General Specification for Civil Engineering Works

2006 Edition

AMENDMENT NO. 1/2019

VOLUME 1

SECTION 1 GENERAL

WORK ON ROADS

(a) Clause 1.18(4)

Replace "BS 449:Part2" **with** "BS EN 1993-1 unless otherwise specified"**.**

Replace "BS 3262 shall be not less than 45" **with** "BS EN 1436 shall be Class S1"**.**

(b) Clause 1.34A

Add the title of the new clause to read as follows:

Control of Dogs on Construction Sites

Add the new clause as follows:

(1) No dog shall be kept by the Contractor or his employees, his agents or sub-contractors or their employees, on the Site unless the dog is acceptable for licensing by the Agriculture, Fisheries and Conservation Department (AFCD), and is licensed under the Rabies Ordinance (Cap. 421), implanted with a microchip and vaccinated against rabies. In addition, the keeper of the dog under the license shall either be:

(a) an employee of the Contractor who shall be of a rank not lower than deputy site agent or equivalent as agreed by the Engineer; or

(b) a security firm in its own name or an employee of the firm who shall not be of a rank lower than assistant manager level, where the security firm is engaged by the Contractor solely for the purpose of Site security.

(2) All licensed dogs kept on the Site must be neutered. The Contractor shall keep or cause the aforesaid security firm to keep on the Site a copy of the licence, together with a copy of the certificate issued by a registered veterinary surgeon confirming that the dogs kept on the Site have been neutered, for inspection by the Engineer upon request. All licensed dogs on the Site shall be identified by suitable markings on their collars as agreed by the Engineer, and shall be removed by the Contractor from the Site upon completion of the Works under the Contract.

(3) The Contractor shall alert the AFCD and facilitate access, where appropriate, to the Site for removal of any unlicensed dogs from the Site.

(4) The Contractor shall observe and undertake, or cause his employees, his agents or sub-contractors or their employees to observe and undertake, the licensing and control measures as set out in the current edition of the Code of Practice for the Keeping of dogs on Construction Sites in Hong Kong issued by AFCD for any dogs kept on the Site. The Engineer or his Representative shall have the power to order the removal of any person who fails to comply with the requirements from the Site.

SITE ESTABLISHMENT

(c) Clause 1.45A **Add the title of the new clause to read as follows:**

Occupancy and Rental of Private Land of Ecological Values

Add the new clause as follows:

The Contractor shall not rent or occupy any private land falling within the designated areas listed below for any purposes arising out of or in connection with the Contract unless prior approval is obtained from the Engineer:

(a) Existing country parks designated under the Country Parks Ordinance (Cap 208);

(b) Areas designated as Coastal Protection Area, Site of Special Scientific Interest, Green Belt, Conservation Area and Other Specified Uses (River Park) on statutory plans (i.e. Outline Zoning Plans and Development Permission Area Plans) under the Town Planning Ordinance (Cap 131);

(c) Restricted areas under the Wild Animals Protection Ordinance (Cap 170); and

(d) Areas designated under the Marine Parks Ordinance (Cap 476).

(d) Clause 1.49(5) **Add the following before the 1st sentence of this sub-clause:**

All contract preliminary items shall be provided to the office of the Engineer's Representative for central acceptance and distribution. The Engineer's Representative should inform the Contractor of the name of the officers responsible for accepting these items. The Contractor shall not provide the items directly to an individual member of the site supervisory staff.

(e) Clause 1.52(2) **Add the following after the last sentence of this sub-clause:**

The contract transport for the Engineer should be properly painted or affixed by adhesive plastic labels with the contract number, Contractor name, Department name, Department logo, Department complaint hotline (or other suitable identifications) and the phrase "For Official Use Only" "只供公務用途" in good size letters for easy identification.

