NAYLOR
DRAINAGE
Made in the UK
Excellent Construction Products

Clay Drainage

Vitrified Clay Drainage System

email: sales@naylor.co.uk web: www.naylor.co.uk

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BS EN295: Lic. KM20173

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Index of **Products**

Naylor Drainage

Vitrified Clay Drainage Handbook

This handbook has been prepared to assist in the specification of Naylor Drainage products. Should any further information be required please contact our sales team on 01226 794077, 01226 794071, 01226 794018, 01226 794056 or by email to sales@naylor.co.uk

For any export enquiries please contact our export sales team on 01226 794014, 01226 794056 or by email to export@naylor.co.uk

A free design and technical service is available and advice is gladly given for particular requirements and applications. Schedules and calculations can be provided from working drawings. We have both office based and external technical personnel able to answer queries and provide specialist knowledge.

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Densleeve

The Naylor Densleeve underground drainage system of plain-end vitrified clay pipes and fittings with flexible sleeve couplings, was developed for building drainage and associated sewerage and is all manufactured to comply with the stringent requirements of BS EN295.

Densleeve is available in diameters DN100, 150, 225 and 300; in addition DN200 and 250 are manufactured for key export markets.

When installed in general accordance with the Naylor Sitework Instructions the Naylor Densleeve system meets the latest technical requirements of the Building Regulations, BS8005 and BS8301.

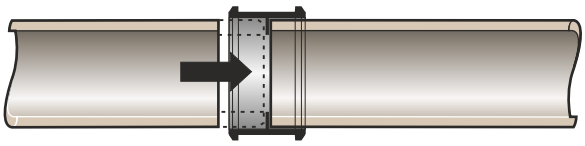
Description

Clayware

Vitrified clay plain-end pipes and fittings, manufactured in accordance with the requirements of BS EN295-1. The standard lengths of pipes are convenient for handling and laying and allow for flexible joints at sufficiently frequent intervals to enable the pipeline to withstand settlement or other ground movement after installation.

Sleeve Couplings

Manufactured in high impact polypropylene with elastomeric seals providing watertight, flexible mechanical joint assemblies, complying with
BS EN295-1: System G.



Standard Coupling Seals

These are manufactured from elastomers conforming to the performance requirements of BS EN681-1. EPDM seals supplied as standard; Nitrile seals are also available for use in contaminated ground.

Joint Performance

Densleeve joint assemblies meet all the requirements of BS EN295-1. They accept angular deflection and shear resistance without leakage, when tested under an internal or external water pressure of 50kPa (5 metres head).

Aggressive Environments

The standard Densleeve pipes, polypropylene couplings and elastomeric sealing rings are resistant to attack from substances which are commonly encountered in sewers.

Where more aggressive effluents or environments are present, other types of coupling seals may be required. Alternatively, Naylor has a separate division, Hathernware Thermachem, which manufactures chemical drainage - ceramic pipes for exceptional high temperature or chemically aggressive environments. Contact the Naylor Technical Sales Department for advice.

Specification

The following statement is a suitable clause for inclusion in contract specification.

Pipes and Fittings

Vitrified clay plain-end pipes & fittings with flexible polypropylene coupling joints, all to BS EN295-1 : System G. (Densleeve type as manufactured by Naylor Drainage Ltd, Clough Green, Cawthorne, Barnsley, S75 4AD, England).

Availability

Densleeve is available either directly from the manufacturer, from Naylor stocking depots or from hundreds of Merchant Stockists throughout Britain as well as Naylor Agents overseas. Contact the Naylor Sales Department for details.

Structural Performance

Densleeve pipes can usually be laid directly on a hand trimmed natural trench bottom with selected, excavated materials (Class D Bedding) used as backfill.

Crushing Strengths

BS EN295-1 includes a variety of crushing strengths for each nominal size of pipe as it takes into account the strength requirements in various parts of Europe. As it is impracticable for any single manufacturer to offer pipes and fittings in the full range of strengths, Naylor has standardised on the strengths shown in the table below.

Densleeve Pipes

The pipe lengths detailed below are standard at the time of publication but may vary due to changes in manufacturing facilities.

Pipe Nominal Size (DN)	Crushing Strength kN/m (System G)	Class	Standard Length (metres)
100	40		1.75
150	40		1.75
200	56	240	1.75
225	45	200	1.75
250	70	280	1.75
300	72	240	2.00

Range

A full system is offered from DN100 to DN300 with an extensive range of fittings, including bends, junctions, tapers and access items, particularly suitable for building drainage applications.

Densleeve can be used in conjunction with other Naylor underground and with other above-ground systems. Connections are made by using purpose-made connectors and adaptors or by the use of Band-Seal couplings.

Pipe Trench Beddings

See the Naylor Drainage Design Handbook for the depths of cover between which Naylor Densleeve pipes conforming to BS EN295-1 can be laid in any width of trench.

Advantages

It is a major advantage of the Densleeve system that plain-end pipes can be quickly and easily cut to intermediate lengths on site and can still be jointed using normal couplings. This feature retains the ease in jointing, reduces wastage and damage and is particularly cost effective.

Flexibility

The flexible joints ensure that the pipeline will accommodate minor settlement and ground movement without failure.

Strength

Vitrified clay pipes and fittings are rigid and do not distort under loading. Their high inherent strength ensures stability even at extreme depths of cover.

Bedding Economy

Densleeve pipes can often be laid on the natural, trimmed trench bottom or where not possible on a 50mm bed of inexpensive granular material such as recycled aggregates. As dug material can be used for the backfill, all resulting in significant savings in granular bedding materials.

Chemical and Temperature Resistance

The Densleeve system has good corrosion resistance and can accommodate controlled discharges of up to 60-70°. For more extreme operational conditions, the Hathernware Thermachem range of chemical drainage is available:

FCR - Fully Chemically Resistant

HT - High Temperature - For very high temperature discharges and thermal shock cycling.

Durability

The Densleeve system is extremely durable. For design purposes, a vitrified clay pipeline can be considered to have unlimited life.

Water Jetting

The Densleeve system, when installed in general accordance with the Naylor Sitework Instructions Booklet is guaranteed for the lifetime of the system against penetration of the pipe wall caused by high pressure water jetting when operated within the following maximum parameters.

