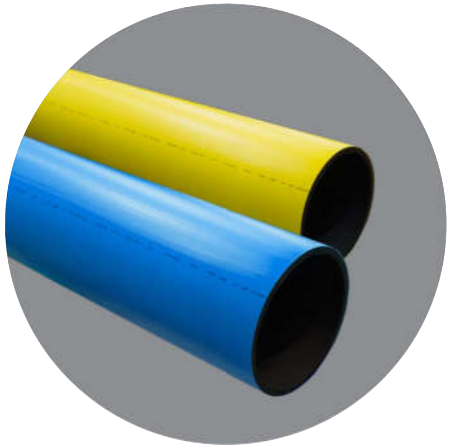
GPS PE PIPE 28

PE pipes for multiple applications

GPS blue pipe	30-31
GPS black pipe	32-33
GPS yellow and orange pipe	34-35
GPS white pipe	36
Enviroline pipe	37







FRIALEN ● 38
Electrofusion fittings
Fittings 40-45
Accessories 45



FABRICATED AND SPIGOT ● 46
Fittings
Fabrications -
Potable,raw water and sewage 48-50
Gas 51-54
Spigots 55-58



MECHANICAL FITTINGS ● 60



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Compression fittings

Liners to suit PE pipe are required for WRAS approval, please see page 9 for these items.



METRIC/IMPERIAL JOINER POL X POL

Sizes	Part number
20mm/½"	9122
25mm/¾"	9133
32mm/1"	9144
40mm/1¼"	9155
50mm/1½"	9166
63mm/2"	9177



SLIP JOINER METRIC/IMPERIAL POL X POL – No internal pipe stop, ideal flexibility for repair or retrofit

Sizes	Part number
20mm/½"	90122
25mm/¾"	90133
32mm/1"	90144
40mm/1¼"	90155
50mm/1½"	90166
63mm/2"	90177



METRIC/IMPERIAL REDUCING JOINER POL X POL

Sizes	Part number
25mm/¾" x 20mm/½"	9132
32mm/1" x 20mm/½"	9142
32mm/1" x 25mm/¾"	9143
40mm/1¼" x 25mm/¾"	9153
40mm/1¼" x 32mm/1"	9154
50mm/1½" x 25mm/¾"	9163
50mm/1½" x 32mm/1"	9164
50mm/1½" x 40mm/1¼"	9165
63mm/2" x 32mm/1"	9174
63mm/2" x 40mm/1¼"	9175
63mm/2" x 50mm/1½"	9176



END CAP

Sizes	Part number
20mm/½"	9029
25mm/¾"	9039
32mm/1"	9049
40mm/1¼"	9059
50mm/1½"	9069
63mm/2"	9079



METRIC/IMPERIAL END CONNECTOR POL X M.I. BSP

Sizes	Part number
20mm/½" x ½" BSP	9221
20mm/½" x ¾" BSP	9222
20mm/½" x 1" BSP	9223
25mm/¾" x ½" BSP	9231
25mm/¾" x ¾" BSP	9232
25mm/¾" x 1" BSP	9233
32mm/1" x ¾" BSP	9242
32mm/1" x 1" BSP	9243
32mm/1" x 1¼" BSP	9244
32mm/1" x 1½" BSP	9245
40mm/1¼" x 1" BSP	9253
40mm/1¼" x 1¼" BSP	9254
40mm/1¼" x 1½" BSP	9255
40mm/1¼" x 2" BSP	9256
50mm/1½" x 1½" BSP	9265
50mm/1½" x 2" BSP	9266
63mm/2" x 1½" BSP	9275
63mm/2" x 2" BSP	9276



METRIC/IMPERIAL END CONNECTOR POL X F.I. BSP

Sizes	Part number
20mm/½" x ½" BSP	9821
20mm/½" x ¾" BSP	9822
20mm/½" x 1" BSP	9823
25mm/¾" x ½" BSP	9831
25mm/¾" x ¾" BSP	9832
25mm/¾" x 1" BSP	9833
32mm/1" x ¾" BSP	9842
32mm/1" x 1" BSP	9843
32mm/1" x 1¼" BSP	9844
40mm/1¼" x 1¼" BSP	9854
40mm/1¼" x 1½" BSP	9855
50mm/1½" x 1½" BSP	9865
50mm/1½" x 2" BSP	9866
63mm/2" x 2" BSP	9876



METRIC/IMPERIAL TEE - Equal POL X POL

Sizes	Part number
20mm/½"	9322
25mm/¾"	9333
32mm/1"	9344
40mm/1¼"	9355
50mm/1½"	9366
63mm/2"	9377

Philmac 3G metric/imperial

Compression fittings

Liners to suit PE pipe are required for WRAS approval, please see page 9 for these items.



SLIP TEE METRIC/IMPERIAL – No internal pipe stop, ideal flexibility for repair or retrofit

Sizes	Part number
20mm/½"	90322
25mm/¾"	90333
32mm/1"	90344
50mm/1½"	90366
63mm/2"	90377



METRIC/IMPERIAL TEE - Reducing POL X POL

Sizes	Part number
25mm/¾" x 25mm/¾" x 20mm/½"	9332
25mm/¾" x 25mm/¾" x 32mm/1"	9334
32mm/1" x 32mm/1" x 25mm/¾"	9343
50mm/1½" x 50mm/1½" x 25mm/¾"	9363
50mm/1½" x 50mm/1½" x 32mm/1"	9364
50mm/1½" x 50mm/1½" x 40mm/1¼"	9365
63mm/2" x 63mm/2" x 25mm/¾"	9373
63mm/2" x 63mm/2" x 32mm/1"	9374
63mm/2" x 63mm/2" x 50mm/1½"	9376



TEE POL X M.I. BSP

Sizes	Part number
25mm/¾" x ½" BSP	9931
25mm/¾" x ¾" BSP	9932



TEE POL X F.I. BSP

Sizes	Part number
20mm/½" x ½" BSP	9421
20mm/½" x ¾" BSP	9422
25mm/¾" x ½" BSP	9431
25mm/¾" x ¾" BSP	9432
25mm/¾" x 1" BSP	9433
32mm/1" x ½" BSP	9441
32mm/1" x ¾" BSP	9442
32mm/1" x 1" BSP	9443
32mm/1" x 1¼" BSP	9444
40mm/1¼" x 1¼" BSP	9454
40mm/1¼" x 1½" BSP	9455
50mm/1½" x ½" BSP	9461
50mm/1½" x ¾" BSP	9462
50mm/1½" x 1½" BSP	9465
50mm/1½" x 2" BSP	9466
63mm/2" x 2" BSP	9476



ELBOW POL X POL

Sizes	Part number
20mm/½"	9522
25mm/¾"	9533
32mm/1"	9544
40mm/1¼"	9555
50mm/1½"	9566
63mm/2"	9577



REDUCING ELBOW POL X POL

Sizes	Part number
25mm/¾" x 20mm/½"	9532
63mm/2"	9577



ELBOW POL X F.I. BSP

Sizes	Part number
20mm/½" x ½" BSP	9621
20mm/½" x ¾" BSP	9622
25mm/¾" x ½" BSP	9631
25mm/¾" x ¾" BSP	9632
25mm/¾" x 1" BSP	9633
32mm/1" x 1" BSP	9643
32mm/1" x 1¼" BSP	9644
40mm/1¼" x 1¼" BSP	9654
40mm/1¼" x 1½" BSP	9655
50mm/1½" x 1½" BSP	9665
50mm/1½" x 2" BSP	9666
63mm/2" x 2" BSP	9676

New sizes now available.



ELBOW POL X M.I. BSP

Sizes	Part number
20mm/½" x ½" BSP	9721
25mm/¾" x ¾" BSP	9732
32mm/1" x 1" BSP	9743
32mm/1" x 1¼" BSP	9744
40mm/1¼" x 1" BSP	9753
40mm/1¼" x 1¼" BSP	9754
40mm/1¼" x 1½" BSP	9755
50mm/1½" x 1½" BSP	9765
63mm/2" x 2" BSP	9776



45 DEG ELBOW POL X POL

Sizes	Part number
20mm/½"	9028
25mm/¾"	9038
32mm/1"	9048
40mm/1¼	9058
50mm/1½"	9068
63mm/2"	9078

Philmac 3G metric/imperial

Compression fittings

Liners to suit PE pipe are required for WRAS approval, please see page 9 for these items.



WALL PLATE ELBOW PLASTIC

Sizes	Part number
20mm/½" x ½" BSP	9022
25mm/¾" x ½" BSP	9031
25mm/¾" x ¾" BSP	9032



TANK CONNECTOR ASSEMBLY – c/w Seal Washers

Sizes	Part number
25mm/¾" x ¾" BSP	9780
32mm/1" x 1" BSP	9781

Other tank connector options available on page XX-XX



WALL PLATE ELBOW METAL

Sizes	Part number
20mm/½" x ½" BSP	9228
25mm/¾" x ¾" BSP	9229



HOSE UNION BIB TAP BS2682 CV

Sizes	Part number
DZR ½" c/w double check valve	3022
DZR ¾" c/w double check valve	3033



ARCTIC ICE RESISTANT BIB TAP

Sizes	Part number
½" BSP	8021
¾" BSP	8022
1" BSP *Water: -20°C	8023

For Arctic Resistance Ball Valves, see page XX



HOSE UNION TAP CONNECTOR

Sizes	Part number
½"	HOSCON 21
¾" (to suit 8022 only)	HOSCON 22



METRIC SADDLE

Sizes	Part number
50mm x 25mm/¾"	90635
63mm x 25mm/¾"	90735



FLANGE ADAPTOR Flange to BS 4504

Sizes	Part number
50mm/1½" x 2"	87766
63mm/2" x 2"	87776



JOINER

Sizes	Part number
20mm/½" x 15mm	1321
25mm/¾" x 15mm	1331
25mm/¾" x 22mm	1332
32mm/1" x 22mm	1342
32mm/1" x 28mm	1343

Two part assembled to correct torque. Do not tighten further. For connections to pex pipe please refer to pipe manufacturers installation instructions and only use pex liners compatible with the pipe being used.



ELBOW

Sizes	Part number
20mm/½" x 15mm	1521
25mm/¾" x 15mm	1531
25mm/¾" x 22mm	1532
32mm/ 1" x 28mm	2543

Two part assembled to correct torque. Do not tighten further. For connections to pex pipe please refer to pipe manufacturers installation instructions and only use pex liners compatible with the pipe being used.



METRIC/IMPERIAL STOPCOCK POL X POL

Sizes	Part number
20mm/½"	2822
25mm/¾"	2833
32mm/1"	2844



METRIC/IMPERIAL STOPCOCK POL x FI

Sizes	Part number
25mm/¾" x ½"	2831
25mm/¾" x ¾"	2832
32mm/1" x ¾"	2842
32mm/1" x 1"	2843



METRIC/IMPERIAL ¼ Turn BALL VALVE POL X POL

Sizes	Part number
20mm/½"(16mm Nominal Bore)	95272
25mm/¾"(16mm Nominal Bore)	95372
25mm/¾"(19.5mm Nominal Bore)	95273
32mm/1" (19.5mm Nominal Bore)	95373

Philmac 3G metric/imperial

Liners & connection kits



MDPE LINERS EN12201/BS 6572 (below ground) & EN12201/BS 6730 (above ground)

Sizes	Part number
20mm	78002
25mm	78003
32mm	78004
50mm	78006
63mm	78007



METRIC/IMPERIAL CONNECTION KIT

Sizes	Part number
20mm/½"	999002
25mm/¾"	999003
32mm/1"	999004
40mm/1¼"	999005
50mm/1½"	999006
63mm/2"	999007



METRIC/IMPERIAL NORMAL GAUGE CONNECTION KIT BS 1972 IRS 134

Sizes	Part number
½" (fits 3/8 " LD and HD)	93012
¾"	93003
1"	93004
1¼"	93005
1½"	93006
2"	93007



REDUCING SETS – BS 6572/6730 Metric & BS 1972/3284 & IRS 135 Imperial

Sizes	Part number
25mm/¾" x 20mm/½"	98032
32mm/1" x 20mm/½"	98042
32mm/1" x 25mm/¾"	98043
50mm/1½" x 25mm/¾"	98063
50mm/1½" x 32mm/1"	98064
63mm/2" x 25mm/¾"	98073
63mm/2" x 32mm/1"	98074
63mm/2" x 50mm/1½"	98076



NORMAL GAUGE REDUCING SETS

Sizes	Part number
¾" x ½"	93132
1" x ½"	93142
1 x ¾"	93143



COPPER CONNECTION KIT BS EN 1057 – Connection Kit for copper pipe for above and below ground use

Sizes	Part number
20mm/½" x 15mm	86002
25mm/¾" x 22mm	86003
32mm/1" x 28mm	86004
25mm/¾" x 15mm	86032

Suitable for single use only. Not suitable for PB or PEX pipe.



BLANKING PLUG

Sizes	Part number
20mm/½"	9128
25mm/¾"	9138
32mm/1"	9148
40mm/1¼"	9158
50mm/1½"	9168
63mm/2"	9178



METRIC PVC/ABS CONNECTION KIT

Sizes	Part number
20mm	94202
25mm	94203
32mm	94204
40mm	94205
50mm	94206
63mm	94207



METRIC PVC/ABS CONNECTION KIT

Sizes	Part number
20mm	94202
25mm	94203
32mm	94204
40mm	94205
50mm	94206
63mm	94207

*Complete with nut and seal

Philmac UTC

Compression fittings



UNIVERSAL TRANSITION JOINER UTC X POL c/w Metric MDPE Liner

Sizes	Part number
15-21mm x 20mm/½"	1032
15-21mm x 25mm/¾"	1033
21-27mm x 20mm/½"	1042
21-27mm x 25mm/¾"	1043
27-34mm x 20mm/½"	1052
27-34mm x 25mm/¾"	1053
27-34mm x 32mm/1"	1054
27-34mm x 40mm/1¼"	1055
34-39mm x 32mm/1"	1074
34-39mm x 40mm/1¼"	1075
39-43mm x 32mm/1"	1064
39-43mm x 40mm/1¼"	1065
47-49mm x 50mm/1½"	1086
47-49mm x 63mm/2"	1087
59-61mm x 63mm/2"	1097



UNIVERSAL TRANSITION ELBOW UTC X POL c/w Metric MDPE Liner

Sizes	Part number
15-21mm x 25mm/¾"	1533
21-27mm x 25mm/¾"	1543
21-27mm x 32mm/1"	1544
27-34mm x 25mm/¾"	1553
27-34mm x 32mm/1"	1653



UNIVERSAL TRANSITION DOUBLE ENDED REPAIR JOINER

Sizes	Part number
15-21mm x15-21mm	1133
21-27mm x 21-27mm	1144
27-34mm x 27-34mm	1155
34-39mm x 34-39mm	1177
39-43mm x 39-43mm	1166
47-49mm x 47-49mm	1188
59-61mm x 59-61mm	1199



PIPE GAUGE – for use with Universal Transition Coupling

Sizes	Part number
15-34mm	1135
27-43mm	1136
43-63mm	1137



UNIVERSAL TRANSITION REDUCED REPAIR JOINER

Sizes	Part number
21-27mm x 15-21mm	1143
27-34mm x 21-27mm	1154
27-34mm x 15-21mm	1153
39-43mm x 27-34mm	1165



UNIVERSAL TRANSITION M.I. END CONNECTOR UTC X M.I. BSP

Sizes	Part number
15-21mm x ½" BSP	1231
15-21mm x ¾" BSP	1232
15-21mm x 1" BSP	1233
21-27mm x ¾" BSP	1242
21-27mm x 1" BSP	1243
21-27mm x 1¼" BSP	1244
27-34mm x ¾" BSP	1252
27-34mm x 1" BSP	1253
27-34mm x 1¼" BSP	1254
27-34mm x 1½" BSP	1255

Philmac UTC connectors guide

GUIDE ONLY – Actual size dependant on pipe condition

UTC RANGE	15–21mm	21–27mm	27–34mm	34–39mm	39–43mm	47–49mm	59–61mm
PIPE CIRCUMFERENCE	**47–66mm**	**68–85mm**	**85–107mm**	**107–122mm**	**122–135mm**	**148–154mm**	**185–192mm**
Alkathene	3/8"	1/2"	3/4"	1"	1-¼"	1-½"	2"
Normal Gauge IRS 134	1/2"	3/4"	1"	1-¼"			
Heavy Gauge IRS 135		1/2"	3/4"	1"			
Copper	15mm	22mm	28mm	35mm	42mm		
Galvanised Iron	3/8"	1/2"	3/4"	1"	1-¼"	1-½"	2"
Stainless Steel	3/8"	1/2"	3/4"	1"	1-¼"	1-½"	2"
Metric ABS/PVC	16 & 20mm	25mm	32mm		40mm		
Imperial ABS/PVC	3/8"	1/2"	3/4"	1"	1-¼"	1-½"	2"
Lead	3/8"	1/2"	3/4"	1-¼"	1"	1-½"	
	5lb (20mm OD)	6lb (21.6mm OD)	9lb (30.6mm OD)	7lb (37.6mm OD)	16lb (41mm OD)	12lb (48mm OD)	
		7lb (23.2mm OD)	11lb (32.8mm OD)				
		9lb (25.4mm OD)					
	1/2"	3/4"	1"		1-¼"		
	2lb (16mm OD)	4lb (25.2mm OD)	6lb (31mm OD)		9lb (39.2mm OD)		
	4lb (19.2mm OD)	5lb (26.4mm OD)	7lb (31.6mm OD)				

Fitting selection can be made easier with use of the Philmac Pipe Gauge

Copper

If user does not want to use a UTC the copper needs to be M.I. or F.I. ended so that we can offer a Met/Imp fitting to suit. Same rule applies for 54mm O.D. copper. Use copper compression fitting to adapt to M.I. or F.I. and then use Met/Imp fitting.

