Specifications for Plastic Drainage and Service Ducts in Highways

Introduction

The Specification for Highway Works is a series of standards and documentation[1] relating to the design, construction and maintenance of highways in England, Wales, Scotland and Northern Ireland. It includes the Design Manual for Roads and Bridges (DMRB) and the Manual of Contract Documents for Highway Works (MCHW), together with supporting guidance and codes of practice.

The MCHW, first published in 1992, is made up of six volumes and contains the primary documents required for the preparation of contracts for trunk road works including motorways in England, Scotland and Wales and all roads in Northern Ireland. Volume 1 contains the specifications for highways work and Volume 2 gives notes and guidance in the implementation of the specifications.

All requirements contained in MCHW are considered to have the status of 'Standards' and any variation is a 'Departure from Standard'. Any requests for Departures from Standards in a contract for trunk roads works require justification and identification of the changes to be submitted to the Overseeing Organisation (Highways England, Transport Scotland, the Welsh Government, or the Department for Regional Development) before entering into a contract.

Series 500 of Volume 1 (Specification for Highway Works) and Series NG500 of Volume 2 (Notes for Guidance), cover drainage and service ducts and were last amended in February 2020. They contain references to British Standards[2] some of which have now been withdrawn and/or superseded.

For plastic piping systems (only), the BPF Pipes Group provides below a list of the referenced British Standards and their replacements which might be helpful to those preparing highways contracts and requests for Departures from Standards.

The information is presented against the clause number from Series 500 and Series NG500 for ease of reference.

[1] https://www.standardsforhighways.co.uk/ha/standards/mchw/index.htm

[2] A full list of publications including British Standards referenced in the Specification for Highway Works can be found in Volume 1 Specification for Highway Works Appendix F Publications Referred to in the Specification, Updated February 2021,

Volume 1 Specifications for Highways Works Series 500

Clause 501: Table 5/1 Pipes for Drainage

Material	Usage	Comment	Current standard (March 2021)
Thermoplastics solid wall pipes and fittings	Foul and surface water drains	BS 5481 was withdrawn in 2009.	BS EN 1401 Part 1 (PVC-U) or BS 4660 (PVC-U ancillary fittings) BS EN 1852 Part 1 (PP) BS EN 12666 Part 1 (PE)
	Filter drains	No specific standards exist for thermoplastics pipes and fittings for filter drains. Pipes for surface water drains (see above) are modified by the manufacturer to meet the particular requirements in Table 5/1.	None
Thermoplastics structured wall pipes and fittings	Surface water drains		Clause 518
	Filter drains		Clause 518
	Subsoil field drains		BS 4962 or Clause 518

Clause 501: Table 5/2 Pipes and fittings for Ducts

Material	Usage	Comment	Current standard (March 2021)
Thermoplastics-solid wall pipes and fittings	Ducts excluding cable management	The following standards are not applicable to ducts: BS EN 13598 (thermoplastic **inspection chambers** and ancillary fittings). BS 3506 (PVC pipe for **industrial** use). BS EN 1452 (PVC **pressure** pipe for drainage and sewerage)	PVC-U: BS EN 1401 Part 1 (PVC-U) or BS 4660 (PVC-U ancillary fittings) PP: BS EN 1852 Part 1 PE: BS EN 12666 Part 1
Thermoplastics-solid wall pipes and fittings	Ducts for cable management		BS EN 61386-24
Thermoplastics-structured wall pipes and fittings	Ducts for cable management		BS EN 61386-24 and Clause 518

Clause 504: Jointing of pipes

Note: Standards for fittings are listed in Tables 5/1 and 5/2.

504.7: BS EN 13598 covers inspection chambers and ancillary fittings, and is not applicable to jointing of pipes.

504.7 (ii): BS 3506 covers PVC pipes for industrial uses and is not applicable to drainage and service ducts.

504.7 (ii): BS EN 1452 1 – 5 covers PVC pressure pipe and is not applicable to drainage and service ducts.

Clause 507: Chambers

507.9: BS EN 124:1994 was superseded in 2015. The current standards are BS EN 124 Parts 1-6 and BS 9124. .

NG 507.4: BS EN 124 was superseded in 2015. The current standards are BS EN 124 Parts 1-6.

NG 507.4: BS 7903:1997 was revised in 2020. The current standard is BS 7903:2020.