- Pressure - 7500psi (510 bar)
- Flow rate - 20gals/min (1.5ltrs/sec)
- Time - Static for 5 minutes

Quick Installation

Pipe jointing is a straightforward manual push fit operation. Testing and backfilling can start immediately.

Pipe Lengths and Delivery

Naylor Pipes are supplied in easy-to-handle lengths. They are delivered in convenient packs with optional mechanical offloading equipment available on the delivery vehicle.

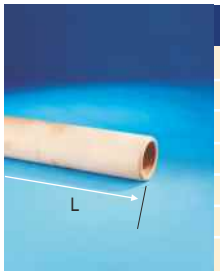
Easy Cutting

Where shorter lengths of pipe are required, pipes may be easily cut on site.

Pipes and Fittings

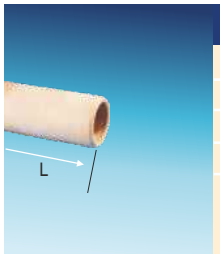
DN100, 150, 225 & 300 plain-end vitrified clay sewer pipes and fittings with sleeve joints, plus DN200 and 250 for overseas markets, to BS EN295.
15% of our Clayware products are made from recycled material.

Pipes & Bends



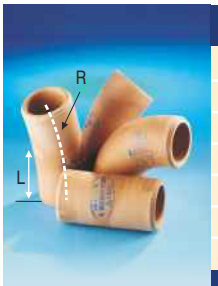
Pipes

DN	CODE	L
100	17036	1.75M
150	17022	1.75M
200*	17018	1.75M
225**	22003	1.75M
250*	17019	1.75M
300**	22005	2.00M



Rocker Pipes

DN	CODE	L
150	17016	0.6M
225	17012	0.6M
300	17004	0.6M



Bends (90°)

DN	CODE	L	R
100	19001	190	150
150	19002	230	200
200*	19003	250	250
225	19004	310	250
250*	19303	310	300
300	19005	360	300

(45°)

DN	CODE	L	R
100	19007	190	375
150	19008	230	450
200*	19009	250	600
225	19010	310	600
250*	19301	310	600
300	19011	310	600

(22½°)

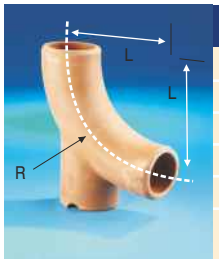
DN	CODE	L	R
100	19016	150	750
150	19017	180	900
200*	19018	250	1200
225	19019	250	1200
250*	19299	250	1200
300	19020	250	1200

(11¼°)

DN	CODE	L	R
100	19021	120	1200
150	19022	175	1750
200*	19023	245	2400
225	19024	245	2400
250*	19298	245	2400
300	19025	245	2400

*Additional Overseas sizes. 15°, 30° and 60° Bends also available
** Supplied with coupling

Bends

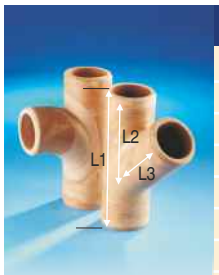


Rest Bend

DN	CODE	L	R
100	19029	250	220
150	19030	270	250
225	19031	310	250
300	19032	360	300

These radiuses do not apply to fabricated products

Junctions



Oblique (45°)

DN	CODE	L1	L2	L3
100x100	19035	380	250	240
150x100	19036	450	330	300
150x150	19037	450	330	350
225x100	19043	500	380	375
225x150	19044	500	360	420
225x225	19045	700	530	500
300x100	19046	500	360	420
300x150	19048	600	480	490
300x225	19050	750	530	550
300x300	19051	900	600	615

Curved Square (90°)

DN	CODE	L1	L2	L3
100x100	19067	380	145	180
150x100	19068	450	225	180
150x150	19069	450	185	225
225x100	19074	500	175	275
225x150	19075	600	220	290
225x225	19076	700	290	300
300x100	19077	500	200	300
300x150	19078	600	240	320
300x225	19079	750	330	370
300x300	19080	900	350	550

Also available 200x150, 200x200, 250x150, 250x200, 250x250, 300x200, 300x250

Saddles

Oblique (45°)

DN	DN Main	CODE
100	Small (up to 200)	19087
	Med. (up to 400)	19091
	Large (over 400)	19093
150	Med. (up to 400)	19099
	Large (over 400)	19101
225	Med. (up to 400)	19106
	Large (over 400)	19108

Fittings

15% of our Clayware products are made from recycled material.

Saddles

Square (90°)

DN	DN Main	CODE
100	Small (up to 200)	19111
	Med. (up to 400)	19115
	Large (over 400)	19117
150	Med. (up to 400)	19123
	Large (over 400)	19125
225	Med. (up to 400)	19130
	Large (over 400)	19132

Gullies

Universal Gully

DN Outlet	100
Top (L)	260x170
Depth (H1)	385
Depth (H2)	263
Code	19316
With horizontal back inlet	19315

Complete with removable internal trap, DN100 coupling outlet and black polypropylene top incorporating 152 x 152 plastic grate and bristled slot 159 x 70mm to accept round or square downpipes (max 70mm).
Top and base can be independently repositioned through 360°.

Rainwater Gully

DN Outlet	100
Top (L)	165x165
Depth (H1)	330
Depth (H2)	208
Code	19332
With horizontal back inlet	19333

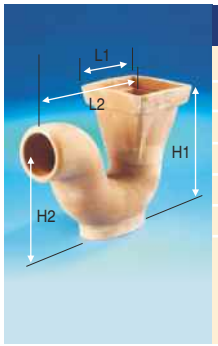
Complete with removable internal trap, DN100 coupling outlet and square black polypropylene top.
Top and base can be independently repositioned through 360°.

Paving Gully

DN Outlet	100
Top (L)	170x170
Depth (H1)	385
Depth (H2)	263
Code	19318
With horizontal back inlet	19317

Complete with removable internal trap, DN100 coupling outlet and square black polypropylene top.
Top and base can be independently repositioned through 360°.