Lead

The general condition of lead pipe can make sizing difficult at top and bottom tolerance. If the recommended UTC is not successful the next size, up or down, depending on fit should be offered.

Philmac Large bore PE metric

Fittings range



JOINER POL X POL

Sizes	Part number
75 mm	8188
90 mm	8199
110 mm	8100



REDUCING JOINER POL X POL

Sizes	Part number
75mm x 63mm	8187
90mm x 75mm	8198
110mm x 90mm	8109



END CONNECTOR POL X M.I. BSP

Sizes	Part number
75mm x 2" BSP	8286
75mm x 3" BSP	8288
90mm x 3" BSP	8298
110mm x 4" BSP	8209



END CONNECTOR

Sizes	Part number
75mm x 2" BSP	8886
90mm x 3" BSP	8898
110mm x 4" BSP	8809



TEE – Equal POL X POL

Sizes	Part number
75 mm	8388
90 mm	8399
110 mm	8300



TEE POL X F.I. BSP

Sizes	Part number
75mm x 2" BSP	8486
90mm x 3" BSP	8498
110mm x 4" BSP	8409



ELBOW POL X POL

Sizes	Part number
75 mm	8588
90 mm	8599
110 mm	8500



ELBOW POL X F.I. BSP

Sizes	Part number
75mm x 2" BSP	8686
90mm x 3" BSP	8698
110 110mm x 4" BSP	8609



END CAP

Sizes	Part number
75 mm	8089
90 mm	8099
110 mm	8009



FLANGE ADAPTOR Flange to BS 4504

Sizes	Part number
90mm x 3"	78798
110mm x 4"	78709

Philmac stopcock and valves

Ball and back flow prevention



STOPCOCK POL X POL

Sizes	Part number
20mm/½"	2822
25mm/¾"	2833
32mm/1"	2844



STOPCOCK POL X FI

Sizes	Part number
25mm/¾" x ½"	2831
25mm/¾" x ¾"	2832
32mm/1" x ¾"	2842
32mm/1" x 1"	2843



¼ TURN BALL VALVE POL X POL

Sizes	Part number	Nominal Bore
20mm/½"	95272	16
25mm/¾"	95372	16
25mm/¾"	95273	19.5
32mm/1"	95373	19.5



ARCTIC ICE RESISTANT BALL VALVE

Sizes	Part number	Nominal Bore
½"	8031	15
¾"	8032	20
1"	8033	25



BALL VALVE F.I. X F.I. BSP

Sizes	Part number	Nominal Bore
¾" F.I. x ¾" F.I.	55002	16
1" F.I. x 1" F.I.	55003	19.5
1¼" F.I. x 1¼" F.I.	55004	26
1½" F.I. x 1½" F.I.	55005	32
2" F.I. x 2" F.I.	55006	40



BALL VALVE M.I. X M.I. BSP

Sizes	Part number	Nominal Bore
¾" M.I. x ¾" M.I.	55402	16
1" M.I. x 1" M.I.	55403	19.5



AIR RELEASE VALVE F.I. BSP

Sizes	Part number	Nominal Bore
1" BSP	55033	25



FOOT VALVE F.I. BSP

Sizes	Part number	Nominal Bore
¾" BSP	55012	22
1" BSP	55013	27
1¼" BSP	55014	32
1½" BSP	55015	38
2" BSP	55016	50



SINGLE CHECK NON RETURN VALVE F.I. BSP X F.I. BSP

Sizes	Part number	Nominal Bore
¾" F.I. x ¾" F.I.	55022	22
1" F.I. x 1" F.I.	55023	27
1¼" F.I. x 1¼" F.I.	55024	32
1½" F.I. x 1½" F.I.	55025	38
2" F.I. x 2" F.I.	55026	50



DZR DOUBLE CHECK VALVE F.I. BSP X F.I. BSP TO BS 6282 – Back Flow Prevention Category 3

Sizes	Part number	Nominal Bore
½" F.I. x ½" F.I.	11101	15
¾" F.I. x ¾" F.I.	11202	20
1" F.I. x 1" F.I.	11303	25



GM FI X FI STOPCOCK (BS.5433 TYPE20)

Sizes	Part number
½" x ½" F.I.	2511
¾" x ¾" F.I.	2522
1" x 1" F.I.	2533
1½" x 1½" F.I.	2055
2" x 2" F.I.	2066



Metric/Imperial BSP End Connectors (for these Valves)

METRIC/IMPERIAL END CONNECTOR POL X M.I. BSP

Sizes	Part number
20mm/½" x ½" BSP	9221
20mm/½" x ¾" BSP	9222
20mm/½" x 1" BSP	9223
25mm/¾" x ½" BSP	9231
25mm/¾" x ¾" BSP	9232
25mm/¾" x 1" BSP	9233
32mm/1" x ¾" BSP	9242
32mm/1" x 1" BSP	9243
32mm/1" x 1¼" BSP	9244
32mm/1" x 1½" BSP	9245
40mm/1¼" x 1" BSP	9253
40mm/1¼" x 1¼" BSP	9254
40mm/1¼" x 1½" BSP	9255
40mm/1¼" x 2" BSP	9256
50mm/1½" x 1½" BSP	9265
50mm/1½" x 2" BSP	9266
63mm/2" x 1½" BSP	9275
63mm/2" x 2" BSP	9276

Liners to suit PE pipe are required for WRAS requirements, please see page 9 for these items.

Philmac BSP threaded

Fittings range



TEE FEMALE

Sizes	Part number
½" BSP	4511
¾" BSP	4522
1" BSP	4533
1¼" BSP	4544
1½" BSP	4555
2" BSP	4566



ELBOW FEMALE

Sizes	Part number
½" BSP	4611
¾" BSP	4622
1" BSP	4633
1¼" BSP	4644
1½" BSP	4655
2" BSP	4666



ELBOW MALE X FEMALE

Sizes	Part number
½" x ½" BSP	4691
¾" x ¾" BSP	4692
1" x 1" BSP	4693
1¼" x 1¼" BSP	4694
1½" x 1½" BSP	4695
2" x 2" BSP	4696



PLUG

Sizes	Part number
½" BSP	4011
¾" BSP	4022
1" BSP	4033
1¼" BSP	4044
1½" BSP	4055
2" BSP	4066



BUSH – REDUCING

Sizes	Part number
¾" x ½" BSP	4121
1" x ½" BSP	4131
1" x ¾" BSP	4132
1¼" x ½" BSP	4141
1¼" x ¾" BSP	4142
1¼" x 1" BSP	4143
1½" x ½" BSP	4151
1½" x ¾" BSP	4152
1½" x 1" BSP	4153
1½" x 1¼" BSP	4154
2" x ½" BSP	4161
2" x ¾" BSP	4162
2" x 1" BSP	4163
2" x 1¼" BSP	4164
2" x 1½" BSP	4165
3" x 2" BSP	4186
4" x 3" BSP	4198



NIPPLE

Sizes	Part number
½" BSP	4211
¾" BSP	4222
1" BSP	4233
1¼" BSP	4244
1½" BSP	4255
2" BSP	4266



NIPPLE – REDUCING

Sizes	Part number
¾" x ½" BSP	4221
1" x ½" BSP	4231
1" x ¾" BSP	4232
1¼" x ½" BSP	4241
1¼" x ¾" BSP	4242
1¼" x 1" BSP	4243
1½" x ½" BSP	4251
1½" x ¾" BSP	4252
1½" x 1" BSP	4253
1½" x 1¼" BSP	4254
2" x ½" BSP	4261
2" x ¾" BSP	4262
2" x 1" BSP	4263
2" x 1¼" BSP	4264
2" x 1½" BSP	4265



SOCKET

Sizes	Part number
½" BSP	4311
¾" BSP	4322
1" BSP	4333
1¼" BSP	4344
1½" BSP	4355
2" BSP	4366



REDUCING SOCKET

Sizes	Part number
¾" x ½" BSP	4321
1" x ½" BSP	4331
1" x ¾" BSP	4332
1¼" x 1" BSP	4343
1½" x ¾" BSP	4352
1½" x 1" BSP	4353
1½" x 1¼" BSP	4354
2" x ¾" BSP	4362
2" x 1" BSP	4363
2" x 1½" BSP	4365

Philmac BSP threaded

Fittings range



CAP

Sizes	Part number
½" BSP	4901
¾" BSP	4902
1" BSP	4903
1¼" BSP	4904
1½" BSP	4905
2" BSP	4906



M.I. BSP HOSE TAILS

Sizes	Part number
½" BSP	RXHT15
¾" BSP	RXHT20
1" BSP	RXHT25
1¼" BSP	RXHT32
1½" BSP	RXHT40
2" BSP	RXHT50



IBC SWIVEL-IT ADAPTORS

Sizes	Part number
2" x ¾" F.I. BSP	60UD075B
2" x 1" F.I. BSP	60UD10B
2" x 2" F.I. BSP	60UD20B

N.B. All threads are BSP tapered. Use PTFE Tape on threads for lubrication purposes. Do not overtighten.



MALE THREADED TANKCONNECTOR WITH FEMALE INLET

Sizes	Part number
½" BSP	RXTTI15
¾" BSP	RXTTI20
1" BSP	RXTTI25
1¼" BSP	RXTTI32
1½" BSP	RXTTI40
2" BSP	RXTTI50



CUT TO SIZE TANK CONNECTOR KITS (PVC) – Containing long thread (1 ft long), backnuts (2) and a washer

Sizes	Part number
½" BSP	TCK050
¾" BSP	TCK075
1" BSP	TCK100

Philmac Accessories



HIGH FLOW BALLCOCK - with or without nut

Sizes	Part no.
¾" standard thread 25mm tail	RXPTV20
¾" long thread 45mm tail c/w nut	RXPTV20L
¾" long thread 45mm tail bent arm	RXPTV20B



PIPE CUTTER

Sizes	Part no.
Up to 32mm (Medium)	1769
Up to 63mm (Large	1770



SPANNER

Sizes	Part no.
20 - 32mm 'Y' spanner (plastic)	702431
32 - 63mm "C" spanner	7057
40 - 63mm 'Y' spanner	7047
50 - 110mm 'C' spanner	7050



SQUEEZE OFF TOOLS

Sizes	Part number
20-32mm	MINI2032
20-63mm	MIDI2063



(oc) (cc)

PIPE CLIPS Suitable for MDPE pipe

Sizes	Part number
16mm (oc)	4305
20mm (oc)	4306
25mm (oc)	4307
32mm (cc)	4308
40mm (cc)	4309
50mm (cc)	4310
63mm (cc)	4312
90mm (cc)	4313
110mm (cc)	4314

(oc) openclip, (cc) closedclip.



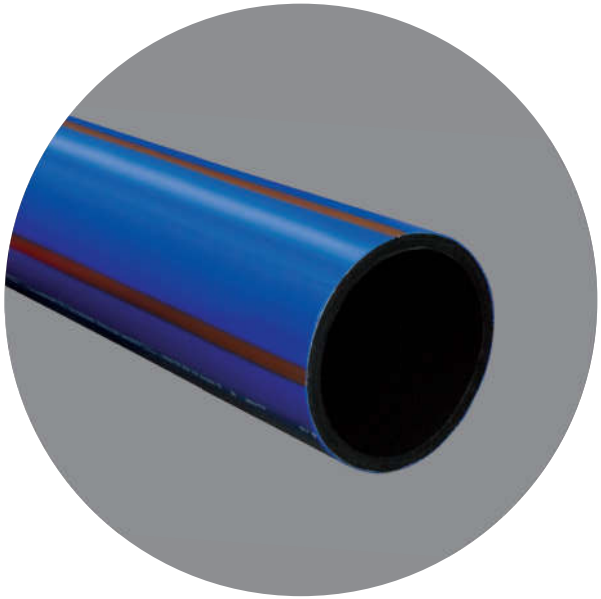
PIPE REPAIR KITS

Sizes	Part number
Pipe repair kit 20mm	PRK20
Pipe repair kit 25mm	PRK25
Pipe repair kit 32mm	PRK32

N.B. All threads are BSP tapered. Use PTFE Tape on threads for lubrication purposes. Do not overtighten.

PROTECTA-LINE

THE TRIED & TRUSTED BARRIER SYSTEM







Protecta-Line pipe

For contaminated land







STICKS SDR 11

Size (mm)	6M Product Code	12M Product Code
63	44 512 311	-
90	44 512 313	44 527 313
110	44 512 314	44 527 314
125	44 512 315	44 652 315
160	44 512 317	44 652 317
180	44 512 318	44 652 318
225	44 512 320	44 652 320
250	44 512 321	44 652 321
280	44 512 322	44 652 322
315	44 512 323	44 652 323
355	44 512 324	44 527 324
400	44 512 325	44 527 325
450	44 512 326	44 527 326
500	44 512 327	44 527 327
560	44 512 328	44 527 328
630	44 512 329	44 527 329

STICKS SDR 17

Size (mm)	6M Product Code	12M Product Code
90	44 653 313	44 654 313
110	44 653 314	44 654 314
125	44 653 315	44 654 315
160	44 653 317	44 654 317
180	44 653 318	44 654 318
225	44 653 320	44 654 320
250	44 653 321	44 654 321
280	44 653 322	44 654 322
315	44 653 323	44 654 323
355	44 653 324	44 654 324
400	44 506 325	44 507 325
450	44 506 326	44 507 326
500	44 506 327	44 507 327
560	44 506 328	44 507 328
630	44 506 329	44 507 329

COILS

Size (mm)	SDR	25M Product Code	50M Product Code	100M Product Code
25	11	44 658 307	44 659 307	-
32	11	44 658 308	44 659 308	-
63	11	44 658 311	44 659 311	44 660 311
90	11	-	44 659 313	44 660 313
	17	-	44 655 313	44 656 313
110	11	-	44 659 314	44 660 314
	17	-	44 655 314	44 656 314
125	11	-	44 659 315	44 660 315
	17	-	44 655 315	44 656 315
160	11		44 659 317	44 660 317
	17	-	44 655 317	44 656 317
180	11	-	44 659 318	44 660 318
	17	-	44 655 318	44 656 318

Protecta-Line 3^{C} & 3^{CTH}

For contaminated land



3^{C} – Clean, capped coils for installation without pre-clorination

3^{C} **SDR 11**

Size (mm)	25M Product Code	50M Product Code	100M Product Code
63	44 845 311	-	44 860 311
90	44 845 313	44 862 313	44 860 313
110	44 845 314	44 862 314	44 860 314
125	44 845 315	44 862 315	44 860 315
160	44 845 317	44 862 317	44 860 317
180	44 845 318	44 862 318	44 860 318

3^{C} **SDR 17**

Size (mm)	25M Product Code	50M Product Code	100M Product Code
90	44 846 313	44 847 313	44 849 313
110	44 846 314	44 847 314	44 849 314
125	44 846 315	44 847 315	44 849 315
160	44 846 317	44 847 317	44 849 317
180	44 846 318	44 847 318	44 849 318



3^{CTH} – Clean, capped coils with towing head for installation without pre-clorination

3^{CTH} **SDR 11**

Size (mm)	25M Product Code	50M Product Code	100M Product Code
63	44 850 311	-	44 852 311
90	44 850 313	44 851 313	44 852 313
110	44 850 314	44 851 314	44 852 314
125	44 850 315	44 851 315	44 852 315
160	44 850 317	44 851 317	44 852 317
180	44 850 318	44 851 318	44 852 318

3^{CTH} **SDR 17**

Size (mm)	25M Product Code	50M Product Code	100M Product Code
90	44 853 313	44 854 313	44 855 313
110	44 853 314	44 854 314	44 855 314
125	44 853 315	44 854 315	44 855 315
160	44 853 317	44 854 317	44 855 317
180	44 853 318	44 854 318	44 855 318