Clause 518: Thermoplastics structured wall pipes and fittings

Table 5/9 Requirements for pipe

Property	Comment	Current standard (March 2021)
General	BS EN ISO 2897-1 and BS EN ISO 2897-2 were superseded by BS EN ISO 19063-1 and BS EN ISO 19063-2, respectively, in 2015. However, neither is applicable as they cover impact resistant polystyrene mouldings and extrusions.	BS ISO 11922-1
Ring stiffness	BS EN 1295-1:1997 (with UK National Annex) was withdrawn and replaced by BS EN 1295-1:2019 and BS 9295:2020.	BS EN ISO 9969 BS EN 1295-1 and BS 9295
Creep ratio		BS EN ISO 9967
High volume low pressre jetting		WRc Jetting Test Method
Longitudinal bending		Sub-clause 518.11
Impact resistance at 0°C	BS EN 1411 withdrawn 2018, replaced by BS EN ISO 11173.	BS EN ISO 11173
Impact resistance at 23°C	BS EN 1411 withdrawn 2018, replaced by BS EN ISO 11173.	BS EN ISO 11173
Rodding resistance		Sub-clause 518.12
Static friction coefficient (ducts)		TS 12-24
Creep at elevanted temperature (ducts)		BS EN ISO 9967
Resistance to point loads (ducts)		Sub-clause 518.13
Tensile strength of seam	BS EN 1979 replaced by BS EN ISO 13262.	BS EN ISO 13262

Table 5/10 Requirements for fittings

Property	Comment	Current standard (March 2021)
General	See Table 5/9 above.	BS ISO 11922-1
Ring stiffness (excluding couplers)	ISO 13967 was adopted as BS EN ISO 13967 in 2009.	BS EN ISO 13967
Rodding resistance		Sub-clause 518.12
Strength and flexibility of fabricated fittings	BS EN 12256 withdrawn 2018 and replaced by BS EN ISO 13264.	BS EN ISO 13264
Impact resistance (drop test)	BS EN 12061 withdrawn 2018 and replaced by BS EN ISO 13263.	BS EN ISO 13263
Watertightness of fabricated fittings	BS EN 1053 withdrawn 2018 and replaced by BS EN ISO 13254.	BS EN ISO 13254

Table 5/11 Requirements of the systems

Property	Comment	Current standard (March 2021)
Leaktightness of joints – diameter distortion (watertight joints)	BS EN 1277 withdrawn 2018 and replaced by BS EN ISO 13259.	BS EN ISO 13259
Leaktightness of joints – angular deflection (watertight joints)	BS EN 1277 withdrawn 2018 and replaced by BS EN ISO 13259.	BS EN ISO 13259
Leakage rate for partially watertight joints		Sub-clause 509.7
Resistance to wheel loads*	BS EN 1437 withdrawn 2011 and replaced by BS EN ISO 13260.	BS EN ISO 13260

* requirement applies to fittings with unequal branches only

Volume 2 Notes for Guidance Series NG500 Sample Contract Specific Appendices

5/7: Thermoplastics structural wall pipes and fittings

Table 1: Unplasticised polyvinyl-chloride (PVC-U)

Property	Comment	Current standard (March 2021)
Tensile properties	BS EN ISO 6259-1: 2001 replaced by standard in three parts.	BS EN ISO 6259-1 BS EN ISO 6259-2 BS EN ISO 527-1
Vicat	BS EN 727 withdrawn 2018, replaced BS EN ISO 2507.	BS EN ISO 2507-1 BS EN ISO 2507-2
Longitudinal reversion	BS EN 743 withdrawn 2005, replaced by BS EN ISO 2505.	BS EN ISO 2505
K-Value	BS EN 922 withdrawn 2011, replaced by BS EN ISO 13229.	BS EN ISO 13229
PVC content	EN 1905 was adopted as BS EN 1905 in 1999.	BS EN 1905
Density	ISO 4451 was for PE not PVC. It has been withdrawn	BS EN ISO 1183-3
Heat Reversion		ISO 12091
Effects of heating (injection moulded fittings only)	BS EN 763 withdrawn 2005 and replaced by BS EN ISO 580.	BS EN ISO 580

Table 2: Polyethylene (PE)

Property	Comment	Current standard (March 2021)
Tensile properties	BS EN ISO 6259-1: 2001 replaced by standard in three parts.	BS EN ISO 6259-1 BS EN ISO 6259-3 BS EN ISO 527-1
Oxygen induction time	BS EN 728 withdrawn 2017 replaced by BS EN ISO 11357-6	BS EN ISO 11357-6
Melt Flow Rate		BS EN ISO 1133
Density	ISO 4451 withdrawn.	BS EN ISO 1183-3
Melt Flow Rate	Duplicate entry in table. ISO 4440 was withdrawn	-
Heat Reversion		ISO 12091
Effects of heating (injection moulded fittings only)	BS EN 763 withdrawn 2005, replaced by BS EN ISO 580.	BS EN ISO 580

Table 3: Polypropylene (PP)

Property	Comment	Current standard (March 2021)
Tensile properties	BS EN ISO 6259-1: 2001 replaced by standard in three parts.	BS EN ISO 6259-1 BS EN ISO 6259-3 BS EN ISO 527-1
Oxygen induction time	BS EN 728 withdrawn 2017, replaced by BS EN ISO 11357-6	BS EN 11357-6
Melt Flow Rate		BS EN ISO 1133
Density	ISO 4451 withdrawn.	BS EN ISO 1183-3
Heat Reversion		ISO 12091
Effects of heating (injection moulded fittings only)	BS EN 763 withdrawn 2005, replaced by BS EN ISO 580.	BS EN ISO 580