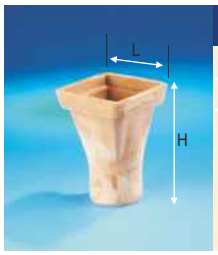
Gullies



Square P Gully

DN Outlet	100
L1	150x150
L2 (to centre)	350
H1	350
H2	180
Code	19267

Hoppers

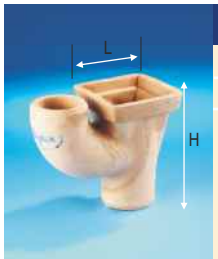


Square

DN	CODE	L	H
100	19204	150	285

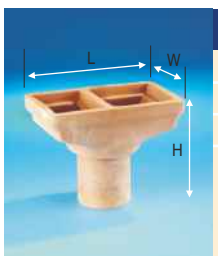
Horizontal 100mm Inlet

DN	CODE	L	H1	H2
100	19206	150	285	160



Vertical 100mm Inlet

DN	CODE	L	H
100	19213	150	285



Rectangular

DN	CODE	L	W	H
100	19193	335	205	265
150	19194	335	205	175

Back Inlet slot: 122x160

Fittings

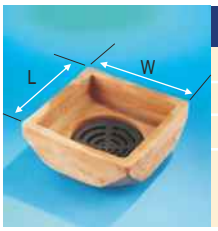
Raising Piece

Standard Raising Piece

H	CODE
75	07366
150	07367
225	07368
300	07370

For 150mm Square Hoppers

Dished Tops

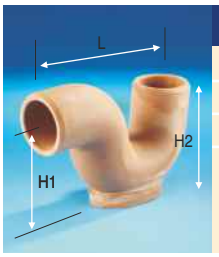


Square Dished Top

GRATE SIZE	L	W	D	CODE
125	245	245	100	07383
178	305	305	100	07385

For Outlet 100 & 150

Low Back Trap



P Outlet 92½°

DN	CODE	L	H1	H2
100	19200	350	295	240
150	19201	450	400	320

Grates for P Gully and Hoppers

Grates, Plates & Sealing Frames

Product	Fig. No.	CODE	SIZE
Loose Grate:	410	60026	152x152
Hinged Locking Grate & Frame:	414	60048	152x152
Sealing Plate & Frame:	400	60011	152x152

Couplings and Connectors

Couplings

EPDM Seals as standard
Nitrile also available

DN	CODE	L1	L2
100	20008	155	90
150	20010	220	120
200*	20012	300	160
225	20013	320	155
250*	20028	350	155
300	20015	410	190

*Additional Overseas sizes.

Made from 100% recycled polypropylene.

Couplings and Connectors

Uni-Drain Connector

For round or square waste & rainwater pipes

DN	CODE	L1	L2
100	15048	140	100

Nominal OD of waste pipe 34-82mm.
Connects to any DN100 below ground drainage system

Made from 100% recycled polypropylene.

Other Connectors

For soil & rainwater pipes			Nom. OD of
Fig.	DN	CODE	Adaptor Pipe
DC6	100	15021	110
DC7	150	15025	160
For underground cast iron			
DC9	100	15024	118
DC9a	150	15027	173
For plain-end thin wall clay			
DC10	100	15034	123
DC15	150	15035	180
DC18	150	15049	178
For twinwall - plastic surface water pipes			
DC150TD	150	15057	
DC225TD	225	15055	
DC300TD	300	15056	

Made from 100% recycled polypropylene.

Stoppers

Polypropylene

DN	CODE	L1	L2
100	15009	160	45
150	15010	218	60
225	15012	317	80
300	19133	410	95

Made from 100% recycled polypropylene.

Access and Rodding Eye Points

Rodding Eye Point

Aluminium oval pattern connects with
DN100 Standard Coupling
DN150 DC15 Connector
With removable plate for Rodding

DN	CODE	L	TOP
100	19033	135	205x150
150	19034	180	270x200

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Fittings

Access and Rodding Eye Points

Square Rodding Eye Point

With removable screw down plate for Rodding

DN	CODE	TOP
100	15085	170x170
150	15085	170x170

Ideal for use in paved areas.
Connect with standard coupling and 45° bend.

Access Pipe

Sealing Plate & Frame - Alloy

CODE	ACCESS SIZE
60025	250x150

Oval Raising Piece

CODE	H	ACCESS
07511	300	250x150

Access Pipe

DN	CODE	L
100	19154	450
150	19156	450

Oval Opening

Non Man Entry Inspection Chamber

Restricted Access Cover & Frame

DN	CODE
450	15052

Light duty Polypropylene,
Dual Lock Cover & Frame. Test Load 35kN

Raising Piece

DN	HEIGHT	CODE
450	235	15004

DN450 Upstand x 235 deep with fitted seal.

Base Unit

DN	CODE
450	15060

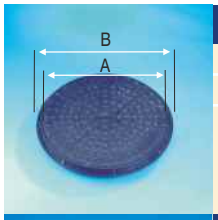
DN450 Base Unit x 280 deep.
150mm straight main channel with 2x45° and 2x90° 100mm right/left hand branch entries.
Supplied complete with sealing ring for shaft and 3 blank off plugs.

PPIC inlet Adaptor

DN	CODE
150	15007

Converts DN160 chamber inlets to DN150 Densleeve

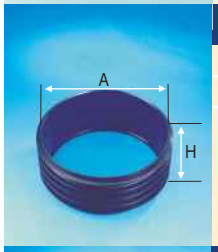
Plastic Inspection Chambers



Cover and Frame

DN	CODE	A	B
450	15003	455	595

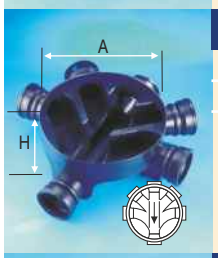
Light duty Polypropylene. Dual Lock Cover and Frame. Test Load 35kN
Square covers available recessed to accept block paving. Size 580x580mm.



Raising Piece

DN	CODE	A	H
470	15063	500	215

WEIGHT: 4Kg
The raising piece is supplied complete with a rubber seal and can be cut to interim heights.
MATERIAL: Polypropylene
COLOUR: Black



Base Unit

DN	CODE	A	H
470	15062	500	240

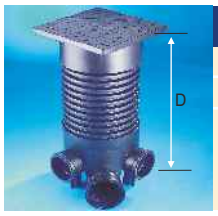
WEIGHT: 4Kg
Inlets x 5 DN100. Outlet x 1 DN100.
Suitable for direct connection to the Densleeve system. With reduced access cover and frame can be installed up to 3m.