Protecta-Line compression fittings

For contaminated land



PE TO PE COUPLERS

Size (mm)	Product Code
25 x 25	44 100 307
32 x 32	44 100 308
63 x 63	44 100 311



PE TO COPPER COUPLERS

Size (mm)	Product Code
25 x 15	44 996 005
25 x 22	44 996 006
32 x 28	44 996 007



PE TO PE REDUCING COUPLERS

Size (mm)	Product Code
32 x 25	44 114 409
63 x 25	44 114 412
63 x 32	44 114 415



EQUAL TEES

Size (mm)	Product Code
25 x 25	44 122 307
32 x 32	44 122 308
63 x 63	44 122 311



90° ELBOWS

Size (mm)	Product Code
25	44 115 307
32	44 115 308
63	44 115 311



REDUCING SETS – TO ALLOW EASY PROTECTA-LINE DIAMETER CHANGES

Size (mm)	Product Code
32 x 25	44 105 409
63 x 32	44 105 415



END CONNECTORS – PE X FEMALE IRON BSP TAPERED

Size (mm x inch)	Product Code
25 x ¾	44 101 608
32 x 1	44 101 612
63 x 2	44 101 629



STOP COCKS – BS 5433 TYPE

Size (mm)	Product Code
25*	44 142 307
32**	44 142 308

* Includes 22mm copper Type A insert
** Includes 28mm copper Type A insert

Protecta-Line compression fittings

For contaminated land



END CONNECTORS – PE X MALE IRON BSP TAPERED

Size (mm x inch)	Product Code
25 x ¾	44 151 608
32 x ¾	44 151 611
32 x 1	44 151 612
63 x 1½	44 151 628
63 x 2	44 151 629



90° ELBOWS – PE X FEMALE IRON BSP TAPERED

Size (mm x inch)	Product Code
25 x ¾	44 396 608
32 x 1	44 396 612
63 x 2	44 396 629

Protecta-Line electrofusion fittings

For contaminated land



COUPLERS – REMOVABLE CENTRE STOP

Size (mm)	SDR	Black Code
90	11	PF 612 687
110	11	PF 612 688
125	11	PF 612 689
160	11	PF 612 691



REDUCERS

Size d x d[1] (mm)	Black Code
110 x 90	PF 615 693
125 x 90	PF 615 694
125 x 110	PF 616 510
160 x 110	PF 615 695
180 x 125	PF 616 511



90° ELBOWS

Size (mm)	Black Code
90	PF 612 103
110	PF 612 105
125	PF 612 107
160	PF 615 276
180	PF 615 689



COUPLERS – SLIDEOVER

Size (mm)	SDR	Black Code
180	11	PF 612 672
225	11	PF 612 674
250	11	PF 612 675
280	11	PF 615 073
315	11	PF 612 670
355	11	PF 615 074



EQUAL TEES

Size (mm)	Black Code
90	PF 612 166
110	PF 612 167
125	PF 612 168
160	PF 615 277
180	PF 615 691



45° ELBOWS

Size (mm)	Black Code
90	PF 612 102
110	PF 612 104
125	PF 612 106
160	PF 615 275
180	PF 615 687



FLANGED TEES

Size (mm)	SDR	Black Code
90 x 80 PN16	11	PF 301 313
110 x 80 PN16	11	PF 301 314
125 x 80 PN16	11	PF 301 315
160 x 80 PN16	11	PF 301 317
180 x 80 PN16	11	PF 301 318
90 x 100 PN16	11	PF 302 313
110 x 100 PN16	11	PF 302 314
125 x 100 PN16	11	PF 302 315
160 x 100 PN16	11	PF 302 317
180 x 100 PN16	11	PF 302 318
160 x 150 PN16	11	PF 303 317
180 x 150 PN16	11	PF 303 318



FLANGE ADAPTOR KIT

Size (mm)	SDR	Black Code
90 x 80	11	PF 251 313
110 x 100	11	PF 251 314
125 x 100	17	PF 250 315
160 x 150	17	PF 250 317
180 x 150	17	PF 250 318
225 x 200	17	PF 250 320
250 x 200	17	PF 250 534
250 x 250	17	PF 250 321
280 x 250	17	PF 250 322
315 x 250	17	PF 250 543
315 x 300	17	PF 250 323
355 x 300	17	PF 250 547
355 x 350	17	PF 250 324

Protecta-Line fabrications

For contaminated land



REDUCERS

Size (mm)	SDR 11 Code	SDR 17 Code
110 x 90	44 323 483	44 322 483
125 x 90	44 323 484	44 322 484
160 x 90	44 323 486	44 322 486
160 x 110	44 323 495	44 322 495
160 x 125	44 323 504	44 322 504
180 x 90	44 323 487	44 322 487
180 x 125	44 323 505	44 322 505
225 x 160	44 323 507	44 322 507
250 x 125	44 323 508	44 322 508
250 x 180	44 323 529	44 322 529
315 x 180	44 323 531	44 322 531
315 x 250	44 323 543	44 322 543
355 x 180	44 323 532	44 322 532
355 x 250	44 323 544	44 322 544
355 x 315	44 323 547	44 322 547



STUB FLANGE ASSEMBLIES PN16

Size (mm)	SDR 11 Code	SDR 17 Code
90 x DN80	44 327 313	44 326 313
110 x DN100	44 327 314	44 326 314
125 x DN100	44 327 315	44 326 315
160 x DN150	44 327 317	44 326 317
180 x DN150	44 327 318	44 326 318
225 x DN200	44 327 320	44 326 320
250 x DN250	44 327 321	44 326 321
280 x DN250	44 327 322	44 326 322
315 x DN300	44 327 323	44 326 323
355 x DN350	44 327 324	44 326 324



EQUAL TEES

Size (mm)	SDR 11 Code	SDR 17 Code
90	44 321 313	44 320 313
110	44 321 314	44 320 314
125	44 321 315	44 320 315
160	44 321 317	44 320 317
180	44 321 318	44 320 318
225	44 321 320	44 320 320
250	44 321 321	44 320 321
280	44 321 322	44 320 322
315	44 321 323	44 320 323
355	44 321 324	44 320 324



SLIMFLANGE ASSEMBLIES

Size (mm)	SDR 11 Code	SDR 17 Code
250 x DN200	44 453 321	44 452 321
315 x DN250	44 453 323	44 452 323
355 x DN300	44 453 324	44 452 324



FLANGED SHORT BRANCH TEES

Size (mm)	SDR 11 Code	SDR 17 Code
90 x DN80	44 341 313	44 310 313
110 x DN80	44 341 314	44 310 314
125 x DN80	44 341 315	44 310 315
160 x DN80	44 341 317	44 310 317
180 x DN80	44 341 318	44 310 318
225 x DN80	44 341 320	44 310 320
250 x DN80	44 341 321	44 310 321
280 x DN80	44 341 322	44 310 322
315 x DN80	44 341 323	44 310 323
355 x DN80	44 341 324	44 310 324
90 x DN100	44 342 313	44 311 313
110 x DN100	44 342 314	44 311 314
125 x DN100	44 342 315	44 311 315
160 x DN100	44 342 317	44 311 317
180x DN100	44 342 318	44 311 318
225 x DN100	44 342 320	44 311 320
250 x DN100	44 342 321	44 311 321
280 x DN100	44 342 322	44 311 322
315 x DN100	44 342 323	44 311 323
355 x DN100	44 342 324	44 311 324
160 x DN150	44 343 317	44 312 317
180 x DN150	44 343 318	44 312 318
225 x DN150	44 343 320	44 312 320
250 x DN150	44 343 321	44 312 321
280 x DN150	44 343 322	44 312 322
315 x DN150	44 343 323	44 312 323
355 x DN150	44 343 324	44 312 324

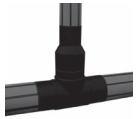


END CAPS

Size (mm)	SDR 11 Code	SDR 17 Code
90	44 332 313	44 331 313
110	44 332 314	44 331 314
125	44 332 315	44 331 315
160	44 332 317	44 331 317
180	44 332 318	44 331 318
225	44 332 320	44 331 320
250	44 332 321	44 331 321
280	44 332 322	44 331 322
315	44 332 323	44 331 323
355	44 332 324	44 331 324

Protecta-Line fabrications

For contaminated land



REDUCED BRANCH TEES

Size (mm)	Size (mm)	SDR 11 Code	SDR 17 Code
90mm Branch	110	44 347 314	44 356 314
	125	44 347 315	44 356 315
	160	44 347 317	44 356 317
	180	44 347 318	44 356 318
	225	44 347 320	44 356 320
	250	44 347 321	44 356 321
	280	44 347 322	44 356 322
	315	44 347 323	44 356 323
	355	44 347 324	44 356 324
125mm Branch	180	44 348 318	44 357 318
	225	44 348 320	44 357 320
	250	44 348 321	44 357 321
	280	44 348 322	44 357 322
	315	44 348 323	44 357 323
	355	44 348 324	44 357 324
180mm Branch	225	44 349 320	44 358 320
	250	44 349 321	44 358 321
	280	44 349 322	44 358 322
	315	44 349 323	44 358 323
	355	44 349 324	44 358 324
250mm Branch	315	44 335 323	44 336 323
	355	44 335 324	44 336 324



90° MITRED ELBOWS

Size (mm)	SDR 11 Code	SDR 17 Code
90	44 244 313	44 243 313
110	44 244 314	44 243 314
125	44 244 315	44 243 315
160	44 244 317	44 243 317
180	44 244 318	44 243 318
225	44 244 320	44 243 320
250	44 244 321	44 243 321
280	44 244 322	44 243 322
315	44 244 323	44 243 323
355	44 244 324	44 243 324



45° MITRED ELBOWS

Size (mm)	SDR 11 Code	SDR 17 Code
90	44 242 313	44 241 313
110	44 242 314	44 241 314
125	44 242 315	44 241 315
160	44 242 317	44 241 317
180	44 242 318	44 241 318
225	44 242 320	44 241 320
250	44 242 321	44 241 321
280	44 242 322	44 241 322
315	44 242 323	44 241 323
355	44 242 324	44 241 324



22.5° MITRED ELBOWS

Size (mm)	SDR 11 Code	SDR 17 Code
90	44 317 313	44 316 313
110	44 317 314	44 316 314
125	44 317 315	44 316 315
160	44 317 317	44 316 317
180	44 317 318	44 316 318
225	44 317 320	44 316 320
250	44 317 321	44 316 321
280	44 317 322	44 316 322
315	44 317 323	44 316 323
355	44 317 324	44 316 324



11.25° MITRED ELBOWS

Size (mm)	SDR 11 Code	SDR 17 Code
90	44 298 313	44 297 313
110	44 298 314	44 297 314
125	44 298 315	44 297 315
160	44 298 317	44 297 317
180	44 298 318	44 297 318
225	44 298 320	44 297 320
250	44 298 321	44 297 321
280	44 298 322	44 297 322
315	44 298 323	44 297 323
355	44 298 324	44 297 324

Protecta-Line mechanical fittings

For contaminated land



COUPLERS

Size (mm)	SDR	Product Code
63	11	PM 110 311
90	11	PM 100 313
	17	PM 109 313
110	11	PM 100 314
	17	PM 109 314
125	11	PM 100 315
	17	PM 109 315
160	11	PM 100 317
	17	PM 109 317
180	11	PM 100 318
	17	PM 109 318



REPAIR COUPLERS

Size (mm)	SDR	Product Code
63	11	PM 246 311
90	11	PM 246 313
	17	PM 245 313
110	11	PM 246 314
	17	PM 245 314
125	11	PM 246 315
	17	PM 245 315
160	11	PM 246 317
	17	PM 245 317
180	11	PM 246 318
	17	PM 245 318



90° ELBOWS

Size (mm)	SDR	Product Code
63	11	PM 209 311
90	11	PM 210 313
	17	PM 208 313
110	11	PM 210 314
	17	PM 208 314
125	11	PM 210 315
	17	PM 208 315
160	11	PM 210 317
	17	PM 208 317
180	11	PM 210 318
	17	PM 208 318



REDUCERS

Size (mm)	SDR	Product Code
90 x 63	11	PM 441 459
110 x 90	11	PM 441 483
	17	PM 440 483
125 x 110	11	PM 441 493
	17	PM 440 493
160 x 125	11	PM 441 504
	17	PM 440 504
180 x 125	17	PM 440 505



EQUAL TEES

Size (mm)	SDR	Product Code
63	11	PM 221 311
90	11	PM 222 313
	17	PM 220 313
110	11	PM 222 314
	17	PM 220 314
125	11	PM 222 315
	17	PM 220 315
160	11	PM 222 317
	17	PM 220 317
180	11	PM 222 318
	17	PM 220 318



STUB FLANGE ADAPTORS

Size (mm)	SDR	Product Code
63 x DN50 PN16	11	PM 227 311
63 x DN80 PN16	11	PM 228 311
90 x DN80 PN16	11	PM 228 313
	17	PM 226 313
110 x DN100 PN16	11	PM 228 314
	17	PM 226 314
125 x DN100 PN16	11	PM 228 315
	17	PM 226 315
160 x DN150 PN16	11	PM 228 317
	17	PM 226 317
180 x DN150 PN16	11	PM 228 318
	17	PM 226 318



45° ELBOWS

Size (mm)	SDR	Product Code
63	11	PM 215 311
90	11	PM 216 313
	17	PM 214 313
110	11	PM 216 314
	17	PM 214 314
125	11	PM 216 315
	17	PM 214 315
160	11	PM 216 317
	17	PM 214 317
180	11	PM 216 318
	17	PM 214 318

Protecta-Line mechanical fittings

For contaminated land



FLANGED BRANCH TEES

Size (mm)	SDR	Product Code
90 x DN80 PN16	11	PM 351313
	17	PM 363313
110 x DN80 PN16	11	PM 351 314
	17	PM 363 314
125 x DN80 PN16	17	PM 363 315
160 x DN80 PN16	17	PM 363 317
180 x DN80 PN16	17	PM 363 318
90 x DN100 PN16	11	PM 352 313
	17	PM 364 313
110 x DN100 PN16	11	PM 352 314
	17	PM 364 314
125 x DN100 PN16	17	PM 364 315
160 x DN100 PN16	17	PM 364 317
180 x DN100 PN16	17	PM 364 318
160 x DN150 PN16	17	PM 365 317
180 x DN150 PN16	17	PM 365 318



DUCK FOOT BENDS

Size (mm)	SDR	Product Code
63 x DN80 PN16	11	PM 384 459
90 x DN80 PN16	11	PM 384 313
	17	PM 385 313
110 x DN80 PN16	11	PM 384 483
	17	PM 385 483
125 x DN80 PN16	17	PM 385 484
160 x DN80 PN16	17	PM 385 486
180 x DN80 PN16	17	PM 385 487

Protecta-Line ferrule off-takes

For contaminated land



STAINLESS STEEL 25MM AND 32MM SELF-TAPPING FERRULE OFF-TAKES

25MM

Size (mm)	Product Code
63 x 25	44 763 412
90-125 x 25	44 763 393
160-180 x 25	44 763 397

32MM

Size (mm)	Product Code
63 x 32	44 763 415
90-125 x 32	44 763 417
160-180 x 32	44 763 421



DUCTILE IRON FERRULE

Size (mm x inches)	Product Code
25 x ¾ MI	44 762 407



GUNMETAL 25MM AND 32MM SELF-TAPPING FERRULE OFF-TAKES

25MM

Size (mm)	Product Code
225 x 25	44 762 400
250 x 25	44 762 401
280 x 25	44 762 402
315 x 25	44 762 403
355 x 25	44 762 404

32MM

Size (mm)	Product Code
225 x 32	44 762 424
250 x 32	44 762 425
280 x 32	44 762 426
315 x 32	44 762 427
355 x 32	44 762 428

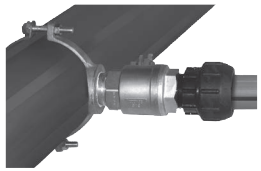
Protecta-Line ferrule off-takes

For contaminated land



90° GUNMETAL ELBOWS

Size (inch x inch)	Product Code
2" MI x 2" FI	44 996 050



63MM FERULE OFF-TAKES

Size (mm)	Product Code
90 x 63	44 762 459
110 x 63	44 762 460
125 x 63	44 762 461
160 x 63	44 762 463
180 x 63	44 762 464
225 x 63	44 762 466
250 x 63	44 762 467
280 x 63	44 762 468
315 x 63	44 762 469
355 x 63	44 762 470



DRILL AND LINER TOOL HEADS

	Product Code
Protecta-Line 2" Drill Head	44 794 003
Protecta-Line 2" Liner Head	44 794 004
Protecta-Line Drill/ Liner Head O-Ring Kit	44 996 062