APPENDIX 1.1 - STANDARDS

(f) Appendix 1.1 **Delete the following standards:**

BS 8005:Part 1:1987	Guide to new sewerage construction

(g) **Replace the following standards:**

BS 65:1991 (2003)	BS EN 295-1:2013 Vitrified clay pipe systems for drains and sewers. Requirements for pipes, fittings and joints BS EN 295-2:2013 Vitrified clay pipe systems for drains and sewers. Evaluation of conformity and sampling BS EN 295-3:2012 Vitrified clay pipe systems for drains and sewers. Test methods
BS 449:Part 2	BS EN 1993-1-1:2005 Design of Steel Structures : General rules and rules for buildings BS EN 1993-1-5:2006 Design of Steel Structures : Plated structural elements BS EN 1993-1-6:2007 Design of Steel Structures : Strength and stability of shell structures BS EN 1993-1-7:2007 Design of Steel Structures : Plate structure subject to out of plane loading BS EN 1993-1-8:2005 Design of Steel Structures : Design of joints BS EN 1993-1-9:2005 Design of Steel Structures : Fatigue BS EN 1993-1-10:2005 Design of Steel Structures : Material toughness and through-thickness properties BS EN 1993-1-11:2006 Design of Steel Structures : Design of structures with tension components
BS 1247:1990	BS EN 13101:2002 Steps for underground man entry chambers. Requirements, marking, testing and evaluation of conformity
BS 1400:1985	BS EN 1982:2008 Specification for Copper and copper alloys — Ingots and castings
BS 2789:1985	BS EN 1563:2011 Founding – Spheroidal graphite cast irons
BS 2874:1986	BS EN 12163:2011 Copper and copper alloys - Rod for general purposes BS EN 12167:2011 Copper and copper alloys -

	Profiles and bars for general purposes
BS 4147:1980 (1987)	BS EN 10300:2005 Steel tubes and fittings for onshore and offshore pipelines – bituminous hot applied materials for external coating
BS 4346:Part 2:1970	BS EN ISO 1452 – 3: 2010 Plastics piping systems for water supply and for buried and above–ground drainage and sewerage under pressure – Unplasticized poly (vinyl chloride) (PVC-U) Part 3: Fittings
BS 4346:Part 3:1982	BS EN 14814:2016 Adhesives for thermoplastic piping systems for fluids under pressure – Specification
BS 4504:Section 3.1:1989	BS EN 1092-1:2007+A1:2013 Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated Part 1: Steel flanges
BS 4514:1983	BS 4514:2001 Specification for unplasticized PVC soil and ventilating pipes, fittings and accessories
BS 4576:Part 1:1989	BS EN 12200-1:2000 Plastics rainwater piping systems for above ground external use. Unplasticized poly (vinyl chloride) (PVC-U). Specifications for pipes, fittings and the system
BS 4660:2000	BS EN 13598-1:2010 Plastics piping systems for non-pressure underground drainage and sewerage – unplasticized poly(vinyl chloride) (PVC-U), polypropylene (PP) and polyethylene (PE) Part 1: Specifications for ancillary fittings including shallow inspection chambers
BS 5150:1990	BS EN 1171:2015 Industrial valves — Cast iron gate valves
BS 5255:1989 (indoor)	Partially replaced by BS EN 1392-1:2014 Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure. Unplasticized poly (vinyl chloride) (PVC-U). Specifications for pipes, fittings and the system
BS 5481:1977 (1989)	BS EN 1401-1:2009 Plastic piping systems for non-pressure underground drainage and sewerage. Unplasticized poly(vinyl chloride) (PVC-U). Specifications for pipes, fittings and the system
BS 5911:Part 2:1982	BS EN 1917:2002 Concrete manholes and inspection chambers, unreinforced, steel fibre and reinforced BS 5911-4:2002 + A2:2010 Concrete pipes and ancillary concrete products. Specification for unreinforced and reinforced concrete inspection chambers BS 5911-6:2004+ A1:2010 Specification for road gullies and gully cover slabs