PPIC inlet Adaptor

DN	CODE
100	15072

Converts DN110 chamber inlets to DN100 Densleeve

Universal Manhole



Polypropylene Mini Access Chamber

DN	CODE	D
250	15087	600

Complete unit with cover and frame
Inlets x 3 - DN100,
Outlet x 1 - DN100

Plastic Inspection Chambers

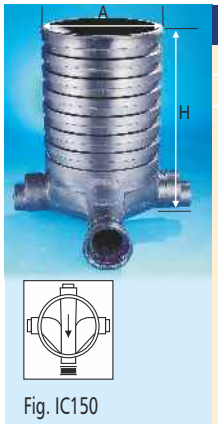


Fig. IC150

Denrod 500 Complete Chamber

DN	CODE	A	H
500	15008	500	1000

WEIGHT: 12Kg
Inlets x 3 - DN100 or DN150.
Outlet x 1 - DN150.
NB. Inlet size is achieved by cutting off the relevant inlet cap.
Outlet connects to DN150 Densleeve using Naylor DC7 Connector (Supplied).
MATERIAL: High Density Polypropylene
COLOUR: Black
Use IC6 Cover and Frame for light duty applications.
Made from 100% recycled material

Fittings

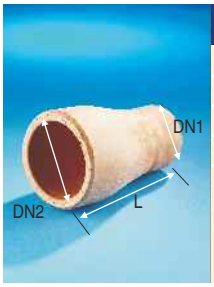
Adaptors

To / From Denseal

DN	TYPE	CODE	L
100	1a	19142	300
150	1a	19144	300
225	1a	19146	300
300	1a	19148	320

Type 1a: Plain end for cement jointing

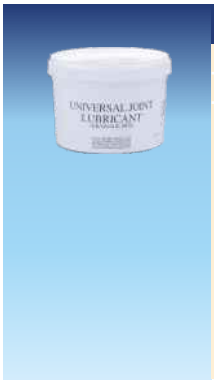
Tapers



Taper

DN D1-D2	CODE	L
100-150	19134	300
150-225	19138	380
225-300	19140	500

Sitework Equipment



Lubricant

50001	1Kg Tub
50002	2.5Kg Tub

Supplied in plastic tubs.
This vegetable-based lubricant is suitable for all types of push fit and gravity pipe systems.

Average Number of Joints per 1Kg Tub
100 - DN100
50 - DN150
30 - DN225
24 - DN300
15 - DN375/400
10 - DN450/500

NB: Measurements are only as a guideline

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Denline

The Naylor Denline underground drainage system of DN100, 150, 225, 300 plain-end, vitrified clay perforated pipes with flexible polyethylene sleeve joints, was specifically developed for groundwater and surface water drainage of all types, including

- Motorways
- Roads
- Sports grounds
- Land reclamation
- Retaining walls
- Land and landfill drainage.

Description

Clayware

Vitrified clay perorated pipes and unperforated fittings manufactured in accordance with BS EN295-1.

Sleeve Couplings

Manufactured in high impact polypropylene with elastomeric seals providing watertight, flexible mechanical joint assemblies, complying with
BS EN295-1: System G.

Joint Performance

The Denline sleeve coupling is a friction fit joint. It locates the joints and prevents the ingress of debris. It is not intended to provide a watertight seal.

Aggressive Environments

The pipes, fittings and couplings are resistant to attack from chemicals, aggressive soils and bacteria. In addition they have a high abrasion resistance.

Specification

The following statement is a suitable clause for inclusion in contract specification.

Perforated Pipes

Vitrified clay plain-end pipes to BS EN295-5 with plastic sleeve joints, (Denline type as manufactured by Naylor Drainage Ltd. Clough Green, Cawthorne, Barnsley, S75 4AD, England).

Availability

Denline is available directly from the manufacturer. Contact the Naylor Sales Department for details.

DN100, 150, 225, and 300 vitrified clay perforated pipes and unperforated fittings with sleeve joints, to BS EN295.
15% of our clayware products are made from recycled material.

Pipes and Fittings

Structural Performance

Crushing Strengths

BS EN295-5 includes a variety of crushing strengths for each nominal size of pipe, as it takes into account the strength requirements available in various parts of Europe. As it is impracticable for any single manufacturer to offer pipes and fittings in the full range of strengths, Naylor has standardised on the strengths shown in the table below.

Range

Perforated pipes from DN100 to DN300 with a range of unperforated bends and junctions. The details above are standard at the time of publication but these may vary due to changes in manufacturing facilities.

Pipe Nominal Size (DN)	Crushing Strength kN/m	Class	Standard Length (metres)	Rows of 8mm Holes	Number (per pack) Approx	Weight (tonnes per pack)
150	22		1.75	4	41	1.6
225	28	120	1.6	6	20	1.45
300	36	120	1.75	6	12	1.75

Advantages

Flexibility

The flexible joints ensure that the pipeline will accommodate minor settlement and ground movement.

Strength

Vitrified clay pipes and fittings are rigid and do not distort under loading. Their high inherent strength ensures stability under even the highest loadings, eg deep landfill sites.

Chemical Resistance

Denline pipes and couplings are unaffected by chemicals and bacteria normally found in sewerage and have high resistance to attack from aggressive soils.

Durability

The Denline system is extremely durable. For design purposes, a vitrified clay pipeline can be considered to have an unlimited life.

Temperature Resistance

Denline pipes and joints will not distort, soften or embrittle, even when subject to extremes of temperature likely to be experienced in service.

Quick Installation

Pipe jointing is a straightforward operation. Backfilling can start immediately.

Pipe Lengths and Delivery

Naylor Pipes are supplied in easy-to-handle lengths. They are delivered in convenient packs with optional mechanical offloading equipment available on the delivery vehicle.

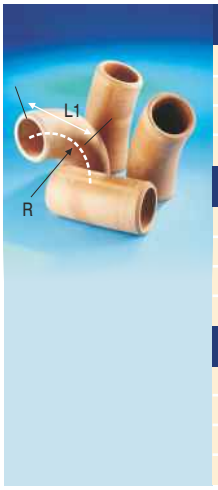
Easy Cutting

Where shorter lengths of pipes are required, pipes may be cut on site and jointed into the sleeve coupling.