Protecta-Line accessories



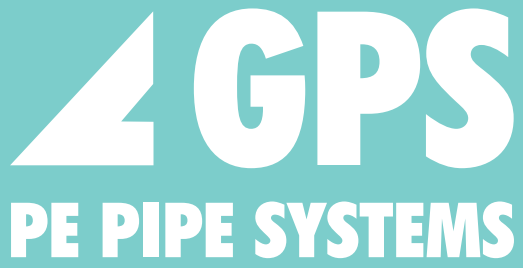
ALUMINIUM WRAPPING TAPE

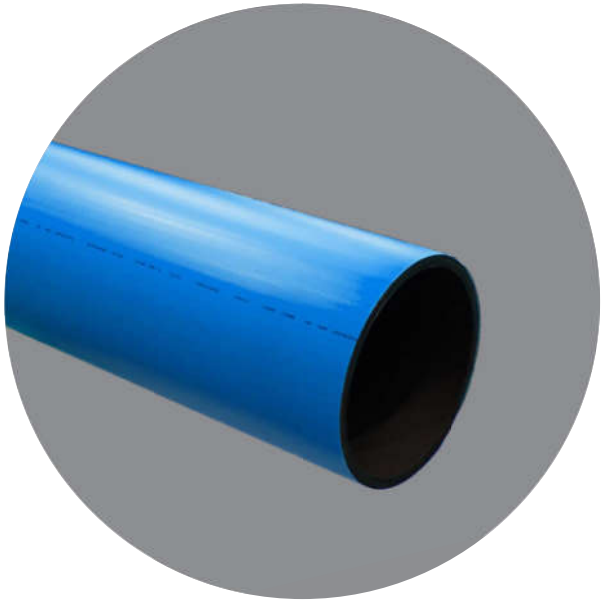
Description	Product Code
Aluminium wrapping tape (45m long x 50mm wide)	44 996 008

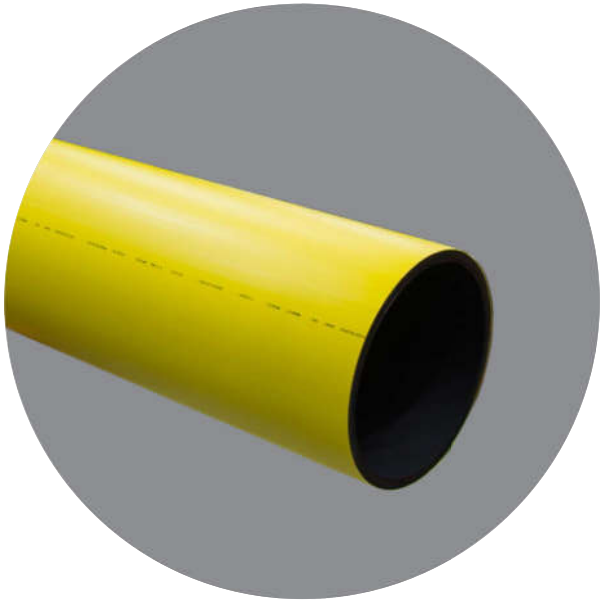


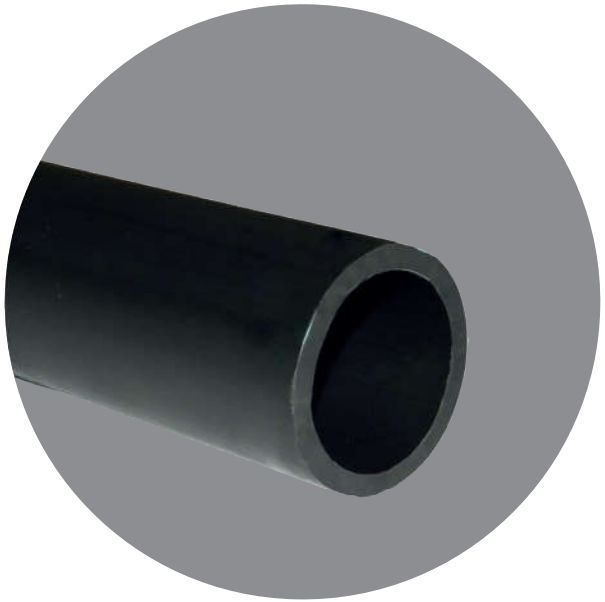
SILICONE TAPE

Description	Product Code
Silicone tape 10.9m long x 48mm wide	53 996 001


GPS
PE PIPE SYSTEMS







GPS blue pipe

For potable water applications









STICKS — SDR 11

Size (mm)	Length (m)	Product Code
50	6	51 512 310
63	6	51 513 311
75	6	21 512 312
	12	21 527 312
90	6	21 512 313
	12	21 527 313
110	6	21 512 314
	12	21 527 314
125	6	21 512 315
	12	21 527 315
160	6	21 512 317
	12	21 527 317
180	6	21 512 318
	12	21 527 318
200	6	21 512 319
	12	21 527 319
225	6	21 512 320
	12	21 527 320
250	6	21 512 321
	12	21 527 321
280	6	21 512 322
	12	21 527 322
315	6	21 512 323
	12	21 527 323
355	6	21 512 324
	12	21 527 324
400	6	21 512 325
	12	21 527 325
450	6	21 512 326
	12	21 527 326
500	6	21 512 327
	12	21 527 327
560	6	21 512 328
	12	21 527 328
630	6	21 512 329
	12	21 527 329
710	6	21 512 330
	12	21 527 330

COILS — SDR 11

Size (mm)	Length (m)	Product Code
20	25	51 558 306
	50	51 559 306
	100	51 560 306
	150	51 561 306
25	25	51 558 307
	50	51 559 307
	100	51 560 307
	150	51 561 307
32	25	51 558 308
	50	51 559 308
	100	51 560 308
	150	51 561 308
50	25	51 558 310
	50	51 559 310
	100	51 560 310
	150	51 561 310
63	25	51 558 311
	50	51 559 311
	100	51 560 311
	150	51 561 311
75	50	21 559 312
	100	21 560 312
90	50	21 559 313
	100	21 560 313
110	50	21 559 314
	100	21 560 314
125	50	21 559 315
	100	21 560 315
160	50	21 559 317
	100	21 560 317
180	50	21 559 318
	100	21 560 318

STICKS — SDR 17

Size (mm)	Length (m)	Product Code
75	6	21 506 312
	12	21 507 312
90	6	21 506 313
	12	21 507 313
110	6	21 506 314
	12	21 507 314
125	6	21 506 315
	12	21 507 315
160	6	21 506 317
	12	21 507 317
180	6	21 506 318
	12	21 507 318
200	6	21 506 319
	12	21 507 319
225	6	21 506 320
	12	21 507 320
250	6	21 506 321
	12	21 507 321
280	6	21 506 322
	12	21 507 322
315	6	21 506 323
	12	21 507 323
355	6	21 506 324
	12	21 507 324
400	6	21 506 325
	12	21 507 325
450	6	21 506 326
	12	21 507 326
500	6	21 506 327
	12	21 507 327
560	6	21 506 328
	12	21 507 328
630	6	21 506 329
	12	21 507 329
710	6	21 506 330
	12	21 507 330
800	6	21 506 332
	12	21 507 332

STICKS — SDR 17

Size (mm)	Length (m)	Product Code
900	6	21 506 333
	12	21 507 333
1000	6	21 506 334
	12	21 507 334
1200	6	21 506 335
	12	21 507 335



COILS — SDR 17

Size (mm)	Length (m)	Product Code
75	50	21 548 312
	100	21 549 312
90	50	21 548 313
	100	21 549 313
110	50	21 548 314
	100	21 549 314
125	50	21 548 315
	100	21 549 315
160	50	21 548 317
	100	21 549 317
180	50	21 548 318
	100	21 549 318

GPS blue pipe

For potable water applications





STICKS **SDR 21**

Size (mm)	Length (m)	Product Code
160	6	21 519 317
	12	21 539 317
180	6	21 519 318
	12	21 539 318
200	6	21 519 319
	12	21 539 319
225	6	21 519 320
	12	21 539 320
250	6	21 519 321
	12	21 539 321
280	6	21 519 322
	12	21 539 322
315	6	21 519 323
	12	21 539 323
355	6	21 519 324
	12	21 539 324
400	6	21 519 325
	12	21 539 325
450	6	21 519 326
	12	21 539 326
500	6	21 519 327
	12	21 539 327
560	6	21 519 328
	12	21 539 328
630	6	21 519 329
	12	21 539 329
710	6	21 519 330
	12	21 539 330
800	6	21 519 332
	12	21 539 332
900	6	21 519 333
	12	21 539 333
1000	6	21 519 334
	12	21 539 334
1200	6	21 519 335
	12	21 539 335

STICKS **SDR 26**

Size (mm)	Length (m)	Product Code
160	6	21 518 317
	12	21 528 317
180	6	21 518 318
	12	21 528 318
200	6	21 518 319
	12	21 528 319
225	6	21 518 320
	12	21 528 320
250	6	21 518 321
	12	21 528 321
280	6	21 518 322
	12	21 528 322
315	6	21 518 323
	12	21 528 323
355	6	21 518 324
	12	21 528 324
400	6	21 518 325
	12	21 528 325
450	6	21 518 326
	12	21 528 326
500	6	21 518 327
	12	21 528 327
560	6	21 518 328
	12	21 528 328
630	6	21 518 329
	12	21 528 329
710	6	21 518 330
	12	21 528 330
800	6	21 518 332
	12	21 528 332
900	6	21 518 333
	12	21 528 333
1000	6	21 518 334
	12	21 528 334
1200	6	21 518 335
	12	21 528 335

GPS blue 3^{C} & 3^{CTH}

For potable water applications





3^{C} – Clean, capped coils for installation without pre-clorination
3^{CTH} – Clean, capped coils with towing head for installation without pre-clorination

COILS **SDR 11**

Size (mm)	Length (m)	3^{C} Product Code	3^{CTH} Product Code
32	50	51 845 308	-
	100	51 860 308	-
63	50	51 845 311	51 850 311
	100	51 860 311	51 852 311
90	50	21 845 313	21 850 313
	75	21 862 313	21 851 313
	100	21 860 313	21 852 313
110	50	21 845 314	21 850 314
	75	21 862 314	21 851 314
	100	21 860 314	21 852 314
125	50	21 845 315	21 850 315
	75	21 862 315	21 851 315
	100	21 860 315	21 852 315
160	50	21 845 317	21 850 317
	75	21 862 317	21 851 317
	100	21 860 317	21 852 317
180	50	21 845 318	21 850 318
	75	21 862 318	21 851 318
	100	21 860 318	21 852 318

COILS **SDR 17**

Size (mm)	Length (m)	3^{C} Product Code	3^{CTH} Product Code
90	50	21 846 313	21 853 313
	75	21 847 313	21 854 313
	100	21 849 313	21 855 313
110	50	21 846 314	21 853 314
	75	21 847 314	21 854 314
	100	21 849 314	21 855 314
125	50	21 846 315	21 853 315
	75	21 847 315	21 854 315
	100	21 849 315	21 855 315
160	50	21 846 317	21 853 317
	75	21 847 317	21 854 317
	100	21 849 317	21 855 317
180	50	21 846 318	21 853 318
	75	21 847 318	21 854 318
	100	21 849 318	21 855 318

GPS black pipe

For raw water and sewage applications



STICKS — SDR 11

Size (mm)	Length (m)	Product Code
50	6	50 512 310
63	6	50 513 311
75	6	40 512 312
	12	40 527 312
90	6	40 512 313
	12	40 527 313
110	6	40 512 314
	12	40 527 314
125	6	40 512 315
	12	40 527 315
160	6	40 512 317
	12	40 527 317
180	6	40 512 318
	12	40 527 318
200	6	40 512 319
	12	40 527 319
225	6	40 512 320
	12	40 527 320
250	6	40 512 321
	12	40 527 321
280	6	40 512 322
	12	40 527 322
315	6	40 512 323
	12	40 527 323
355	6	40 512 324
	12	40 527 324
400	6	40 512 325
	12	40 527 325
450	6	40 512 326
	12	40 527 326
500	6	40 512 327
	12	40 527 327
560	6	40 512 328
	12	40 527 328
630	6	40 512 329
	12	40 527 329
710	6	40 512 330
	12	40 527 330



COILS — SDR 11

Size (mm)	Length (m)	Product Code
20	25	50 558 306
	50	50 559 306
	100	50 560 306
	150	50 561 306
25	25	50 558 307
	50	50 559 307
	100	50 560 307
	150	50 561 307
32	25	50 558 308
	50	50 559 308
	100	50 560 308
	150	50 561 308
50	25	50 558 310
	50	50 559 310
	100	50 560 310
	150	50 561 310
63	25	50 558 311
	50	50 559 311
	100	50 560 311
	150	50 561 311
75	50	21 559 312
	100	21 560 312
90	50	40 559 313
	100	40 560 313
110	50	40 559 314
	100	40 560 314
125	50	40 559 315
	100	40 560 315
160	50	40 559 317
	100	40 560 317
180	50	40 559 318
	100	40 560 318



STICKS — SDR 17

Size (mm)	Length (m)	Product Code
90	6	40 506 313
	12	40 507 313
110	6	40 506 314
	12	40 507 314
125	6	40 506 315
	12	40 507 315
160	6	40 506 317
	12	40 507 317
180	6	40 506 318
	12	40 507 318
200	6	40 506 319
	12	40 507 319
225	6	40 506 320
	12	40 507 320
250	6	40 506 321
	12	40 507 321
280	6	40 506 322
	12	40 507 322
315	6	40 506 323
	12	40 507 323
355	6	40 506 324
	12	40 507 324
400	6	40 506 325
	12	40 507 325
450	6	40 506 326
	12	40 507 326
500	6	40 506 327
	12	40 507 327
560	6	40 506 328
	12	40 507 328
630	6	40 506 329
	12	40 507 329
710	6	40 506 330
	12	40 507 330
800	6	40 506 332
	12	40 507 332
900	6	40 506 333
	12	40 507 333

STICKS — SDR 17

Size (mm)	Length (m)	Product Code
1000	6	40 506 334
	12	40 507 334
1200	6	40 506 335
	12	40 507 335



COILS — SDR 17

Size (mm)	Length (m)	Product Code
75	50	40 548 312
	100	40 549 312
90	50	40 548 313
	100	40 549 313
110	50	40 548 314
	100	40 549 314
125	50	40 548 315
	100	40 549 315
160	50	40 548 317
	100	40 549 317
180	50	40 548 318
	100	40 549 318

GPS black pipe

For raw water and sewage applications



STICKS **SDR 21**

Size (mm)	Length (m)	Product Code
160	6	40 519 317
	12	40 539 317
180	6	40 519 318
	12	40 539 318
200	6	40 519 319
	12	40 539 319
225	6	40 519 320
	12	40 539 320
250	6	40 519 321
	12	40 539 321
280	6	40 519 322
	12	40 539 322
315	6	40 519 323
	12	40 539 323
355	6	40 519 324
	12	40 539 324
400	6	40 519 325
	12	40 539 325
450	6	40 519 326
	12	40 539 326
500	6	40 519 327
	12	40 539 327
560	6	40 519 328
	12	40 539 328
630	6	40 519 329
	12	40 539 329
710	6	40 519 330
	12	40 539 330
800	6	40 519 332
	12	40 539 332
900	6	40 519 333
	12	40 539 333
1000	6	40 519 334
	12	40 539 334
1200	6	40 519 335
	12	40 539 335



STICKS **SDR 26**

Size (mm)	Length (m)	Product Code
160	6	40 518 317
	12	40 528 317
180	6	40 518 318
	12	40 528 318
200	6	40 518 319
	12	40 528 319
225	6	40 518 320
	12	40 528 320
250	6	40 518 321
	12	40 528 321
280	6	40 518 322
	12	40 528 322
315	6	40 518 323
	12	40 528 323
355	6	40 518 324
	12	40 528 324
400	6	40 518 325
	12	40 528 325
450	6	40 518 326
	12	40 528 326
500	6	40 518 327
	12	40 528 327
560	6	40 518 328
	12	40 528 328
630	6	40 518 329
	12	40 528 329
710	6	40 518 330
	12	40 528 330
800	6	40 518 332
	12	40 528 332
900	6	40 518 333
	12	40 528 333
1000	6	40 518 334
	12	40 528 334
1200	6	40 518 335
	12	40 528 335

GPS yellow pipe

For low and intermediate pressure gas applications



STICKS — SDR 11

Size (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



STICKS — SDR 13.6

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



STICKS — SDR 17.6

Size (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



STICKS — SDR 21

Size (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

GPS yellow pipe

For low and intermediate pressure gas applications



COILS — SDR 11

Size (mm)	Length (m)	Product Code
16	50	58 559 305
20	50	52 559 306
	100	52 560 306
25	50	52 559 307
	100	52 560 307
32	50	52 559 308
	100	52 560 308
	150	52 561 308
40	100	58 560 309
55	100	58 560 301
	150	58 561 301
63	50	52 559 311
	100	52 560 311
90	50	25 559 313
	100	25 560 313
125	50	25 559 315
	100	25 560 315
180	50	25 559 318
	100	25 560 318



COILS — SDR 13.6

Size (mm)	Length (m)	Product Code
63	50	52 577 311
	100	52 578 311
	150	52 579 311
75	50	25 577 312
	100	25 578 312



COILS — SDR 17.6

Size (mm)	Length (m)	Product Code
90	50	25 569 313
	100	25 570 313
125	50	25 569 315
	100	25 570 315
140	50	25 569 316
	100	25 570 316
180	50	25 569 318
	100	25 570 318

GPS orange pipe

For high pressure gas applications





STICKS SDR 11

Size (mm)	Length (m)	Product Code
63	6	48 512 311
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

COILS SDR 11

Size (mm)	Length (m)	Product Code
63	50	48 559 311
	100	48 560 311
75	50	48 559 312
	100	48 560 312
90	50	48 559 313
	100	48 560 313
125	50	48 559 315
	100	48 560 315
180	50	48 559 318
	100	48 560 318

GPS white pipe

For above ground applications

White pipe coils up to 180mm can be made to order subject to a minimum order value – please contact our customer services team for further information.



