

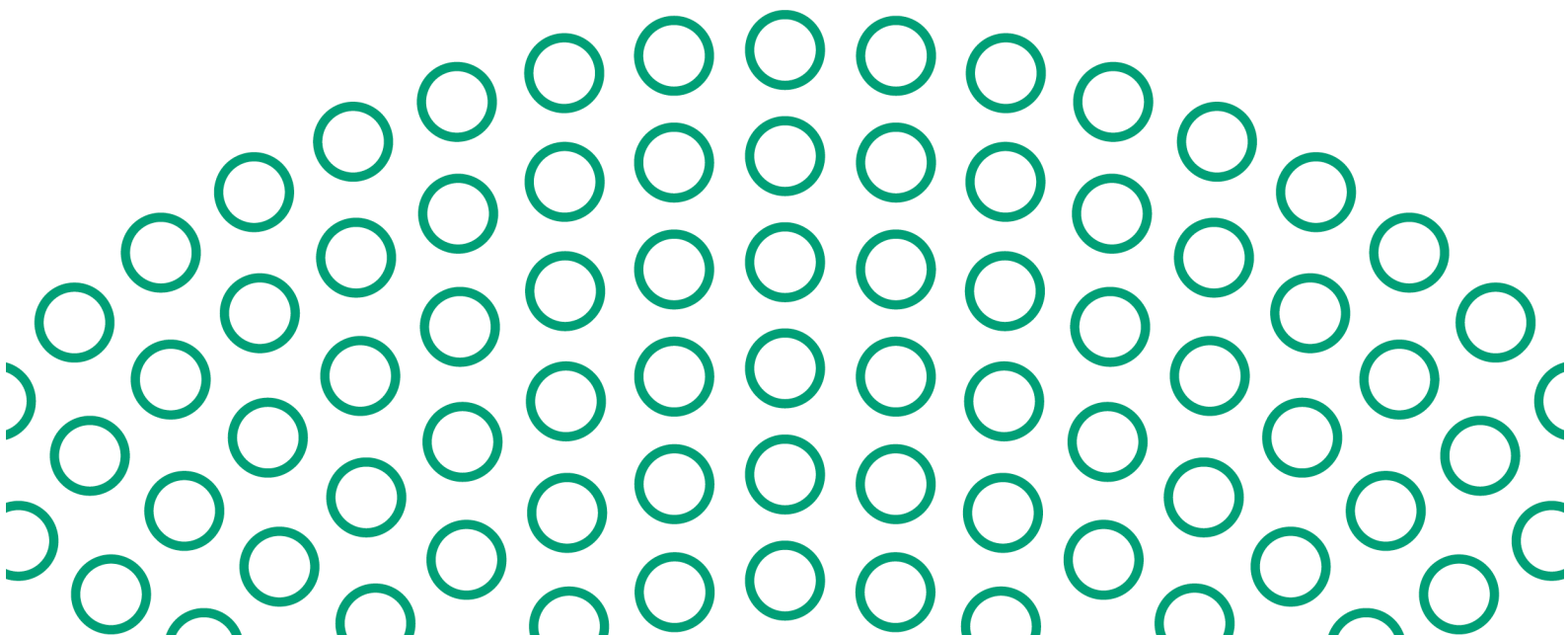


RADIUS
SYSTEMS

Polyethylene Pipe Instructions for use

SC100 (PE100) XL Large Diameter/ Heavy Wall
Dark Blue Potable Water Pipe

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This document is for the information of Water Supply Companies in the supply of water for human consumption, and is for use with the following Radius Systems product only.

Further Technical advice may be obtained from Radius Systems Technical Services.



Introduction

SC100 (PE100) XL Large Diameter / Heavy Wall, Dark Blue pipe is a High-Density Polyethylene (PE100) pipe - For the conveyance of cold potable water in buried pipeline applications.

Radius Systems SC100 (PE100) XL solid wall single layer pipes are an exciting new range of large diameter/heavy wall polyethylene pipes that are manufactured with a black PE100 inner “core layer” and a dark blue PE100 outer layer which identifies the pipe's application.

This innovative pipe system has been designed to provide a cost neutral replacement to conventional single colour PE100 pipes. They can be installed and joined using existing equipment and jointing techniques

Dimensional Details (mm)

Nominal Size OD (mm)	Minimum Wall thickness (mm)	Minimum Wall thickness (mm)	Minimum wall thickness (mm)	Minimum wall thickness (mm)
	SDR9	SDR 11	SDR 13.6	SDR 17
500	55.8	-	-	-
560	62.5	-	-	-
630	70.3	57.2	-	-
710	79.3	64.5	52.2	-
800	89.3	72.6	58.8	-
900	-	81.7	66.1	53.3
1000	-	90.8	73.5	59.3
1100 ¹	-	100.0	81.0	64.7
1200	-	109.0	88.2	71.1
¹ 1100 is a non-standard size				
Note: The minimum internal bore diameter of the smallest pipe size shown above based on the specified maximum wall thickness is 500mm SDR9, which results in an internal bore of 377.0mm .				