Pipes & Bends

Pipes

DN	CODE	L
150	25009	1.75
225	25001	1.75
300	25008	2.00



Bends (90°)

DN	CODE	L	R
150	19001	230	200
225	19004	310	250
300	19005	310	300

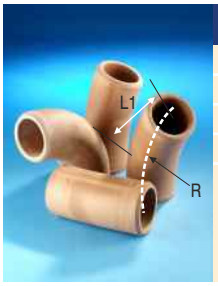
(45°)

DN	CODE	L	R
150	19008	230	450
225	19010	310	600
300	19011	310	600

(22½°)

DN	CODE	L	R
150	19017	145	900
225	19019	245	1200
300	19020	245	1200

These radiuses do not apply to fabricated products.



Bends (11¼°)

DN	CODE	L	R
150	19022	145	1750
225	19024	245	2400
300	19025	245	2400

Junctions

Oblique (45°)

DN	CODE	L1	L2	L3
150 x 150	19037	450	330	350
225 x 150	19044	500	360	420
225 x 225	19045	700	530	500
300 x 150	19048	600	480	490
300 x 225	19050	750	530	550
300 x 300	19051	900	600	615

Curved Square (90°)

DN	CODE	L1	L2	L3
150 x 150	19069	450	185	225
225 x 150	19075	600	220	290
225 x 225	19076	700	290	300
300 x 150	19078	600	240	320
300 x 225	19079	750	330	370
300 x 300	19080	900	350	550

Denduct

The Naylor Denduct underground duct system consists of DN100 and 150 vitrified clay plain-end ducts with flexible sleeve couplings and fittings. It is especially ideal for the enclosure and protection of underground cables or other services on heavy civil projects where the inherent strength of the ducting system is important.

Description

Clayware

Vitrified clay pipes and fittings manufactured in accordance with BS65.

Sleeve Couplings

Manufactured in high impact polypropylene with elastomeric seals providing watertight, flexible mechanical joint assemblies, complying with BS EN295-1: System G.

Joint Performance

The Denduct sleeve coupling is a friction fit coupling. It locates the joint and prevents the ingress of debris. It is not intended to provide a watertight seal.

Aggressive Environments

The pipes, fittings and couplings are resistant to attack from chemicals, aggressive soils and bacteria.

Specification

The following statement is a suitable clause for inclusion in contract specification.

Ducts and Fittings

Vitrified clay plain-end ducts to BS65 with plastic sleeve joints, (Denduct type as manufactured by Naylor Drainage Ltd. Clough Green, Cawthorne, Barnsley, S75 4AD, England).

Availability

Denduct is available directly from the manufacturer. Contact the Naylor Sales Department for details.

15% of our clayware products
are made from recycled material.

Pipes and Fittings

Advantages

Smooth Bore

The smooth internal surface of Denduct ensures that no damage to cables occurs during the pull-through phase of cable installation.

Flexibility

The plastic flexible sleeve permits movement at each joint whilst the central annular recess of the coupling allows additional flexibility, thereby accommodating settlement and ground movement.

Strength

Denduct is rigid and therefore does not distort under loading.

Chemical Resistance

The ducts and couplings are unaffected by chemicals and bacteria normally found in the ground and ground water.

Durability

Denduct is extremely durable. For design purposes, a limit to the life of a duct system need not normally be considered.

Quick Installation

Denduct jointing and laying is a straightforward operation even when multiways are required.

Pipe Lengths and Delivery

Denduct is supplied in easy-to-handle lengths and are delivered in conveniently sized packs. Upon request, Denduct can be supplied on a self off-loading vehicle.

Easy Cutting

Where shorter lengths of duct are required, Denduct may be cut on site and jointed into the sleeve coupling.

Sitework Equipment

Draw Rope

6mm Polyropylene Draw Rope in 220m coils.
Code: 34035

Marker/Warning Tape

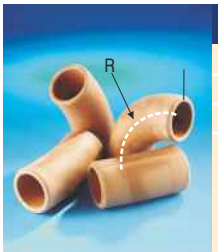
365m rolls

Service	Colour	Code
Electric Cable	Yellow	34036
Street Lighting	Yellow	34041
Gas Main	Yellow	34038
Water Main	Blue	34037
Telephone Cable	Green	34039
Foul Sewer	Red	34040

Pipes & Bends

Pipes

DN	CODE	L
100	31001	1.6
150	31005	1.75



Bends (45°)

DN	CODE	R
100	19007	375
150	19008	450

Bends (22½°)

DN	CODE	R
100	19016	750
150	19017	900

Bends (11¼°)

DN	CODE	R
100	19021	1200
150	19022	1750

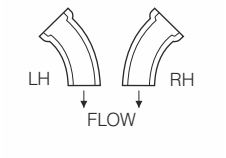
Channels

The Naylor range of butt and socketed Channel Pipes and Fittings are manufactured in accordance with BS EN295-1 or BS65 for the construction of manholes or open channel surface water drains.

Description

All Channel Pipes and Fittings, with the exception of the ¾ section branch bends used for manhole construction are cut from standard Densleeve or Denseal pipes detailed on previous pages.

Left Handed and Right Handed Fittings



It is important that the correct hand of channel fittings are specified when ordering. The 'hand' of the channel is determined by looking upstream against the flow.

Specification

The following statement is a suitable clause for inclusion in contract specification.

Channel Pipes and Fittings

Vitrified clay pipes and fittings to BS EN295-1 or BS65. (Channel pipes and fittings as manufactured by Naylor Drainage Ltd. Clough Green, Cawthorne, Barnsley, S75 4AD, England).

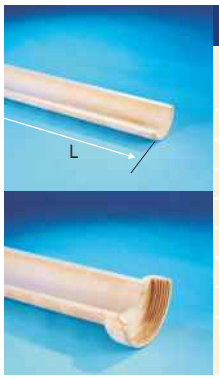
Availability

Channel Pipes and Fittings are is available either directly from the manufacturer or from hundreds of Merchant Stockists throughout Britain - Contact the Naylor Sales Department for details.