STICKS **SDR 11**

Size (mm)	Length (m)	Product Code
180	6	27 512 318
	12	27 527 318
200	6	27 512 319
	12	27 527 319
225	6	27 512 320
	12	27 527 320
250	6	27 512 321
	12	27 527 321
280	6	27 512 322
	12	27 527 322
315	6	27 512 323
	12	27 527 323
355	6	27 512 324
	12	27 527 324
400	6	27 512 325
	12	27 527 325
450	6	27 512 326
	12	27 527 326
500	6	27 512 327
	12	27 527 327
560	6	27 512 328
	12	27 527 328
630	6	27 512 329
	12	27 527 329



STICKS **SDR 17**

Size (mm)	Length (m)	Product Code
180	6	27 506 318
	12	27 507 318
200	6	27 506 319
	12	27 507 319
225	6	27 506 320
	12	27 507 320
250	6	27 506 321
	12	27 507 321
280	6	27 506 322
	12	27 507 322
315	6	27 506 323
	12	27 507 323
355	6	27 506 324
	12	27 507 324
400	6	27 506 325
	12	27 507 325
450	6	27 506 326
	12	27 507 326
500	6	27 506 327
	12	27 507 327
560	6	27 506 328
	12	27 507 328
630	6	27 506 329
	12	27 507 329



STICKS **SDR 21**

Size (mm)	Length (m)	Product Code
180	6	27 519 318
	12	27 539 318
225	6	27 519 320
	12	27 539 320
250	6	27 519 321
	12	27 539 321
280	6	27 519 322
	12	27 539 322
315	6	27 519 323
	12	27 539 323
355	6	27 519 324
	12	27 539 324
400	6	27 519 325
	12	27 539 325
450	6	27 519 326
	12	27 539 326
500	6	27 519 327
	12	27 539 327
560	6	27 519 328
	12	27 539 328
630	6	27 519 329
	12	27 539 329



STICKS **SDR 26**

Size (mm)	Length (m)	Product Code
180	6	27 518 318
	12	27 528 318
225	6	27 518 320
	12	27 528 320
250	6	27 518 321
	12	27 528 321
280	6	27 518 322
	12	27 528 322
315	6	27 518 323
	12	27 528 323
355	6	27 518 324
	12	27 528 324
400	6	27 518 325
	12	27 528 325
450	6	27 518 326
	12	27 528 326
500	6	27 518 327
	12	27 528 327
560	6	27 518 328
	12	27 528 328
630	6	27 518 329
	12	27 528 329

Enviro-Line

For rainwater harvesting, grey water and irrigation applications



STICKS — SDR 11

Size (mm)	Length (m)	Product Code
63	6	23 512 311
90	6	23 512 313
	12	23 527 313
110	6	23 512 314
	12	23 527 314
125	6	23 512 315
	12	23 527 315
160	6	23 512 317
	12	23 527 317
180	6	23 512 318
	12	23 527 318
200	6	23 512 319
	12	23 527 319
225	6	23 512 320
	12	23 527 320
250	6	23 512 321
	12	23 527 321
280	6	23 512 322
	12	23 527 322
315	6	23 512 323
	12	23 527 323
355	6	23 512 324
	12	23 527 324



COILS — SDR 11

Size (mm)	Length (m)	Product Code
25	50	23 559 307
	100	23 560 307
32	50	23 559 308
	100	23 560 308
40	50	23 559 309
	100	23 560 309
50	50	23 559 310
	100	23 560 310
63	25	23 558 311
	50	23 559 311
	100	23 560 311
90	50	23 559 313
	100	23 560 313
110	50	23 559 314
	100	23 560 314
125	50	23 559 315
	100	23 560 315
160	50	23 559 317
	100	23 560 317
180	50	23 559 318
	100	23 560 318



STICKS — SDR 17

Size (mm)	Length (m)	Product Code
90	6	23 506 313
	12	23 507 313
110	6	23 506 314
	12	23 507 314
125	6	23 506 315
	12	23 507 315
160	6	23 506 317
	12	23 507 317
180	6	23 506 318
	12	23 507 318
200	6	23 506 319
	12	23 507 319
225	6	23 506 320
	12	23 507 320
250	6	23 506 321
	12	23 507 321
280	6	23 506 322
	12	23 507 322
315	6	23 506 323
	12	23 507 323
355	6	23 506 324
	12	23 507 324



COILS — SDR 17

Size (mm)	Length (m)	Product Code
90	50	23 548 313
	100	23 549 313
110	50	23 548 314
	100	23 549 314
125	50	23 548 315
	100	23 549 315
160	50	23 548 317
	100	23 549 317
180	50	23 548 318
	100	23 549 318

Frialen electrofusion fittings


FRIAFIT





Frialen electrofusion fittings

For all applications



COUPLERS – Removable Centre Stop SDR11

Size (mm)	SDR	Product Code
20	11	FL 612 680
25	11	FL 612 681
32	11	FL 612 682
40	11	FL 612 683
50	11	FL 612 684
63	11	FL 612 685
75	11	FL 612 686
90	11	FL 612 687
110	11	FL 612 688
125	11	FL 612 689
140	11	FL 612 690
160	11	FL 612 691



FRIAFIT COUPLERS – Slideover

Size (mm)	SDR	Product Code
110	17	FF 680 001
125	17	FF 680 013
160	17	FF 680 002
180	17	FF 680 003
200	17	FF 680 004
225	17	FF 680 005
250	17	FF 680 006
280	17	FF 680 007



COUPLERS – Slideover SDR 11

Size (mm)	SDR	Product Code
180	11	FL 612 672
200	11	FL 612 673
225	11	FL 612 674
250	11	FL 612 675
280	11	FL 615 073
315	11	FL 612 670
355	11	FL 615 074
400	11	FL 615 075
450	11	FL 615 076
500	11	FL 615 124
560	11	FL 613 312
	17	FL 615 706
630	11	FL 616 269
	17	FL 615 726
710	11	FL 616 313
	17	FL 615 994
800	11	FL 616 314
	17	FL 616 290
900	17	FL 616 345
1000	17	FL 616 403
1200	17	FL 616 416



COUPLERS – Slideover SDR 7.4

Size (mm)	SDR	Product Code
90	7.4	FL 616 270
110	7.4	FL 616 271
125	7.4	FL 616 272
140	7.4	FL 616 273
160	7.4	FL 616 274
180	7.4	FL 616 282
200	7.4	FL 616 283
225	7.4	FL 616 284
250	7.4	FL 616 285
315	7.4	FL 616 287
355	7.4	FL 616 288



COUPLERS – Slideover SDR 9

Size (mm)	SDR	Product Code
400	9	FL 616 441
450	9	FL 616 447
500	9	FL 616 445
560	9	FL 616 446
630	9	FL 616 439



LONG COUPLERS – Removable Centre Stop

Size (mm)	SDR	Product Code
32	11	FL 615 736
40	11	FL 615 737
50	11	FL 615 608
63	11	FL 615 738



CONICAL RING COUPLERS

Size (mm)	SDR	Product Code
1000	17	FL 616 434
1200	17	FL 616 435

Frialen electrofusion fittings

For all applications



REDUCERS

Size (mm)	SDR	Product Code
32 x 20	11	FL 615 386
32 x 25	11	FL 615 502
40 x 20	11	FL 615 387
40 x 32	11	FL 615 388
50 x 20	11	FL 612 069
50 x 32	11	FL 612 070
50 x 40	11	FL 612 071
63 x 32	11	FL 615 389
63 x 40	11	FL 615 390
63 x 50	11	FL 612 072
90 x 50	11	FL 615 391
90 x 63	11	FL 615 392
110 x 63	11	FL 615 393
110 x 90	11	FL 615 693
125 x 63	11	69 402 461
125 x 90	11	FL 615 694
125 x 110	11	FL 616 510
160 x 110	11	FL 615 695
180 x 125	11	FL 616 511
225 x 160	11	FL 616 356



REDUCERS

Size (mm)	SDR	Product Code
250 x 180	11	FL 402 529
315 x 250	11	FL 402 543



UNDER CLAMP SPIGOT SADDLES

Size (mm)	SDR	Product Code
63 x 32	11	FL 612 757
63 x 50	11	FL 612 759
75 x 50	11	FL 615 020
90 x 32	11	FL 615 285
90 x 63	11	FL 612 819
110 x 32	11	FL 615 334
110 x 50	11	FL 615 031
110 x 63	11	FL 612 760
110 x 90	11	FL 615 411
125 x 32	11	FL 615 087
125 x 63	11	FL 612 761
125 x 90	11	FL 615 412
125 x 110	11	FL 615 584
160 x 32	11	FL 612 886
160 x 63	11	FL 612 762
160 x 90	11	FL 615 413
160 x 110	11	FL 615 739
160 x 125	11	FL 615 585
180 x 63	11	FL 612 763
180 x 90	11	FL 615 414
180 x 110	11	FL 615 948
180 x 125	11	FL 615 740
200 x 63	11	FL 612 764
225 x 63	11	FL 612 765
225 x 90	11	FL 615 415
225 x 110	11	FL 616 044
225 x 125	11	FL 616 045
225 x 160	11	FL 616 046



TOP LOADING SPIGOT SADDLES

Size (mm)	SDR	Product Code
250-560(630) x 32	11	FL 615 465
250-560(630) x 63	11	FL 615 466



EQUAL TEES

Size (mm)	SDR	Product Code
25	11	FL 616 338
32	11	FL 615 719
40	11	FL 615 720
50	11	FL 615 721
63	11	FL 615 722



EQUAL TEES

Size (mm)	SDR	Product Code
75	11	FL 612 165
90	11	FL 612 166
110	11	FL 612 167
125	11	FL 612 168
160	11	FL 615 277
180	11	FL 615 691
200	11	FL 616 266
225	11	FL 615 692



LARGE DIAMETER EQUAL TEES

Size (mm)	SDR	Product Code
250	11	FL 616 412
280	11	FL 616 413
315	11	FL 616 414



REDUCED BRANCH TEES

Size (mm)	SDR	Product Code
32 x 20	11	FL 616 417
40 x 32	11	FL 616 418
50 x 32	11	FL 616 419
50 x 40	11	FL 616 420
63 x 32	11	FL 616 421
63 x 40	11	FL 616 422
63 x 50	11	FL 616 423

Frialen electrofusion fittings

For all applications



90° ELBOWS

Size (mm)	SDR	Product Code
25	11	FL 612 091
32	11	FL 612 093
40	11	FL 612 095
50	11	FL 612 097
63	11	FL 612 099
75	11	FL 612 101
90	11	FL 612 103
110	11	FL 612 105
125	11	FL 612 107
160	11	FL 615 276
180	11	FL 615 689
200	11	FL 616 265
225	11	FL 615 690



LARGE DIAMETER 90° ELBOWS

Size (mm)	SDR	Product Code
250	11	FL 616 408
280	11	FL 616 409
315	11	FL 616 410



45° ELBOWS

Size (mm)	SDR	Product Code
32	11	FL 612 092
40	11	FL 612 094
50	11	FL 612 096
63	11	FL 612 098
75	11	FL 612 100
90	11	FL 612 102
110	11	FL 612 104
125	11	FL 612 106
160	11	FL 615 275
180	11	FL 615 687
200	11	FL 616 264
225	11	FL 615 688



LARGE DIAMETER 45° ELBOWS

Size (mm)	SDR	Product Code
250	11	FL 616 404
280	11	FL 616 405
315	11	FL 616 406



30° ELBOWS

Size (mm)	SDR	Product Code
90	11	FL 615 272
110	11	FL 615 273
125	11	FL 615 274
160	11	FL 615 340
180	11	FL 616 261
200	11	FL 616 262
225	11	FL 616 263



END CAPS

Size (mm)	SDR	Product Code
20	11	FL 612 025
25	11	FL 612 026
32	11	FL 612 027
40	11	FL 612 028
50	11	FL 612 029
63	11	FL 612 030
75	11	FL 612 031
90	11	FL 612 032
110	11	FL 612 033
125	11	FL 612 034
160	11	FL 612 035
180	11	FL 616 183
200	11	FL 616 184
225	11	FL 616 185



REINFORCING SADDLES

Size (mm)	SDR	Product Code
63	11	FL 612 519



FULL FACED FLANGED BRANCH SADDLES

Size (mm)	SDR	Product Code
110 x 80 PN16	11	FL 616 016
125 x 80 PN16	11	FL 616 017
160 x 80 PN16	11	FL 616 018
180 x 80 PN16	11	FL 616 019
225 x 80 PN16	11	FL 616 020
160 x 100 PN16	11	FL 616 022
225 x 100 PN16	11	FL 616 024

Frialen electrofusion fittings

For all applications



REPAIR & REINFORCING SADDLES

Size (mm)	SDR	Product Code
90	11	FL 615 164
110	11	FL 615 165
125	11	FL 615 166
160	11	FL 615 168
180	11	FL 615 169
200	11	FL 615 170
225	11	FL 615 171



REPAIR SADDLES

Size (mm)	SDR	Product Code
560	17	FL 616 367
630	17	FL 616 368
710	17	FL 616 369
800	17	FL 616 370
900	17	FL 616 371
1000	17	FL 616 372
1200	17	FL 616 379



TOP LOADING REPAIR SADDLES

Size (mm)	SDR	Product Code
250-560	11	FL 615 397



32MM TOP LOADING TAPPING TEES

Size (mm)	SDR	Product Code
63/2" x 32	11	FL 411 415
75 x 32	11	FL 411 416
90/3" x 32	11	FL 411 417
110-140/4" x 32	11	FL 411 419
160-213/6" x 32	11	FL 411 422
225-315 x 32	11	FL 411 427



63MM UNDER CLAMPED PRESSURE TAPPING TEES

Size (mm)	SDR	Product Code
90 x 63	11	FL 612 701
110 x 63	11	FL 612 624
125 x 63	11	FL 612 309
160 x 63	11	FL 612 650
180 x 63	11	FL 612 652
200 x 63	11	FL 612 659
225 x 63	11	FL 612 655



New product design available*



63MM TOP LOADING PRESSURE TAPPING TEE

Size (mm)	SDR	Product Code
250-315(355-400) x 63	11	FL 615 339



CAP FOR PRESSURE TAPPING TEES

Size (mm)	SDR	Product Code
50	11	FL 612 310

Frialen electrofusion fittings

For potable water applications only



FULL FACED FLANGED BRANCH TEES

Size (mm)	SDR	Product Code
110 x 80 PN16	11	FL 615 590
125 x 80 PN16	11	FL 615 591
160 x 80 PN16	11	FL 615 592
180 x 80 PN16	11	FL 615 910
225 x 80PN16	17	FL 616 031



TRANSITION COUPLERS PE100/BRASS MALE THREAD

Size (mm x inch)	SDR	Product Code
32 x 1	11	FL 612 712
32 x 1¼	11	FL 612 709
32 x 1½	11	FL 612 698
40 x 1	11	FL 612 721
40 x 1¼	11	FL 612 713
40 x 1½	11	FL 612 718
40 x 2	11	FL 612 725
50 x 1	11	FL 612 719
50 x 1¼	11	FL 612 716
50 x 1½	11	FL 612 714
50 x 2	11	FL 612 706
63 x 1¼	11	FL 612 722
63 x 1½	11	FL 612 717
63 x 2	11	FL 612 715



90° TRANSITION ELBOWS PE100 /BRASS MALE THREAD

Size (mm x inch)	SDR	Product Code
32 x 1	11	FL 612 120
32 x 1½	11	FL 612 140
40 x 1	11	FL 612 127
40 x 1¼	11	FL 612 122
40 x 1½	11	FL 612 121
50 x 1	11	FL 612 119
50 x 1¼	11	FL 612 123
50 x 1½	11	FL 612 124
63 x 1½	11	FL 612 125
63 x 2	11	FL 612 126



