



# Denseal

The Naylor Denseal underground drainage system of socketed pipes and comprehensive range of fittings, with flexible, mechanical joints is particularly suitable for foul sewerage and surface water as well as road drainage.

When installed in accordance with the Naylor Sitework Instructions, the Naylor Denseal System meets the latest technical requirements of the Building Regulations, BS8005 and 8301.

Denseal is available in diameters DN150, 225, 300, 375, 400, 450, 500 and 600; in addition DN200 and 250 are manufactured for key overseas markets.

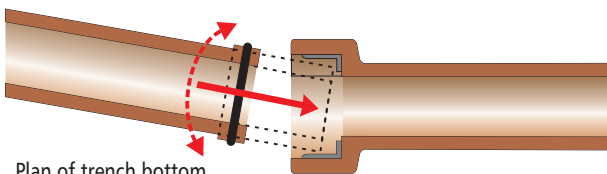
## Description

### Clayware

Vitrified clay 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 thus give flexible joints at sufficiently frequent intervals to enable the pipeline to withstand a degree of settlement or other ground movement after installation.

### Joints

Flexible mechanical joints with polyester fairings and elastomeric 'O' ring seals provide watertight joint assemblies, complying with BS EN295-1: Systems D and N.



Plan of trench bottom

### Standard Sealing Rings

These are manufactured from elastomers conforming to the performance requirements of BS EN681-1. EPDM seals are supplied as standard; Nitrile rings are also available for use in contaminated ground or where mineral oil may be present in discharges.

### Joint Performance

Denseal 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 50 kPa (5 metres head).

### Aggressive Environments

The standard Denseal pipes, polyester fairings and elastomeric sealing rings are resistant to all forms of attack from substances which are commonly encountered in public sewers. Where more aggressive effluents or environments are present, special sealing rings may be required. Alternatively, Naylor has a separate division, Hatherware, which manufactures chemical drainage - ceramic pipes for exceptional high temperature or chemically aggressive environments. Contact the Naylor Technical Sales Department for advice.

### Short Lengths

Pipes are also available in 0.6 and 1m lengths. These are normally used as 'rocker' pipes for building into manholes and other structures to provide flexibility against differential settlement.

## Specification

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

### Pipes and Fittings

Vitrified clay spigot and socket pipes and fittings with polyester fairings and 'O' ring seals, all to BS EN295-1: systems D or N. (Denseal type as manufactured by Naylor Drainage Ltd. Clough Green, Cawthorne, Barnsley, S75 4AD, England).

## Availability

Denseal is available either from Naylor stocking depots or Merchant Stockists throughout Britain, as well as Naylor Agents Overseas. Contact the Naylor Sales Department for details.

## Structural Performance

Denseal pipes can usually be laid either directly on a hand trimmed natural trench bottom, or with minimum bedding. Selected excavated material is often a suitable 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 applicable 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.

## Denseal Packs

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

## Range

A full system is offered from DN150 to DN600 with a range of fittings, including bends, junctions and tapers.

Denseal can be used in conjunction with other Naylor systems, especially the Densleeve range.

## Pipe Trench Beddings

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

Pipe Nominal Size (DN)	Crushing Strength kN/m				Standard Length (metres)
	(System D) Class	(System N) Class	(System N) Class	(System N) Class	
150	34	40			1.4
200*	40	200	48	240	1.6
225	36	160	36	160	1.75
250*	40	160	60	240	1.6/1.75
300	48	160	72	240	1.6
375	45	120	64	160	2.0
400	64	160	64	160	2.0
450	54	120	72	160	2.0
500	60	120	80	160	2.0
600			96	160	1.85

\*Additional overseas sizes.

## Advantages

### 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 under high loadings.

### Bedding Economy

Denseal pipes, because of their inherent strength, may often be laid on the natural, trimmed trench bottom or with minimum granular bedding material requirements.

### Chemical and Temperature Resistance

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

- FCR - Fully Chemically Resistant
- HT - High Temperature - For very high temperature discharges and thermal shock cycling.

### Durability

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

### Water Jetting

The Denseal system, when installed in 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.

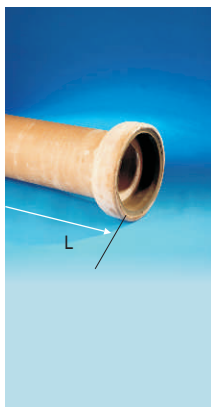
### Pipe Lengths and Delivery

Naylor Pipes are supplied in convenient lengths. They are delivered in unit packs for mechanical offloading by site equipment eg crane, rough terrain forklift etc.

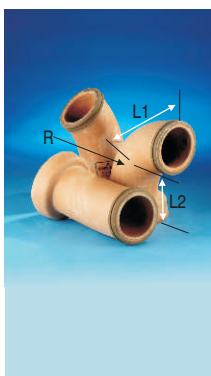
# Pipes and Fittings

DN150, 225, 300, 375, 400, 450, 500 and 600 vitrified clay spigot & socket pipes and fittings with polyester joints to BS EN295. Plus DN200 and 250 for overseas markets. 15% of our Clayware products are made from recycled material.