Pipes & Fittings

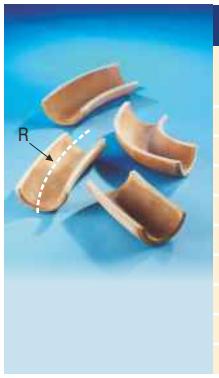
15% of our clayware products are made from recycled material.

Pipes & Bends



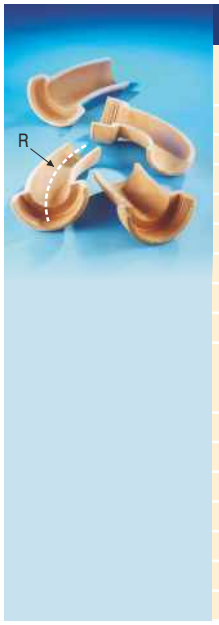
Pipes

DN	CODE (Butt)	CODE (Socketed)	L
100	05057	-	1.0
150	05058	05008	1.0
225	05059	05052	1.0
300	05039	05053	1.0
375	05041	05054	1.0
400	05043	05060	1.0
450	05047	05056	1.0



Bends (Butt)

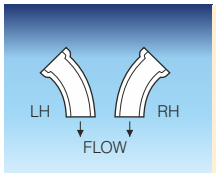
	Codes			
DN	90°	45°	22½°	11¼°
100	09018	09023	09027	09031
150	09019	09024	09028	09032
225	09021	09026	09030	09034



Bends (Socketed)

	LH Codes			
DN	90°	45°	22½°	11¼°
100	09001	09035	09053	09071
150	09002	09036	09054	09073
225	09004	09038	09056	09077
300	09006	09040	09058	09081
375	09007	09041	09059	09083
400	09008	09042	09060	09085
450	09009	09043	09061	09087

	RH Codes			
DN	90°	45°	22½°	11¼°
100	09010	09044	09062	09072
150	09011	09045	09063	09074
225	09012	09047	09065	09078
300	09014	09049	09067	09082
375	09015	09050	09068	09084
400	09016	09051	09069	09086
450	09017	09052	09070	09088



A channel is a LEFT HAND fitting when viewed from the spigot towards socket (ie. Against the direction of flow), the socket projects to the LEFT. Similarly when the socket projects to the RIGHT the channel is a RIGHT HAND fitting

Junctions

Butt

		CODES			
DN Main	DN Arm	LH Oblique	LH Square	RH Oblique	RH Square
100	100	09503	09532	09504	09533
150	100	09505	09530	09506	09531
150	150	09507	09529	09508	09528
225	100	09509	09548	09510	09549
225	150	09511	09536	09512	09537
225	225	09513	09540	09514	09539
300	100				
300	150	09547			
300	225				
300	300				

Socketed

		CODES			
DN Main	DN Arm	LH Oblique	LH Square	RH Oblique	RH Square
100	100	09319	09402	09320	09403
150	100	09321	09404	09322	09405
150	150	09323	09406	09324	09407
225	100	09325	09408	09326	09409
225	150	09327	09410	09328	09411
225	225	09329	09412	09330	09413
300	100	09331	09414	09332	09415
300	150	09333	09416	09334	09417
300	225	09335	09418	09336	09419
300	300	09337	09420	09338	09421

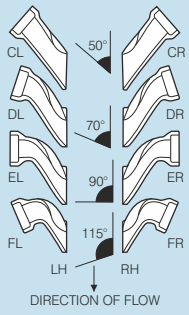
Socketed

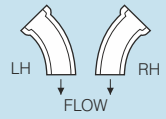
	CODES		
DN	DN Arm	Double	Breeches
100	100	09445	09301
150	150	09447	09303
225	225	09450	09306
300	300	09454	09309

Fittings

15% of our clayware products are made from recycled material.

Bends





Bends

DN	Type	LH Code	RH Code
100	C	09093	09094
100	D	09095	09096
100	E	09097	09098
100	F	09099	09100
150	C	09109	09110
150	D	09111	09112
150	E	09113	09114
150	F	09115	09116
225	C	09125	09126
225	D	09127	09128
225	E	09129	09130
225	F	09131	09132

Splayed Ends (also known as Winser or Barron Bends). These Branch Bends available LH or RH are designed to avoid splashing and fouling in the manhole.

A channel is a LEFT HAND fitting when viewed from the spigot towards socket (ie. Against the direction of flow), the socket projects to the LEFT. Similarly when the socket projects to the RIGHT the channel is a RIGHT HAND fitting

Tapers

Taper (Butt)

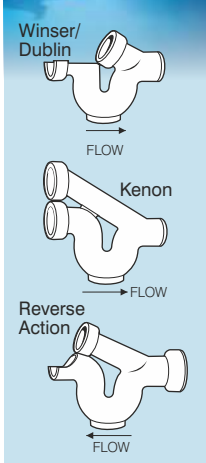
DN to DN	CODE
100 - 150	09527
150 - 225	09538
225 - 300	09544

Taper (Socketed)

Increaser DN to DN	CODE
100 - 150	09471
150 - 225	09472
225 - 300	09473
300 - 375	09474
375 - 450	09475
Reducer DN to DN	
150 - 100	09476
225 - 150	09477
300 - 225	09478
375 - 300	09479
450 - 375	09480

Manhole Interceptors

Manhole interceptors eliminate odours into the manhole from the downstream sewer. They also facilitate ease of rodding.



Winser or Dublin

DN	Code
100	09481
150	09482
225	09483
300	09484

Kenon

DN	Code
100	09487
150	09488
225	09489
300	09490

Reverse Action

DN	Code
100	09493
150	09495

Interceptors supplied with 100mm Stoppers unless otherwise requested. Alternatives are: Black Sealing Plate and Frame, Lever Locking Stopper.

Sitework Instructions

Unloading

Access to site must be over a hard road capable of supporting a fully laden vehicle. The delivery vehicle must be parked on firm, flat ground. Naylor pipes are delivered to site in packs weighing between 1 and 1.9 tonnes. Fittings are usually supplied in crates. Any loose fittings should be removed by hand from the delivery vehicle before other goods are unloaded.