TRANSITION COUPLERS PE100/ GUNMETAL FEMALE THREAD

Size (mm x inch)	SDR	Product Code
32 x 1	11	FL 612 595
40 x 1¼	11	FL 612 596
50 x 1½	11	FL 612 692
63 x 1½	11	FL 612 708
63 x 2	11	FL 612 693



DUCK FOOT BENDS

Size (mm)	SDR	Product Code
63 x 80 PN16	11	FL 384 459
90 x 80 PN16	11	FL 384 313
125 x 80 PN16	11	FL 384 484
180 x 80 PN16	11	FL 384 487



FLANGE ADAPTOR KITS

Size (mm)	SDR	Product Code
63 x 50 PN16	11	FL 251 311
90 x 80 PN16	17	FL 250 313
125 x 100 PN16	17	FL 250 315
90 x 100 PN16	17	FL 250 484
160 x 150 PN16	17	FL 250 317
180 x 150 PN16	17	FL 250 318
250 x 250 PN16	17	FL 250 321
250 x 200 PN16	17	FL 250 534
315 x 300 PN16	17	FL 250 323



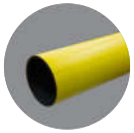
FLANGED BRANCH TEES

Size (mm)	SDR	Product Code
90 x 80 PN16	11	FL 301 313
110 x 80 PN16	11	FL 301 314
125 x 80 PN16	11	FL 301 315
160 x 80 PN16	11	FL 301 317
180 x 80 PN16	11	FL 301 318
90 x 100 PN16	11	FL 302 313
110 x 100 PN16	11	FL 302 314
125 x 100 PN16	11	FL 302 315
160 x 100 PN16	11	FL 302 317
180 x 100 PN16	11	FL 302 318
160 x 150 PN16	11	FL 303 317
180 x 150 PN16	11	FL 303 318

Frialen electrofusion fittings

For low and intermediate gas applications only

Gas





COUPLERS – with excess flow limiters

Size (mm)	SDR	Product Code
32	11	FL 102 308



REDUCERS – with excess flow limiters

Size (mm)	SDR	Product Code
32 x 25	11	FL 102 409



63MM TOP LOADING TAPPING TEES

Size (mm)	SDR	Product Code
63 x 63	11	87 996 001
90 x 63	11	58 404 459
125 x 63	11	58 404 461
180 x 63	11	58 404 464
250 x 63	11	58 404 467
315 x 63	11	58 404 469

Accessory



ELECTROFUSION WIPES

	Product Code
Electrofusion iso-propyl Alcohol Wipes 100% (100 per tub)	53 996 603

Fabricated and Spigot fittings







Fabricated fittings

For potable, raw water and sewage applications

Water



REDUCERS

Size (mm)	SDR 11 Code	SDR 17 Code
90 x 63	XX 323 459	-
110 x 90	XX 323 483	XX 322 483
125 x 63	XX 323 461	-
125 x 90	XX 323 484	XX 322 484
160 x 90	XX 323 486	XX 322 486
160 x 110	XX 323 495	XX 322 495
160 x 125	XX 323 504	XX 322 504
180 x 90	XX 323 487	XX 322 487
180 x 125	XX 323 505	XX 322 505
200 x 160	XX 323 506	XX 322 506
225 x 160	XX 323 507	XX 322 507
250 x 125	XX 323 508	XX 322 508
250 x 180	XX 323 529	XX 322 529
315 x 250	XX 323 543	XX 322 543
315 x 280	XX 323 545	XX 322 545
355 x 125	XX 323 571	XX 322 571
355 x 180	XX 323 532	XX 322 532
355 x 225	XX 323 541	XX 322 541
355 x 250	XX 323 544	XX 322 544
355 x 280	XX 323 546	XX 322 546
355 x 315	XX 323 547	XX 322 547
400 x 180	XX 323 560	XX 322 560
400 x 250	XX 323 563	XX 322 563
400 x 280	XX 323 564	XX 322 564
400 x 315	XX 323 565	XX 322 565
400 x 355	XX 323 566	XX 322 566
450 x 250	XX 323 573	XX 322 573
450 x 280	XX 323 584	XX 322 584
450 x 315	XX 323 574	XX 322 574
450 x 355	XX 323 575	XX 322 575
450 x 400	XX 323 576	XX 322 576
500 x 355	XX 323 579	XX 322 579
500 x 400	XX 323 580	XX 322 580
500 x 450	XX 323 581	XX 322 581
560 x 450	XX 323 586	XX 322 586
560 x 500	XX 323 594	XX 322 594
630 x 500	XX 323 599	XX 322 599
630 x 560	XX 323 595	XX 322 595



90° ELBOWS

Size (mm)	SDR 11 Code	SDR 17 Code
90	XX 309 313	XX 308 313
110	XX 309 314	XX 308 314
125	XX 309 315	XX 308 315
160	XX 309 317	XX 308 317
180	XX 309 318	XX 308 318
200	XX 309 319	XX 308 319
225	XX 309 320	XX 308 320
250	XX 309 321	XX 308 321
280	XX 309 322	XX 308 322
315	XX 309 323	XX 308 323
355	XX 309 324	XX 308 324



45° ELBOWS

Size (mm)	SDR 11 Code	SDR 17 Code
90	XX 315 313	XX 314 313
110	XX 315 314	XX 314 314
125	XX 315 315	XX 314 315
160	XX 315 317	XX 314 317
180	XX 315 318	XX 314 318
200	XX 315 319	XX 314 319
225	XX 315 320	XX 314 320
250	XX 315 321	XX 314 321
280	XX 315 322	XX 314 322
315	XX 315 323	XX 314 323
355	XX 315 324	XX 314 324



EQUAL TEES

Size (mm)	SDR 11 Code	SDR 17 Code
90	XX 321 313	XX 320 313
110	XX 321 314	XX 320 314
125	XX 321 315	XX 320 315
160	XX 321 317	XX 320 317
180	XX 321 318	XX 320 318
200	XX 321 319	XX 320 319
225	XX 321 320	XX 320 320
250	XX 321 321	XX 320 321
280	XX 321 322	XX 320 322
315	XX 321 323	XX 320 323
355	XX 321 324	XX 320 324
400	XX 321 325	XX 320 325



LARGE DIAMETER EQUAL TEE

Size (mm)	SDR 11 Code	SDR 17 Code
450	XX 321 326	XX 320 326
500	XX 321 327	XX 320 327
560	XX 321 328	XX 320 328
630	XX 321 329	XX 320 329
710	XX 321 330	XX 320 330
800	-	XX 320 332
900	-	XX 320 333
1000	-	XX 320 334
1200	-	XX 320 335



REDUCED BRANCH TEES

Size (mm)	SDR 11 Code	SDR 17 Code
110 x 90	XX 347 314	XX 356 314
125 x 90	XX 347 315	XX 356 315
160 x 90	XX 347 317	XX 356 317
180 x 90	XX 347 318	XX 356 318
200 x 90	XX 347 319	XX 356 319
225 x 90	-	XX 356 320
250 x 90	XX 347 321	XX 356 321
280 x 90	XX 347 322	XX 356 322
315 x 90	XX 347 323	XX 356 323
355 x 90	XX 347 324	XX 356 324
400 x 90	XX 347 325	XX 356 325
180 x 125	XX 348 318	XX 357 318
200 x 125	XX 348 319	XX 357 319
225 x 125	-	XX 357 320
250 x 125	XX 348 321	XX 357 321
280 x 125	XX 348 322	XX 357 322
315 x 125	XX 348 323	XX 357 323
355 x 125	XX 348 324	XX 357 324
400 x 125	XX 348 325	XX 357 325
225 x 180	-	XX 358 320
250 x 180	XX 349 321	XX 358 321
280 x 180	XX 349 322	XX 358 322
315 x 180	XX 349 323	XX 358 323
355 x 180	XX 349 324	XX 358 324
400 x 180	XX 349 325	XX 358 325
315 x 250	XX 335 323	XX 336 323
355 x 250	XX 335 324	XX 336 324
400 x 250	XX 335 325	XX 336 325

Note: Replace XX with colour required: Black = 40 Blue = 41

Fabricated fittings

For potable, raw water and sewage applications

Water



LARGE DIAMETER REDUCED BRANCH TEES

Size (mm)	SDR 11 Code	SDR 17 Code
450 x 180	XX 349 326	XX 358 326
450 x 250	XX 335 326	XX 336 326
450 x 315	XX 809 326	XX 285 326
500 x 180	XX 349 327	XX 358 327
500 x 250	XX 335 327	XX 336 327
500 x 315	XX 809 327	XX 285 327
630 x 180	XX 349 329	XX 358 329
630 x 250	XX 335 329	XX 336 329
630 x 315	XX 809 329	XX 285 329



END CAPS

Size (mm)	SDR 11 Code	SDR 17 Code
90	XX 332 313	XX 331 313
110	XX 332 314	XX 331 314
125	XX 332 315	XX 331 315
160	XX 332 317	XX 331 317
180	XX 332 318	XX 331 318
200	XX 332 319	XX 331 319
225	XX 332 320	XX 331 320
250	XX 332 321	XX 331 321
280	XX 332 322	XX 331 322
315	XX 332 323	XX 331 323
355	XX 332 324	XX 331 324
400	XX 332 325	XX 331 325
450	XX 332 326	XX 331 326
500	XX 332 327	XX 331 327



FLANGED SHORT BRANCH TEES

Size (mm)	SDR 11 Code	SDR 17 Code
90 x 80 PN16	XX 341 313	XX 310 313
110 x 80 PN16	XX 341 314	XX 310 314
125 x 80 PN16	XX 341 315	XX 310 315
160 x 80 PN16	XX 341 317	XX 310 317
180 x 80 PN16	XX 341 318	XX 310 318
200 x 80 PN16	XX 341 319	XX 310 319
225 x 80 PN16	XX 341 320	XX 310 320
250 x 80 PN16	XX 341 321	XX 310 321
280 x 80 PN16	XX 341 322	XX 310 322
315 x 80 PN16	XX 341 323	XX 310 323
90 x 100 PN16	XX 342 313	XX 311 313
110 x 100 PN16	XX 342 314	XX 311 314
125 x 100 PN16	XX 342 315	XX 311 315
160 x 100 PN16	XX 342 317	XX 311 317
180 x 100 PN16	XX 342 318	XX 311 318
200 x 100 PN16	XX 342 319	XX 311 319
225 x 100 PN16	XX 342 320	XX 311 320
250 x 100 PN16	XX 342 321	XX 311 321
280 x 100 PN16	XX 342 322	XX 311 322
315 x 100 PN16	XX 342 323	XX 311 323
355 x 100 PN16	XX 342 324	XX 311 324
160 x 150 PN16	XX 343 317	XX 312 317
180 x 150 PN16	XX 343 318	XX 312 318
200 x 150 PN16	XX 343 319	XX 312 319
225 x 150 PN16	XX 343 320	XX 312 320
250 x 150 PN16	XX 343 321	XX 312 321
315 x 150 PN16	XX 343 323	XX 312 323
355 x 150 PN16	XX 343 324	XX 312 324



STUB FLANGE ASSEMBLIES

Size (mm)	SDR 11 Code	SDR 17 Code
63 x 50 PN16	XX 327 311	-
63 x 80 PN16	XX 327 459	-
90 x 80 PN16	XX 327 313	XX 326 313
110 x 100 PN16	XX 327 314	XX 326 314
125 x 100 PN16	XX 327 315	XX 326 315
160 x 150 PN16	XX 327 317	XX 326 317
180 x 150 PN16	XX 327 318	XX 326 318
200 x 200 PN16	XX 327 319	XX 326 319
225 x 200 PN16	XX 327 320	XX 326 320
250 x 250 PN16	XX 327 321	XX 326 321
280 x 250 PN16	XX 327 322	XX 326 322
315 x 300 PN16	XX 327 323	XX 326 323
355 x 350 PN16	XX 327 324	XX 326 324
400 x 400 PN16	XX 327 325	XX 326 325
450 x 450 PN16	XX 327 326	XX 326 326
500 x 500 PN16	XX 327 327	XX 326 327
560 x 600 PN16	XX 327 328	XX 326 328
630 x 600 PN16	XX 327 329	XX 326 329
710 x 700 PN16	XX 327 330	XX 326 330
800 x 800 PN16	-	XX 326 332
900 x 900 PN16	-	XX 326 333
1000 x 1000 PN16	-	XX 326 334
1200 x 1200 PN16	-	XX 326 335



SPECIAL FLANGE ASSEMBLIES PN16

Size (mm)	SDR 11 Code	SDR 17 Code
630 x 500 PN16	XX 456 329	XX 455 329
710 x 600 PN16	XX 456 330	XX 455 330
800 x 700 PN16	-	XX 455 332
900 x 800 PN16	-	XX 455 333
1000 x 900 PN16	-	XX 455 334
1200 x 1000 PN16	-	XX 455 335



SLIMFLANGE ASSEMBLIES

Size (mm)	SDR 11 Code	SDR 17 Code
250 x 200 PN16	XX 453 321	XX 452 321
315 x 250 PN16	XX 453 323	XX 452 323
355 x 300 PN16	XX 453 324	XX 452 324
400 x 350 PN16	XX 453 325	XX 452 325
450 x 400 PN16	XX 453 326	XX 452 326
500 x 450 PN16	XX 453 327	XX 452 327
560 x 500 PN16	XX 453 328	XX 452 328

Note: Replace XX with colour required: Black = 40 Blue = 41

Fabricated fittings

For potable, raw water and sewage applications

Water



90° MITRED ELBOWS

Size (mm)	SDR 11 Code	SDR 17 Code	SDR 21 Code
90	XX 244 313	XX 243 313	-
110	XX 244 314	XX 243 314	-
125	XX 244 315	XX 243 315	-
160	XX 244 317	XX 243 317	XX 248 317
180	XX 244 318	XX 243 318	XX 248 318
200	XX 244 319	XX 243 319	XX 248 319
225	XX 244 320	XX 243 320	XX 248 320
250	XX 244 321	XX 243 321	XX 248 321
280	XX 244 322	XX 243 322	XX 248 322
315	XX 244 323	XX 243 323	XX 248 323
355	XX 244 324	XX 243 324	XX 248 324
400	XX 244 325	XX 243 325	XX 248 325
450	XX 244 326	XX 243 326	XX 248 326
500	XX 244 327	XX 243 327	XX 248 327
560	XX 244 328	XX 243 328	XX 248 328
630	XX 244 329	XX 243 329	XX 248 329
710	XX 244 330	XX 243 330	XX 248 330
800	-	XX 243 332	XX 248 332
900	-	XX 243 333	XX 248 333
1000	-	XX 243 334	XX 248 334
1200	-	XX 243 335	XX 248 335



45° MITRED ELBOWS

Size (mm)	SDR 11 Code	SDR 17 Code	SDR 21 Code
90	XX 242 313	XX 241 313	-
110	XX 242 314	XX 241 314	-
125	XX 242 315	XX 241 315	-
160	XX 242 317	XX 241 317	XX 247 317
180	XX 242 318	XX 241 318	XX 247 318
200	XX 242 319	XX 241 319	XX 247 319
225	XX 242 320	XX 241 320	XX 247 320
250	XX 242 321	XX 241 321	XX 247 321
280	XX 242 322	XX 241 322	XX 247 322
315	XX 242 323	XX 241 323	XX 247 323
355	XX 242 324	XX 241 324	XX 247 324
400	XX 242 325	XX 241 325	XX 247 325
450	XX 242 326	XX 241 326	XX 247 326
500	XX 242 327	XX 241 327	XX 247 327
560	XX 242 328	XX 241 328	XX 247 328
630	XX 242 329	XX 241 329	XX 247 329
710	XX 242 330	XX 241 330	XX 247 330
800	-	XX 241 332	XX 247 332
900	-	XX 241 333	XX 247 333
1000	-	XX 241 334	XX 247 334
1200	-	XX 241 335	XX 247 335



22½° MITRED ELBOWS

Size (mm)	SDR 11 Code	SDR 17 Code	SDR 21 Code
90	XX 317 313	XX 316 313	-
110	XX 317 314	XX 316 314	-
125	XX 317 315	XX 316 315	-
160	XX 317 317	XX 316 317	XX 246 317
180	XX 317 318	XX 316 318	XX 246 318
200	XX 317 319	XX 316 319	XX 246 319
225	XX 317 320	XX 316 320	XX 246 320
250	XX 317 321	XX 316 321	XX 246 321
280	XX 317 322	XX 316 322	XX 246 322
315	XX 317 323	XX 316 323	XX 246 323
355	XX 317 324	XX 316 324	XX 246 324
400	XX 317 325	XX 316 325	XX 246 325
450	XX 317 326	XX 316 326	XX 246 326
500	XX 317 327	XX 316 327	XX 246 327
560	XX 317 328	XX 316 328	XX 246 328
630	XX 317 329	XX 316 329	XX 246 329
710	XX 317 330	XX 316 330	XX 246 330
800	-	XX 316 332	XX 246 332
900	-	XX 316 333	XX 246 333
1000	-	XX 316 334	XX 246 334
1200	-	XX 316 335	XX 246 335