## Pipes & Bends



Pipes					
DN	CODE	SL	CODE	RL	
150	10078	1.4	10009	0.6	
200*	11016	1.6	11015	0.6	
225	10086	1.75	10021	0.6	
250*	11030	1.6	11028	0.6	
300	10036	1.6	10032	0.6	
375	10048	2.0	10038	0.6	
400	10051	2.0	10045	0.6	
450	10060	2.0	10053	0.6	
500	10066	2.0	10062	0.6	
600	10037	1.85	10052	0.6	

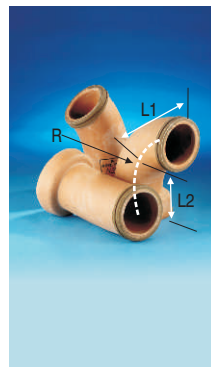


Bends (90°)					
DN	CODE	L1	L2	R	
150	12002	225	225	200	
200*	12003	290	290	250	
225	12004	270	320	250	
250*	12005	340	380	300	
300	12006	305	285	300	
375	12007	430	350	350	
400	12008	430	350	350	
450	12009	460	430	400	
500	12243	520	470	550	

Bends (45°)					
DN	CODE	L1	L2	R	
150	12011	190	190	450	
200*	12012	220	290	600	
225	12013	195	300	600	
250*	12014	250	350	600	
300	12015	310	350	600	
375	12016	270	360	750	
400	12017	290	360	750	
450	12018	360	430	750	
500	12250	435	435	750	


Bends (22½°)					
DN	CODE	L1	L2	R	
150	12020	135	225	900	
200*	12021	180	260	1200	
225	12022	215	215	1200	
250*	12023	220	360	1200	
300	12024	220	300	1200	
375	12025	320	390	1500	
400	12026	270	360	1500	
450	12027	260	385	1500	
500	12028	290	290	1500	

\*Additional overseas sizes. These radiuses do not apply to fabricated products.



Bends (11¼°)					
DN	CODE	L1	L2	R	
150	12030	155	185	1750	
200*	12031	210	290	2400	
225	12032	220	240	2400	
250*	12033	265	285	2400	
300	12034	240	285	2400	
375	12035	250	325	2400	
400	12036	200	320	2400	
450	12037	200	320	2600	
500	12245	300	300	2800	

## Junctions



Oblique (45°) & Curved Square (90°)					
DN Main	DN Arm	CODE Oblique	CODE Curved Square	L1 Main Length	
150	100	12046	12105	380	
150	150	12047	12106	450	
225	100	12051	12108	380	
225	150	12052	12109	450	
225	225	12053	12110	600	
300	150	12058	12112	450	
300	225	12059	12113	760	
300	300	12060	12253	900	
375	150	12062	12116	600	
375	225	12064	12117	760	
375	300	12065	12118	900	
375	375	12066	12119	1000	
400	150	12068	12120	600	
400	225	12069	-	760	
400	300	12070	-	900	
400	400	12071	12242	1000	
450	150	12073	12122	600	
450	225	12074	12123	760	
450	300	12075	12124	1000	
450	375	12076	12125	1000	
450	450	12077	12126	1200	
500	150	12078	12244	600	
500	225	-	12249	760	
500	300	-	12248	1000	
500	375	-	-	1000	
500	400	-	-	1200	
500	450	-	-	1200	
500	500	-	-	1200	

Large diameter junctions DN375 and above are supplied as square 90°.

DN300 and above junctions are available with branch arms down to DN150 only.

To connect branch arms to Densleeve, use Denseal/Densleeve Adaptor Type 2.

NB: A range of DN200 and DN250 Junctions is also available.

# Fittings

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


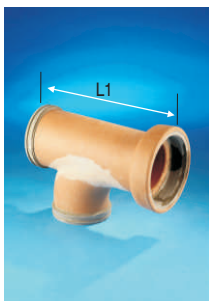



Fig. 33

Rest Bend				
DN	CODE	L1	L2	R
150	12039	230	240	200
225	12040	270	320	250
300	12042	290	320	300



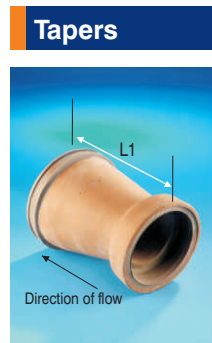
Tumbling Bay (90°)				
DN Main	DN Arm	CODE	L1	
150	150	12173	450	
225	225	12177	600	
300	300	12181	900	
375	375	12184	1070	
400	400	12186	1070	
450	450	12188	1200	

These radiuses do not apply to fabricated products.

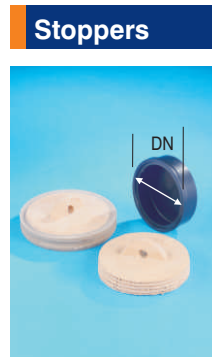


Saddles				
Oblique (45°) & Square				
DN Saddle	Dn Main	CODE Oblique	CODE Square	
150	Medium	13216	13253	
	Large	13218	13255	
225	Medium	13223	13260	
	Large	13225	13262	

Specify: Medium for barrel sizes up to 400mm  
Large for barrel sizes over 400mm



Tapers				
Increaser				
DN Socket	DN Spigot	CODE	L1 Length	
150	225	12210	300	
225	300	12211	450	
300	375	12212	500	



Stoppers		
With Polyester Spigot		
DN Socket	CODE	
150	12201	
200*	13323	
225	12202	
250*	13285	
300	12204	
375	12205	

To fit Denseal socket



Sockets		
Double Sockets		
DN Socket	CODE	
150	13276	
225	13277	
300	13278	

\*Additional Overseas sizes.