There is usually a choice between:

1 **Use of Naylor Moffatt self-loading vehicle**

If you require this service, please request when making delivery arrangements.

The Moffatt is detached from the trailer-load and is operated as a fork-lift to unload the packs and crates. For this purpose, approx. 10 metres of firm level ground space is required along each side of the trailer.

If conditions allow, packs may be placed around the site in order to reduce subsequently handling.

2 **Using site equipment to unload** - (This is the responsibility of the Contractor.)

The packs and crates can be offloaded by fork-lift, or by suitable crane, or other machine using a proven or test-certified sling.

3 **Hand offloading by site personnel**

Check that the pack is stable and that the pipes and packing woods are undamaged before cutting the straps and manually unloading.

Stacking

1 **Pipes delivered in packs**

Set the packs down on a firm and level surface.

2 **Storage of loose pipes**

Rest the bottom row of pipes on battens to keep them clear of the ground and stake the end pipes in order to prevent movement of the stack.

3 **Sleeve couplings and lubricant**

Store indoors in a clean area, away from sunlight. Extremes of temperature must be avoided. Winter conditions, in particular, can affect the ability to make a joint if items have been left outdoors.

Trench Excavation

There should be at least 150mm width of trench on each side of the pipe barrel, in order to provide sufficient space for jointing and proper compaction of the bedding and fill materials.

It is not good practice to excavate a trench too far in advance of pipe-laying.

Do not exceed the specified maximum trench width without prior approval of the supervising authority, because the trench width affects the loading on the pipeline.

When trenches are battered, the maximum allowable trench width must not be exceeded below a point 300mm above the crown of the pipes.

Always provide adequate support to the trenches, for the protection of workmen and to prevent damage to adjacent property. The attention of all site personnel should be drawn to the requirements of the Health & Safety Executive.

Ref. BS8000: Workmanship on Building Sites Pt.14: Below Ground Drainage. CIRIA* R97 Trenching Practice.

Pipe Laying

Line & Level

The correct pipeline alignment and gradient are indicated by laser equipment or by using a taut string line and sight rails.

Pipe manufacturing tolerances need to be taken into account when assessing line and level. For guidance in setting out see CIRIA* publication 'A Manual of Setting Out Procedures'.

Procedure

Class D, N, F, B & S Beddings

Compact the bed to the correct level. Commence pipelaying from the lower end of the line. Lay pipes with their couplings facing upstream. Take care to achieve continuous bedding support. If it is necessary to raise a pipe to the correct level, the pipe should be removed and additional bedding material compacted along the full barrel length - prior to relaying.

Concrete Beddings

Blind the trench bottom with a 50mm thick layer of concrete. Place concrete support blocks on the trench blinding, immediately downstream of each pipe coupling position. Place a compressible board on top of each block and lay the pipes on these. Fine adjustments of the pipe levels can be achieved by using wedges fixed between the pipe barrels and the blocks. To maintain flexibility at joints, fix compressible boards immediately upstream of couplings at the specified intervals along the length of the pipeline. Brace the pipes to prevent any tendency to float when the concrete surround is placed and vibrated.

Inspect & Clean Pipes & Jointing Components

Before laying, check the pipes and fittings to ensure that they have not suffered damage. Make sure that the pipe ends, jointing components and lubricant are clean and free from grit, before attempting to make joints.

The specification; design and construction of drainage and sewerage systems using vitrified clay pipes booklet published by CPDA give additional guidelines when laying pipes in a wide range of difficult ground conditions.

* Construction Industry Research and Information Association

Jointing

Prior to Jointing

- Check the pipes and fittings to ensure that they have not suffered damage.
- Ensure that the pipe ends, jointing components and lubricant are clean and free from grit, before attempting to make joints.

Densleeve Pipes & Fittings

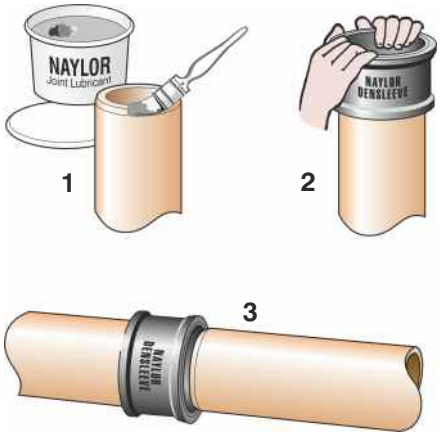
DN100 and DN150 assemblies

1 Stand the pipe upright on a firm clean base (a 600mm piece of wood is ideal) and lubricate the top end of the pipe paying particular attention to the chamfered lead-in portion.

2 Push the sleeve coupling over the lubricated chamfered end of the pipe and ensure that the pipe end is firmly located against the central register of the coupling. The end of any fitting may be pushed into the sleeve coupling - the reverse of the procedure adopted for pipes.

3 Ensure that the sleeve coupling on the previously laid pipe is thoroughly cleaned and free from grit or small stones from the bedding material.

4 Lower new pipe into trench and check, clean and lubricate the free end. Place the pipe end into the mouth of the previously laid coupling and align the pipe along the central axis of the pipeline. Apply a horizontal forward pressure, in combination with a small side to side movement, and push the pipe home into the sleeve coupling.



Densleeve Pipes & Fittings

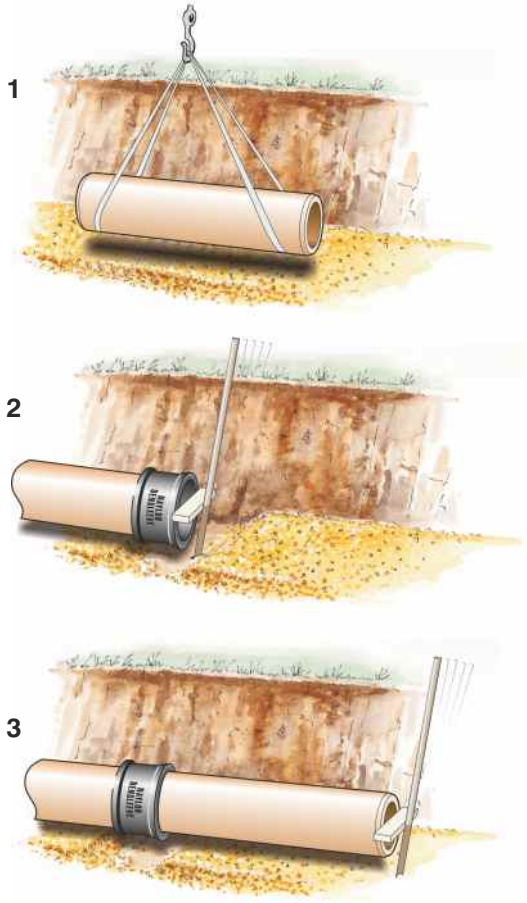
DN200 and above

1 Lower the pipe into the trench using slings and set in position on the prepared bedding. Form coupling recess in the bedding.