11¼° MITRED ELBOWS

Size (mm)	SDR 11 Code	SDR 17 Code	SDR 21 Code
90	XX 298 313	XX 297 313	-
110	XX 298 314	XX 297 314	-
125	XX 298 315	XX 297 315	-
160	XX 298 317	XX 297 317	XX 245 317
180	XX 298 318	XX 297 318	XX 245 318
200	XX 298 319	XX 297 319	XX 245 319
225	XX 298 320	XX 297 320	XX 245 320
250	XX 298 321	XX 297 321	XX 245 321
280	XX 298 322	XX 297 322	XX 245 322
315	XX 298 323	XX 297 323	XX 245 323
355	XX 298 324	XX 297 324	XX 245 324
400	XX 298 325	XX 297 325	XX 245 325
450	XX 298 326	XX 297 326	XX 245 326
500	XX 298 327	XX 297 327	XX 245 327
560	XX 298 328	XX 297 328	XX 245 328
630	XX 298 329	XX 297 329	XX 245 329
710	XX 298 330	XX 297 330	XX 245 330
800	-	XX 297 332	XX 245 332
900	-	XX 297 333	XX 245 333
1000	-	XX 297 334	XX 245 334
1200	-	XX 297 335	XX 245 335

Note: Replace XX with colour required: Black = 40 Blue = 41

Fabricated fittings

For low, intermediate and high pressure gas applications





REDUCERS

Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code (high pressure)
90 x 63	58 323 459	58 322 459	-	48 323 459
125 x 63	58 323 461	58 322 461	-	48 323 461
125 x 90	58 323 484	58 322 484	-	48 323 484
180 x 90	58 323 487	58 322 487	-	48 323 487
180 x 125	58 323 505	58 322 505	-	48 323 505
200 x 160	58 323 506	58 322 506	-	48 323 506
225 x 160	58 323 507	58 322 507	-	48 323 507
250 x 125	-	-	29 740 508	48 323 508
250 x 180	-	-	29 740 529	48 740 529
315 x 250	-	-	29 740 543	48 740 543
315 x 280	-	-	29 740 545	48 740 545
355 x 125	-	-	29 740 571	48 740 571
355 x 180	-	-	29 740 532	48 740 532
355 x 225	-	-	29 740 541	48 740 541
355 x 250	-	-	29 740 544	48 740 544
355 x 280	-	-	29 740 546	48 740 546
355 x 315	-	-	29 740 547	48 740 547
400 x 180	-	-	29 740 560	48 740 560
400 x 250	-	-	29 740 563	48 740 563
400 x 280	-	-	29 740 564	48 740 564
400 x 315	-	-	29 740 565	48 740 565
400 x 355	-	-	29 740 566	48 740 566
450 x 250	-	-	29 740 573	48 740 573
450 x 280	-	-	29 740 584	48 740 584
450 x 315	-	-	29 740 574	48 740 574
450 x 355	-	-	29 740 575	48 740 575
450 x 400	-	-	29 740 576	48 740 576
500 x 355	-	-	29 740 579	48 740 579
500 x 400	-	-	29 740 580	48 740 580
500 x 450	-	-	29 740 581	48 740 581
560 x 450	-	-	29 740 586	48 740 586
560 x 500	-	-	29 740 594	48 740 594
630 x 500	-	-	29 740 599	48 740 599
630 x 560	-	-	29 740 595	48 740 595



90° ELBOWS

Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code (high pressure)
90	58 309 313	58 308 313	-	48 309 313
125	58 309 315	58 308 315	-	48 309 315
180	58 309 318	58 308 318	-	48 309 318
250	-	-	29 743 321	48 309 321
280	-	-	29 743 322	48 309 322
315	-	-	29 743 323	48 309 323



45° ELBOWS

Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code (high pressure)
90	58 315 313	58 314 313	-	48 315 313
125	58 315 315	58 314 315	-	48 315 315
180	58 315 318	58 314 318	-	48 315 318
250	-	-	29 744 321	48 315 321
280	-	-	29 744 322	48 315 322
315	-	-	29 744 323	48 315 323



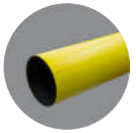
EQUAL TEES

Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code (high pressure)
90	58 321 313	58 320 313	-	48 321 313
125	58 321 315	58 320 315	-	48 321 315
180	58 321 318	58 320 318	-	48 321 318
250	-	-	29 741 321	48 321 321
280	-	-	29 741 322	48 321 322
315	-	-	29 741 323	48 321 323

Note: Replace XX with colour required: 29 = Yellow PE80 / Black PE100RC 58 = Yellow PE80 48 = Orange PE100

Fabricated fittings

For low, intermediate and high pressure gas applications





REDUCED BRANCH TEES

Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code (high pressure)
125 x 90	58 347 315	58 356 315	-	48 347 315
180 x 90	58 347 318	58 356 318	-	48 347 318
250 x 90	-	-	29 797 321	48 347 321
280 x 90	-	-	29 797 322	48 347 322
315 x 90	-	-	29 797 323	48 347 323
355 x 90	-	-	29 797 324	48 347 324
400 x 90	-	-	29 797 325	48 347 325
180 x 125	58 348 318	58 357 318	-	48 348 318
200 x 125	58 348 319	58 357 319	-	48 348 319
225 x 125	58 348 320	58 357 320	-	48 348 320
250 x 125	-	-	29 798 321	48 348 321
280 x 125	-	-	29 798 322	48 348 322
315 x 125	-	-	29 798 323	48 348 323
355 x 125	-	-	29 798 324	48 348 324
400 x 125	-	-	29 798 325	48 348 325
225 x 180	-	58 358 320	-	48 349 320
250 x 180	-	-	29 799 321	48 349 321
280 x 180	-	-	29 799 322	48 349 322
315 x 180	-	-	29 799 323	48 349 323
355 x 180	-	-	29 799 324	48 349 324
400 x 180	-	-	29 799 325	48 349 325
315 x 250	-	-	29 796 323	48 335 323
355 x 250	-	-	29 796 324	48 335 324
400 x 250	-	-	29 796 325	48 335 325



STUB FLANGE ASSEMBLIES

Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code (high pressure)
63 x 50 PN16	58 327 311	-	-	-
90 x 80 PN16	58 327 313	58 326 313	-	48 327 313
125 x 100 PN16	58 327 315	58 326 315	-	48 327 315
125 x 150 PN16	58 327 505	-	-	-
180 x 150 PN16	58 327 318	58 326 318	-	48 327 318
250 x 250 PN16	-	-	29 742 321	48 327 321
280 x 250 PN16	-	-	29 742 322	48 327 322
315 x 300 PN16	-	-	29 742 323	48 327 323
355 x 350 PN16	-	-	29 742 324	48 327 324
400 x 400 PN16	-	-	29 742 325	48 327 325
450 x 450 PN16	-	-	29 742 326	48 327 326
500 x 500 PN16	-	-	29 742 327	48 327 327
560 x 600 PN16	-	-	29 742 328	48 327 328
630 x 600 PN16	-	-	29 742 329	48 327 329
710 x 700 PN16	-	-	29 742 330	48 327 330
800 x 800 PN16	-	-	29 742 332	-



SLIMFLANGE ASSEMBLIES

Size (mm)	SDR 21 Code
250 x 200 PN16	29 487 321
315 x 250 PN16	29 487 323
355 x 300 PN16	29 487 324
400 x 350 PN16	29 487 325
450 x 400 PN16	29 487 326
500 x 450 PN16	29 487 327
560 x 500 PN16	29 487 328

Note: Replace XX with colour required: 29 = Yellow PE80 / Black PE100RC 58 = Yellow PE80 48 = Orange PE100

Fabricated fittings

For low, intermediate and high pressure gas applications



FLANGED SHORT BRANCH TEES

Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code (high pressure)
90 x 80 PN16	58 341 313	58 310 313	-	48 341 313
125 x 80 PN16	58 341 315	58 310 315	-	48 341 315
180 x 80 PN16	58 341 318	58 310 318	-	48 341 318
250 x 80 PN16	-	-	29 802 321	48 341 321
280 x 80 PN16	-	-	29 802 322	48 341 322
315 x 80 PN16	-	-	29 802 323	48 341 323
125 x 100 PN16	58 342 315	58 311 315	-	48 342 315
180 x 100 PN16	58 342 318	58 311 318	-	48 342 318
250 x 100 PN16	-	-	29 803 321	48 342 321
280 x 100 PN16	-	-	29 803 322	48 342 322
315 x 100 PN16	-	-	29 803 323	48 342 323
355 x 100 PN16	-	-	29 803 324	48 342 324
180 x 150 PN16	58 343 318	58 312 318	-	48 343 318
250 x 150 PN16	-	-	29 804 321	48 343 321
315 x 150 PN16	-	-	29 804 323	48 343 323
355 x 150 PN16	-	-	29 804 324	48 343 324



END CAPS

Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code	SDR 11 Code (high pressure)
90	58 332 313	58 331 313	-	48 332 313
125	58 332 315	58 331 315	-	48 332 315
180	58 332 318	58 331 318	-	48 332 318
250	-	-	29 748 321	48 332 321
280	-	-	29 748 322	48 332 322
315	-	-	29 748 323	48 332 323
355	-	-	29 748 324	48 332 324
400	-	-	29 748 325	48 332 325
450	-	-	29 748 326	48 332 326
500	-	-	29 748 327	48 332 327



LARGE DIAMETER EQUAL TEE

Size (mm)	SDR 21 Code
450	29 741 326
500	29 741 327
560	29 741 328
630	29 741 329
710	29 741 330
800	29 741 332



LARGE DIAMETER REDUCED BRANCH TEES

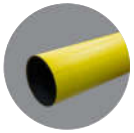
Size (mm)	SDR 21 Code	SDR 11 Code (high pressure)
450 x 180	29 799 326	48 799 326
450 x 250	29 796 326	48 796 326
450 x 315	29 795 326	48 795 326
500 x 180	29 799 327	48 799 327
500 x 250	29 796 327	48 796 327
500 x 315	29 795 327	48 795 327
630 x 180	29 799 329	48 799 329
630 x 250	29 796 329	48 796 329
630 x 315	29 795 329	48 795 329

Note: Replace XX with colour required: 29 = Yellow PE80 / Black PE100RC 58 = Yellow PE80 48 = Orange PE100

Fabricated fittings

For lo and intermediate gas applications

Gas





90° MITRED ELBOWS

Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code
90	58 244 313	58 243 313	-
125	58 244 315	58 243 315	-
180	58 244 318	58 243 318	-
250	-	-	29 248 321
280	-	-	29 248 322
315	-	-	29 248 323
355	-	-	29 248 324
400	-	-	29 248 325
450	-	-	29 248 326
500	-	-	29 248 327
560	-	-	29 248 328
630	-	-	29 248 329
710	-	-	29 248 330
800	-	-	29 248 332



45° MITRED ELBOWS

Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code
90	58 242 313	58 241 313	-
125	58 242 315	58 241 315	-
180	58 242 318	58 241 318	-
250	-	-	29 247 321
280	-	-	29 247 322
315	-	-	29 247 323
355	-	-	29 247 324
400	-	-	29 247 325
450	-	-	29 247 326
500	-	-	29 247 327
560	-	-	29 247 328
630	-	-	29 247 329
710	-	-	29 247 330
800	-	-	29 247 332



22½° MITRED ELBOWS

Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code
90	58 317 313	58 316 313	-
125	58 317 315	58 316 315	-
180	58 317 318	58 316 318	-
250	-	-	29 246 321
280	-	-	29 246 322
315	-	-	29 246 323
355	-	-	29 246 324
400	-	-	29 246 325
450	-	-	29 246 326
500	-	-	29 246 327
560	-	-	29 246 328
630	-	-	29 246 329
710	-	-	29 246 330
800	-	-	29 246 332



11¼° MITRED ELBOWS

Size (mm)	SDR 11 Code	SDR 17.6 Code	SDR 21 Code
90	58 298 313	58 297 313	-
125	58 298 315	58 297 315	
180	58 298 318	58 297 318	-
250	-	-	29 245 321
280	-	-	29 245 322
315	-	-	29 245 323
355	-	-	29 245 324
400	-	-	29 245 325
450	-	-	29 245 326
500	-	-	29 245 327
560	-	-	29 245 328
630	-	-	29 245 329
710	-	-	29 245 330
800	-	-	29 245 332

Spigot fittings

Electrofusion or butt fusion for all applications



REDUCERS

Size (mm)	SDR 11 Code	SDR 17 Code
32 x 25	40 441 409	-
40 x 25	40 441 410	-
40 x 32	40 441 413	-
50 x 25	40 441 411	-
50 x 32	40 441 414	-
50 x 40	40 441 429	-
63 x 25	40 441 395	-
63 x 32	40 441 415	-
63 x 40	40 441 430	-
63 x 50	40 441 444	-
75 x 32	40 441 416	-
75 x 40	40 441 431	-
75 x 50	40 441 445	-
75 x 63	40 441 458	40 440 445
90 x 50	40 441 446	40 440 446
90 x 63	40 441 459	40 440 459
90 x 75	40 441 471	40 440 471
110 x 50	40 441 447	40 440 447
110 x 63	40 441 460	40 440 460
110 x 75	40 441 472	40 440 472
110 x 90	40 441 483	40 440 483
125 x 63	40 441 461	40 440 461
125 x 75	40 441 473	40 440 473
125 x 90	40 441 484	40 440 484
125 x 110	40 441 493	40 440 493
140 x 90	40 441 485	40 440 485

Size (mm)	SDR 11 Code	SDR 17 Code
140 x 110	40 441 494	40 440 494
140 x 125	40 441 503	40 440 503
160 x 90	40 441 486	40 440 486
160 x 110	40 441 495	40 440 495
160 x 125	40 441 504	40 440 504
160 x 140	40 441 512	40 440 512
180 x 125	40 441 505	40 440 505
180 x 140	40 441 513	40 440 513
180 x 160	40 441 520	40 440 520
200 x 140	40 441 514	40 440 514
200 x 160	40 441 521	40 440 521
200 x 180	40 441 527	40 440 527
225 x 160	40 441 522	40 440 522
225 x 180	40 441 528	40 440 528
225 x 200	40 441 533	40 440 533
250 x 180	40 441 529	40 440 529
250 x 200	40 441 534	40 440 534
250 x 225	40 441 538	40 440 538
280 x 200	40 441 535	40 440 535
280 x 225	40 441 539	40 440 539
280 x 250	40 441 542	40 440 542
315 x 225	40 441 540	40 440 540
315 x 250	40 441 543	40 440 543
355 x 250	40 441 544	40 440 544
355 x 280	40 441 546	40 440 546
355 x 315	40 441 547	40 440 547



90° ELBOWS

Size (mm)	SDR 11 Code	SDR 17 Code
32	40 209 308	-
50	40 209 310	-
63	40 209 311	-
75	40 210 312	40 208 312
90	40 210 313	40 208 313
110	40 210 314	40 208 314
125	40 210 315	40 208 315
140	40 210 316	40 208 316
160	40 210 317	40 208 317
180	40 210 318	40 208 318
200	40 210 319	40 208 319
225	40 210 320	40 208 320
250	40 210 321	40 208 321
280	40 210 322	40 208 322
315	40 210 323	40 208 323



FULL FACED FLANGES

Size (mm)	SDR	Product Code
63 x 50 PN16	11	FL 615 417
90 x 80 PN16	11	FL 615 418
110 x 100 PN16	11	FL 615 419
125 x 100 PN16	11	FL 615 605
160 x 150 PN16	11	FL 615 421
180 x 150 PN16	11	FL 615 927
225 x 200 PN16	11	FL 615 607



45° ELBOWS

Size (mm)	SDR 11 Code	SDR 17 Code
32	40 215 308	-
50	40 215 310	-
63	40 215 311	-
75	40 216 312	40 214 312
90	40 216 313	40 214 313
110	40 216 314	40 214 314
125	40 216 315	40 214 315
140	40 216 316	40 214 316
160	40 216 317	40 214 317
180	40 216 318	40 214 318
200	40 216 319	40 214 319
225	40 216 320	40 214 320
250	40 216 321	40 214 321
280	40 216 322	40 214 322
315	40 216 323	40 214 323



FULL FACED REDUCED FLANGES

Size (mm)	SDR	Product Code
110 x 80 PN16	11	FL 616 065
160 x 100 PN16	11	FL 616 241

Spigot fittings

Electrofusion or butt fusion for all applications



90° EQUAL TEES

Size (mm)	SDR 11 Code	SDR 17 Code
63	40 221 311	-
75	40 222 312	40 220 312
90	40 222 313	40 220 313
110	40 222 314	40 220 314
125	40 222 315	40 220 315
140	40 222 316	40 220 316
160	40 222 317	40 220 317
180	40 222 318	40 220 318
200	40 222 319	40 220 319
225	40 222 320	40 220 320
250	40 222 321	40 220 321
280	40 222 322	40 220 322
315	40 222 323	40 220 323