Handling and Storage

PE is a tough resilient material which is relatively light and easy to handle although it is possible that the pipes can be damaged through scoring by sharp objects. Therefore careful handling is always required and the dragging of straight pipe and coils should be avoided wherever possible.

The maximum allowable depth of scoring of the external surface of the pipe is 10% of the wall thickness. Pipes showing obvious defects should be withdrawn and clearly identified as unsuitable for use.

The general properties of PE are unaffected by low ambient temperatures but having very smooth surfaces the pipe can become slippery in wet or frosty weather. Particular attention should be given to the effective securing and storage under such conditions.

As far as it is practicable the protective packaging should be kept intact until the product is required for use. For hygiene purposes the pipe ends are protected from the ingress of dirt/water etc. by end caps. These should be disposed of carefully after use.

Avoid positioning pipes near or adjacent to vehicle exhaust systems or other heat sources, and possible contamination from materials such as diesel oil.

Metal chains or slings should not be brought into direct contact with the material. Webbed slings of polypropylene or nylon are recommended. Chains or end hooks should not be used. Care should be taken to avoid damage to pipes and pipe ends during lifting.

Straight pipes should be fully supported and bound together. For pipe lengths greater than 6m, load spreading beams of a length at least equivalent to one quarter of the length of the pipe or bundlepack should be employed, making suitable allowance for the flexible nature of the pipe. Off-loading on site may be made easier by using skid timbers and rope slings.

Coiled pipes “cannot be supplied” in the sizes shown in the Table of Dimensions listed on the previous page.

The work area should always be restricted to essential personnel only who should always wear hard hat, gloves, safety shoes and eye protection.

The pipe should preferably be stored under cover and protected from direct sunlight until required for use. Where storage facilities necessitate the material to be exposed externally for more than twelve months, suitable opaque protective sheeting should be used.

All pipe stacks should be made on sufficiently firm, flat ground to support the weight of the pipes and any necessary lifting equipment. Stacking heights should be kept to a minimum (no more than 3m) and adequate space allocated for lifting machinery to maneuver without accidental damage occurring.

Pipe bundles should be stored timber to timber. Pyramid stacks of individual pipe lengths should be limited to 1m maximum height.

Pipe Bending

The bending of PE100 pipe is permissible, and the properties of fusion of a fusion-jointed system allow for changes in direction without the necessity for the installation of prefabricated bends. However, pipes should not normally be COLD bent to a radius less than $25 \times$ outside diameter of the pipe, when the ambient temperature of the pipe is at 20°C.

In special circumstances with smaller diameter service pipe the minimum bending radius can be reduced to $15 \times$ outside diameter of the service pipe.

In winter conditions when the temperature drops to 0°C it is recommended that the minimum cold bending radius be increased to $50 \times$ outside diameter.

Joining Methods

The advantages of a PE integrated end load resistant system is usually achieved most economically by fusion welded jointing. Butt fusion is perhaps more commonly applied although electrofusion may be preferred where butt fusion is impractical due to lack of space, for example.

Mechanical fittings for sizes greater than 63mm should be manufactured to WIS No. 4-24-01. Anchor blocks will normally be needed with certain of these fittings.

Although the principles of fusion jointing are relatively simple, in practice care is needed to maintain the integrity of the PE system through appropriate instruction and on-site monitoring. It is strongly recommended that such training is given at both operator and supervisor levels using either external courses or in-house schooling followed by some on-site experience under supervision.

Installation

This section refers to Codes of Practice and British Standards relevant to pipe installation and in particular the influence of the New Roads and Street Works Act, 1991 and the current Edition of the Civil Engineering Specifications for the Water Industry.

The quality of materials and workmanship employed in trench preparation, bedding, backfilling and compaction must be of a high standard if the full strength potential of the pipeline is to be achieved.

Guidance for trench preparation, bedding, backfill and compaction is given in document Civil Engineering Specification for the Water Industry 8TH Edition; November 2023 and should be consistent with IGN 4-08-01 and WIS 4-08-02. The relevant references and

documents can be found by reference to the WaterUK Standards Board website www.standards-board.water.org.uk.

Open Trenching

The trench width should be the minimum compatible with safe working and satisfactory pipe laying. The trench depth must allow for cover depth requirements in addition to any necessary preparation to the base to ensure an essential firm and even base for the pipeline along its entire length.

Any exposed pipes or cables belonging to other utilities must be supported and protected throughout the work, and any damage reported immediately.