2 Lubricate the pipe end to be jointed. Centralise a sleeve coupling to the pipe end and push home. A bar may be used against a timber block.

3 Lower the next pipe into the trench and lubricate the end to be jointed, Ensure that the coupling on the previously laid pipe is thoroughly clean and free from grit or stones. Centralise the pipe and push fully home into the coupling.

A bar may be used against a timber block. Ensure coupling recess is filled with bedding material after making the joint.

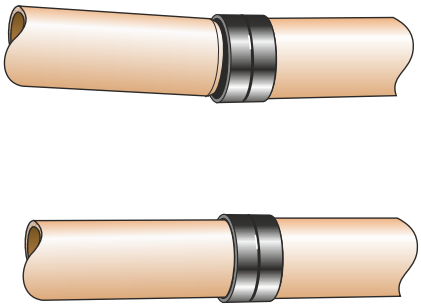


Denline/Denduct Pipes & Fittlngs

1 Introduce the chamfered, plain end of a duct into the sleeve coupling fitted on the end of the previously laid duct.

2 Push the duct straight home against the central register of the coupling.

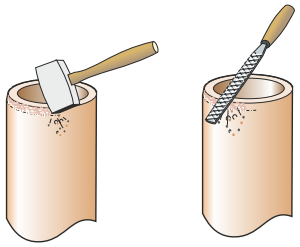
No lubricant or special jointing material is necessary.



Cut Pipes can be jointed by similar means

All Naylor pipes can easily be cut to accurate length with a disc blade power tool (safety precautions such as goggles, dust mask, etc should be worn).

It is essential that sharp edges are removed from cut pipes to provide a satisfactory ‘lead-in’ for the rubber seals on sleeve couplings. This can be achieved by rasping, using a trimming tool or a light hammer.



Testing

Testing the pipeline for water tightness

When laying Naylor Densleeve pipes, it may be convenient to check that all is in order by applying interim air tests to progressive lengths of pipeline as work proceeds.

Once a pipeline has been laid an air or water test may be carried out in accordance with BS EN1610, as detailed below.

Air Test

1 Fix air-tight stoppers at the ends of the pipeline, after checking that they are clean and well-fitting. Connect a manometer to one of the stoppers.

2 Blow or pump air into the pipeline until a pressure slightly more than the required air test pressure is indicated on the manometer. After allowing 5 minutes for the temperature to stabilise, adjust to the required pressure and commence the test.

3 (a) If the measured drop is less than the allowable drop then the test is passed (see table).

Note: The test pressure LA is the same as that previously used in the UK except that the test period is increased for sizes above DN225, as shown.

Test Method	Test Pressure mbar (kPa)	Allowable Drop mbar (kPa)
LA	10 (1)	2.5 (0.25)

Test period in minutes				
DN100	DN200	DN300	DN400	DN600
5	5	7	10	14

(b) If the measured drop exceeds the allowable loss, carefully check the testing apparatus and stoppers and examine the pipes and joints for leakage. If a defect is discovered, remedy it and re-test.

If this test does not reveal a defect, apply a water test.

The above standards do not regard an air test alone as sufficient grounds for rejection and it is recommended that a water test should be applied in the event of apparent failure to meet the air test. An apparent failure of air test can be due to causes other than defects in the pipeline; for example, changes in ambient temperature.

Water Test

1 At the upstream end of the pipeline to be tested, add a 90° bend and sufficient vertical pipes to provide the required head of water. BS EN1610 requires a minimum 1.0m (10kPa) head of water at the high end with a maximum of 5m (50kPa) at the lower end. Both heads above the pipe crown. In cases of very steep gradients, it may be necessary to test the pipe in stages, in order to comply with these limitations.

2. Tighten stoppers at the lower end of the pipeline and at open branches, after checking that they are clean and well-fitting.

3. Strut the ends of the pipeline and the 90° bend to prevent movement and then fill the line with water.

4 Inspect the pipeline for any obvious leaks and remedy any defects. There will be an initial fall of the water level due to absorption and the displacement of trapped air.

5 After at least one hour, top up to the maximum test head, a longer period may be allowed in extremely dry conditions. The loss of water over a period of 30 minutes should then be measured by adding water from a measuring vessel at regular intervals of 10 minutes and noting the quantity required to maintain the original water level. The test is accepted if the water added does not exceed 0.15l/m^2 of internal wetted area over a 30 minute period, for pipelines. Higher limits are set for pipelines including manholes and inspection chambers.

Further information

See BS EN1610 and the Clay Pipe Development Association Ltd booklets Specification, Design and Construction and Testing of Drains & Sewers (Water & Air Tests).

Backfilling

Any selected or granular fill must be carefully hand-compacted in layers not exceeding 150mm to complete the pipeline surround. Place and compact this fill equally on both sides of the pipeline to prevent displacement.

Slice with a spade around the barrels to form a cradle for the pipes. This work is important, as the pipeline derives some of its strength from a properly constructed bedding.

The trench must be backfilled to at least 300mm above the crown of the pipes before any power-ramming takes place. Backfill should then be well-compacted in layers not exceeding 300mm.

As backfilling proceeds withdraw timber and trench sheeting in stages to avoid disturbing the pipeline or the creation of voids within the bedding and surround.

Site Traffic

Site traffic should not pass over buried pipelines before backfilling has been completed and the final surface constructed.

Overloading by unavoidable site traffic can be prevented by bridging the trench with steel plates, timber sleepers or other temporary protection.

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Further Information

Information on other Naylor Group Products may be obtained by **faxing this form** back on 01226 791531

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