STUB FLANGES

Size (mm)	SDR 11 Code	SDR 17 Code
32	40 227 308	-
40	40 227 309	-
50	40 227 310	-
63	40 227 311	-
75	40 228 312	40 226 312
90	40 228 313	40 226 313
110	40 228 314	40 226 314
125	40 228 315	40 226 315
140	40 228 316	40 226 316
160	40 228 317	40 226 317
180	40 228 318	40 226 318
200	40 228 319	40 226 319
225	40 228 320	40 226 320
250	40 228 321	40 226 321
280	40 228 322	40 226 322
315	40 228 323	40 226 323
355	40 228 324	40 226 324



REDUCERS BRANCH TEES

Size (mm)	SDR 11 Code	SDR 17 Code
63 x 32	40 378 415	-
63 x 50	40 378 444	-
75 x 32	40 378 416	-
75 x 50	40 378 372	-
75 x 63	40 378 445	-
90 x 50	40 378 446	40 377 446
90 x 63	40 378 459	40 377 459
90 x 75	40 378 471	40 377 471
110 x 63	40 378 460	40 377 460
110 x 75	40 378 472	40 377 472
110 x 90	40 378 483	40 377 483
125 x 90	40 378 484	40 377 484
125 x 110	40 378 493	40 377 493
140 x 63	40 378 462	40 377 462
140 x 75	40 378 474	40 377 474
140 x 90	40 378 485	40 377 485
140 x 110	40 378 494	40 377 494
160 x 63	40 378 463	40 377 463
160 x 75	40 378 475	40 377 475
160 x 90	40 378 486	40 377 486
160 x 110	40 378 495	40 377 495
180 x 90	40 378 487	40 377 487
180 x 110	40 378 496	40 377 496
180 x 125	40 378 505	40 377 505

Size (mm)	SDR 11 Code	SDR 17 Code
180 x 140	40 378 513	40 377 513
180 x 160	40 378 520	40 377 520
200 x 63	40 378 465	40 377 465
200 x 90	40 378 488	40 377 488
200 x 110	40 378 497	40 377 497
200 x 125	40 378 506	40 377 506
200 x 160	40 378 521	40 377 521
225 x 75	40 378 478	40 377 478
225 x 90	40 378 489	40 377 489
225 x 110	40 378 498	40 377 498
225 x 125	40 378 507	40 377 507
225 x 140	40 378 515	40 377 515
225 x 160	40 378 522	40 377 522
225 x 180	40 378 528	40 377 528
250 x 110	40 378 499	40 377 499
250 x 160	40 378 523	40 377 523
250 x 180	40 378 529	40 377 529
315 x 90	40 378 492	40 377 492
315 x 110	40 378 501	40 377 501
315 x 160	40 378 525	40 377 525
315 x 180	40 378 531	40 377 531
315 x 200	40 378 536	40 377 536
315 x 225	40 378 540	40 377 540
315 x 250	40 378 543	40 377 543

Spigot fittings

Electrofusion or butt fusion for all applications



90° FORMED BENDS

Size (mm)	SDR 11 Code	SDR 17 Code
90	40 371 313	40 370 313
110	40 371 314	40 370 314
125	40 371 315	40 370 315
160	40 371 317	40 370 317
180	40 371 318	40 370 318
200	40 371 319	40 370 319
225	40 371 320	40 370 320
250	40 371 321	40 370 321
315	40 371 323	40 370 323
355	40 371 324	40 370 324
400	40 371 325	40 370 325
450	40 371 326	40 370 326
500	40 371 327	40 370 327
560	40 371 328	40 370 328
630	40 371 329	40 370 329



45° FORMED BENDS

Size (mm)	SDR 11 Code	SDR 17 Code
90	40 376 313	40 375 313
110	40 376 314	40 375 314
125	40 376 315	40 375 315
160	40 376 317	40 375 317
180	40 376 318	40 375 318
200	40 376 319	40 375 319
225	40 376 320	40 375 320
250	40 376 321	40 375 321
315	40 376 323	40 375 323
355	40 376 324	40 375 324
400	40 376 325	40 375 325
450	40 376 326	40 375 326
500	40 376 327	40 375 327
560	40 376 328	40 375 328
630	40 376 329	40 375 329



22½° FORMED BENDS

Size (mm)	SDR 11 Code	SDR 17 Code
90	40 381 313	40 380 313
110	40 381 314	40 380 314
125	40 381 315	40 380 315
160	40 381 317	40 380 317
180	40 381 318	40 380 318
200	40 381 319	40 380 319
225	40 381 320	40 380 320
250	40 381 321	40 380 321
315	40 381 323	40 380 323
355	40 381 324	40 380 324
400	40 381 325	40 380 325
450	40 381 326	40 380 326
500	40 381 327	40 380 327
560	40 381 328	40 380 328
630	40 381 329	40 380 329



11¼° FORMED BENDS

Size (mm)	SDR 11 Code	SDR 17 Code
90	40 373 313	40 372 313
110	40 373 314	40 372 314
125	40 373 315	40 372 315
160	40 373 317	40 372 317
180	40 373 318	40 372 318
200	40 373 319	40 372 319
225	40 373 320	40 372 320
250	40 373 321	40 372 321
315	40 373 323	40 372 323
355	40 373 324	40 372 324
400	40 373 325	40 372 325
450	40 373 326	40 372 326
500	40 373 327	40 372 327
560	40 373 328	40 372 328
630	40 373 329	40 372 329

Spigot fittings

Electrofusion or butt fusion for all applications



FLANGED BRANCH TEES

Size (mm)	SDR 11 Code	SDR 17 Code
63 x 50 PN16	40 350 311	-
90 x 80 PN16	40 351 313	40 363 313
110 x 80 PN16	40 351 314	40 363 314
125 x 80 PN16	40 351 315	40 363 315
160 x 80 PN16	40 351 317	40 363 317
180 x 80 PN16	40 351 318	40 363 318
225 x 80 PN16	40 351 320	40 363 320
250 x 80 PN16	40 351 321	40 363 321
315 x 80 PN16	40 351 323	40 363 323
90 x 100 PN16	40 352 313	40 364 313
110 x 100 PN16	40 352 314	40 364 314
125 x 100 PN16	40 352 315	40 364 315
160 x 100 PN16	40 352 317	40 364 317
180 x 100 PN16	40 352 318	40 364 318
225 x 100 PN16	40 352 320	40 364 320
250 x 100 PN16	40 352 321	40 364 321
315 x 100 PN16	40 352 323	40 364 323
180 x 150 PN16	40 353 318	40 365 318
225 x 150 PN16	40 353 320	40 365 320
250 x 150 PN16	40 353 321	40 365 321
315 x 150 PN16	40 353 323	40 365 323



END CAPS

Size (mm)	SDR 11 Code	SDR 17 Code
20	40 233 306	-
25	40 233 307	-
32	40 233 308	-
40	40 233 309	-
50	40 233 310	-
63	40 233 311	-
75	40 234 312	-
90	40 234 313	40 232 313
110	40 234 314	40 232 314
125	40 234 315	40 232 315
140	40 234 316	40 232 316
160	40 234 317	40 232 317
180	40 234 318	40 232 318
220	40 234 319	40 232 319
225	40 234 320	40 232 320
250	40 234 321	40 232 321
280	40 234 322	40 232 322
315	40 234 323	40 232 323
355	40 234 324	40 232 324
400	40 234 325	40 232 325

Spigot fittings



For potable water applications

STUB FLANGE ASSEMBLIES

Size (mm)	SDR 11 Code	SDR 17 Code
63 x 50 PN16	40 329 311	-
90 x 80 PN16	40 329 313	40 328 313
110 x 100 PN16	40 329 314	40 328 314
125 x 100 PN16	40 329 315	40 328 315
160 x 150 PN16	40 329 317	40 328 317
180 x 150 PN16	40 329 318	40 328 318
225 x 200 PN16	40 329 320	40 328 320
250 x 250 PN16	40 329 321	40 328 321
315 x 300 PN16	40 329 323	40 328 323

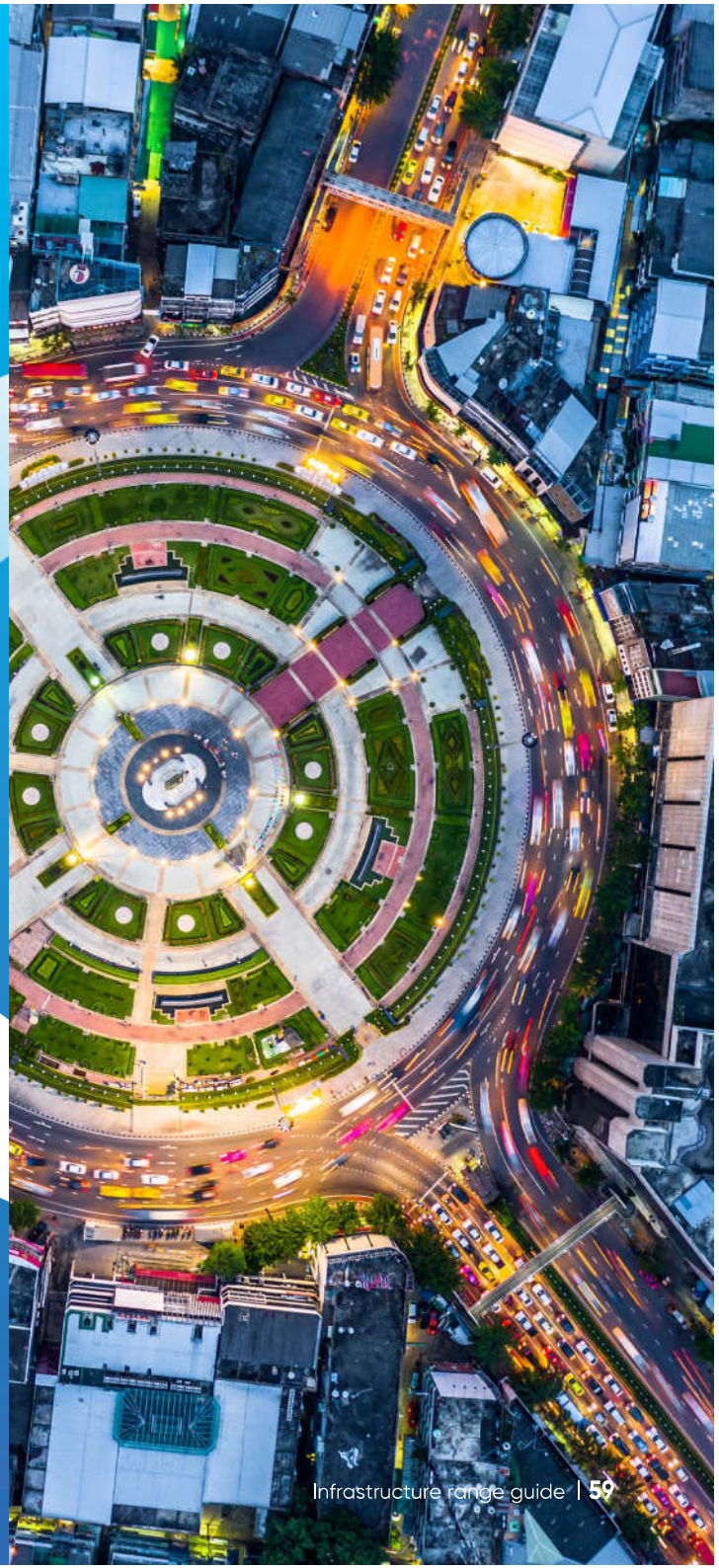


For low and intermediate pressure gas applications

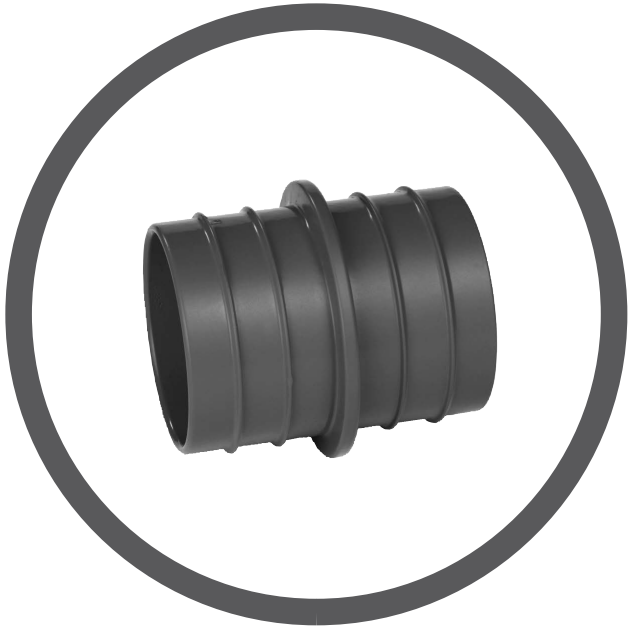
STUB FLANGE ASSEMBLIES

Size (mm)	SDR 11 Code	SDR 17 Code
63 x 50 PN16	40 334 311	-
90 x 80 PN16	40 334 313	40 333 313
125 x 100 PN16	40 334 315	40 333 315
180 x 150 PN16	40 334 318	40 333 318

we make life flow



Mechanical fittings







Mechanical fittings

For potable, raw water and sewage applications

Water



COUPLERS

Size (mm)	SDR	Product Code
63	11	SM 110 311
90	11	SM 100 313
	17	SM 109 313
110	11	SM 100 314
	17	SM 109 314
125	11	SM 100 315
	17	SM 109 315
160	11	SM 100 317
	17	SM 109 317
180	11	SM 100 318
	17	SM 109 318



45° ELBOWS

Size (mm)	SDR	Product Code
63	11	SM 215 311
90	11	SM 216 313
	17	SM 214 313
110	11	SM 216 314
	17	SM 214 314
125	11	SM 216 315
	17	SM 214 315
160	11	SM 216 317
	17	SM 214 317
180	11	SM 216 318
	17	SM 214 318



REPAIR COUPLERS

Size (mm)	SDR	Product Code
63	11	SM 246 311
90	11	SM 246 313
	17	SM 245 313
110	11	SM 246 314
	17	SM 245 314
125	11	SM 246 315
	17	SM 245 315
160	11	SM 246 317
	17	SM 245 317
180	11	SM 246 318
	17	SM 245 318



EQUAL TEES

Size (mm)	SDR	Product Code
63	11	SM 221 311
90	11	SM 222 313
	17	SM 220 313
110	11	SM 222 314
	17	SM 220 314
125	11	SM 222 315
	17	SM 220 315
160	11	SM 222 317
	17	SM 220 317
180	11	SM 222 318
	17	SM 220 318



REDUCERS

Size (mm)	SDR	Product Code
90 x 63	11	SM 441 459
110 x 90	11	SM 441 483
	17	SM 440 483
125 x 110	11	SM 441 493
	17	SM 440 493
160 x 125	11	SM 441 504
	17	SM 440 504
180 x 125	17	SM 440 505



FLANGED BRANCH TEES

Size (mm)	SDR	Product Code
90 x DN80	11	SM 351 313
	17	SM 363 313
110 x DN80	11	SM 351 314
	17	SM 363 314
125 x DN80	17	SM 363 315
160 x DN80	17	SM 363 317
180 x DN80	17	SM 363 318
90 x DN100	11	SM 352 313
	17	SM 364 313
110 x DN100	11	SM 352 314
	17	SM 364 314
125 x DN100	17	SM 364 315
160 x DN100	17	SM 364 317
180 x DN100	17	SM 364 318
160 x DN150	17	SM 365 317
180 x DN150	17	SM 365 318



90° ELBOWS

Size (mm)	SDR	Product Code
63	11	SM 209 311
90	11	SM 210 313
	17	SM 208 313
110	11	SM 210 314
	17	SM 208 314
125	11	SM 210 315
	17	SM 208 315
160	11	SM 210 317
	17	SM 208 317
180	11	SM 210 318
	17	SM 208 318



STUB FLANGE ADAPTORS

Size (mm)	SDR	Product Code
63 x DN50	11	SM 227 311
63 x DN80	11	SM 228 311
90 x DN80	11	SM 228 313
	17	SM 226 313
110 x DN100	11	SM 228 314
	17	SM 226 314
125 x DN100	11	SM 228 315
	17	SM 226 315
160 x DN150	11	SM 228 317
	17	SM 226 317
180 x DN150	11	SM 228 318
	17	SM 226 318

Mechanical fittings

For potable, raw water and sewage applications



DUCK FOOT BENDS

Size (mm)	SDR	Product Code
63 x DN80	11	SM 384 459
90 x DN80	11	SM 384 313
	17	SM 385 313
110 x DN80	11	SM 384 483
	17	SM 385 483
125 x DN80	17	SM 385 484
160 x DN80	17	SM 385 486
180 x DN80	17	SM 385 487

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