Narrow Trenching

Use of a trench with a width of pipe outside diameter plus 100 mm minimum. All the laying and jointing operations are carried out at ground level.

Trenchless Systems

PE is a versatile material and particularly through its toughness and flexibility, it is able to be used with a range of cost effective 'no dig' methods of installation.

Pipe Laying

Generally, PE pipes are normally joined to form a string above ground prior to snaking into a trench. To prevent scoring of the pre-made pipe strings, pipe rollers should be used.

Before commencing pipe laying the person responsible should ensure that the trench is safe in accordance with Health and Safety procedures.

Before lowering and inserting PE pipes into trenches a check should be made for cuts, deep scratches or other pipe damage, and in fusion jointed systems that the system has cooled sufficiently before stress is imposed upon any of the fusion joints.

When lowering pipes into trenches, care should again be taken to avoid scoring the pipe by contact with the sides and bottom of the trench. Special care is needed when passing underground obstructions or other utility services.

Use may be made of planks or slings where appropriate, but wire rope or chains should not be used. During lowering no-one should be allowed to stand underneath the suspended pipe.

Backfill

The 'New Roads and Street Works Act' code specifies four classes of acceptable material which may be used in the backfill zone between the top of the surround and the sub-base zone in a highway reinstatement. Unsuitable material would include large stones, flints, lumps of clay, frozen earth, organic matter or chemically contaminated soil.

A guide to suitable bedding and backfill materials for polyethylene pipe installations is given in WIS 4-08-02 with further information given in IGN No 4-08-02.

Testing and Commissioning

Individual water utilities often have their own procedures for cleaning, testing and commissioning potable water mains. These procedures are suitable for polyethylene pipes and should be followed. In the absence of such procedures, Radius Systems pipes should be cleaned, tested and commissioned in accordance with publication "Principles of Water Hygiene" published by Water UK with the requirements of Annex TGN2 being applicable. The latest edition shall always take precedence.

The commissioning of new or repaired mains is normally carried out in the following order:

- Cleaning, by the passage of foam swabs and/or flushing with clean water.
- Testing using clean disinfected water.

Commissioning by :

- Flushing with clean water.
- Disinfection for 24 hours with water containing at least 20mg/litre free chlorine.
- Flushing and refilling with clean potable water.

Hydrostatic Pressure Testing

All new mains and services shall be inspected to confirm they are not leaking before being placed into service.

For all sizes, suitable methods of testing pipes are set out in WIS 4-01-03

Disposal of Waste

Waste disposal shall be in accordance with local regulations.

Wherever possible, authorised disposal should be sought.

PE pipes can and are routinely re-processed. In some cases, the original pipe manufacturer “may” offer a PE waste collection service, alternatively the end user may elect to sell the waste to a plastics re-cycling company for use in the manufacture of low-grade products.

Health and Safety

Health and Safety is paramount, and good working practices are essential. The guidelines for the use of polyethylene pipes and fittings as published by the Foundation for Water Research in the WRc Manual for Polyethylene Pipe Systems for Water Supply Applications, the British Plastics Federation, the manufacturers of jointing machinery and by Radius Systems should always be strictly adhered to.

Polyethylene is chemically unreactive and generally regarded as biologically inert. It is not classified as a dangerous product by the EEC. It is not considered dangerous for the environment.

Ingestion of polyethylene in any form should be avoided.

In normal ambient temperatures PE does not release harmful fumes, but PE dust can irritate the respiratory system and may cause eye irritation. All scraping or cutting of PE pipe should take place in well-ventilated areas, using protective eyewear.

Polyethylene is not regarded as a skin irritant.

Polyethylene burns but is not classified as flammable. It has a flash point of 360°C approximately. Above 300°C PE will degrade to produce carbon monoxide, water and small amounts of various hydrocarbons and aldehydes.

Avoid the accumulation of PE dust particles as they could give a potential risk of dust explosion.

All electrical equipment in the working area should be carefully sited and earthed.

In the event of fire involving PE material apply water in a spread jet. Dry chemical, foam and carbon dioxide can also be used.

Pipes should be handled and moved in accordance with the instructions above.

Jointing practices are as detailed above. Note that all jointing should be carried out in a well-ventilated environment and inhalation of fumes or dust should be avoided or kept to a minimum. Molten PE should not be allowed to come into contact with the skin, and suitable protective clothing should be worn throughout the jointing process.

Surplus or waste PE may be reprocessed into new pipes or other products. It can be used as landfill or incinerated dependent upon local regulations. Proper combustion does not require special exhaust control technology.

Issue No.	Date	Comments
01	02.09.15	Original issue
02	28.05.25	Amended references to withdrawn specifications and for pressure test procedure following DWI review comments
03	20/08/2025	Moved from old brand on to new brand template.