BS 5911-1:2002	BS 5911-1:2002+A2:2010 Concrete pipes and ancillary concrete products. Specification for unreinforced and reinforced concrete pipes (including jacking pipes) and fittings with flexible joints
BS 5911-3:2002	BS 5911-3:2010 + A1:2014 Concrete pipes and ancillary concrete products. Specification for unreinforced and reinforced concrete manholes and soakaways
BS 6681:1986	BS EN 1562:2012 Founding – Malleable cast irons
BS EN 1561:1997	BS EN 1561:2011 Founding. Grey cast irons
BS EN 10029:1991	BS EN 10029:2010 Hot-rolled steel plates 3 mm thick or above. Tolerances on dimensions and shape
BS EN 10051:1991 + A1:1997	BS EN 10051:2010 Continuously hot-rolled strip and plate/sheet cut from wide strip of non-alloy and alloy steels. Tolerances on dimensions and shape
BS EN ISO 178:2001	BS EN ISO 178:2010+A1:2013 Plastics – Determination of flexural properties
BS EN ISO 9445:2006	BS EN ISO 9445-1:2010 Continuously cold-rolled stainless steel. Tolerances on dimensions and form. Narrow strip and cut lengths
ISO 178:2001	ISO 178:2010 Plastics - Determination of flexural properties
WIS 4-34-04:1995 issue 2	ISO 11296-4:2009 Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks – Part 4: Lining with cured-in-place pipes
Manual of Sewer Condition Classification, 4th Ed, 2003	Manual of Sewer Condition Classification, 5th Ed, 2013 Coding system for recording of results
ASTM D790-2000	ASTM D790-15e2 Measurement/Properties of internal lining for repair of pipelines and culverts: Flexural properties
ASTM D 2000-86	ASTM D 2000-12 Classification system for rubber products in automobile applications

(h) **Add the following standards:**

BS EN 607:2004	Eaves gutters and fittings made of PVC-U. Definitions, requirements and testing
BS EN 1092-2:1997	Flanges and their joints - Circular flanges for pipes, valves, fittings and accessories, PN designated Part 2. Cast iron flanges
BS EN 1329-1:2014	Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure. Unplasticized poly(vinyl chloride) (PVC-U). Specifications for pipes, fittings and the system
BS EN 1462:2004	Brackets for eaves gutters. Requirements and

	testing
BS EN 1916:2002	Concrete pipes and fittings, unreinforced, steel fibre and reinforced
BS EN ISO 9445-2:2010	Continuously cold-rolled stainless steel. Tolerances on dimensions and form. Wide strip and plate/sheet

SECTION 5 DRAINAGE WORKS

MATERIALS

(i) Clause 5.11(1) **Add** "BS EN 1916 and" **before** "BS 5911-1"**.**

(j) Clause 5.12(1) **Replace** "BS 65" **in the first sentence with** "BS EN 295"**.**

(k) Clause 5.13 **Replace** "a" **with** "the required" **and delete** " of 4º" **in sub-clause (2).**

Replace "BS 4504: Section 3.1" **with** "BS EN 1092-1" **in sub-clause (3).**

(l) Clause 5.15 **Replace sub-clauses (3) and (4) with the following:**

(3) Fittings for uPVC pressure pipes complying with BS 3506 shall comply with the following:

Injection moulded uPVC fittings for solvent welding : BS 4346:Part 1

Fittings for uPVC pressure pipes : BS EN ISO 1452-3

(4) Adhesives for uPVC pressure pipes shall comply with BS EN 14814.

(m) Table 5.1 **Replace the headings of the second and third columns with** "Nominal size (mm)" **and** "Standard" **respectively.**

Add "BS EN 1329-1" **to the second and third rows of the third column.**

Replace third row of the second and third columns with "50 - 160" **and** "BS EN 12200-1 BS EN 607 BS EN 1462" **respectively.**

Delete the fourth row of the second and third columns.

Replace fifth row of the second and third columns with "110 - 1000" **and** "BS EN 1401-1 (Fittings also refer to BS 4660 and BS EN 13598-1)" **respectively.**

Delete the sixth row of the second and third columns.

(n) Clause 5.17 (2) **Replace** "BS EN ISO 3506 1&2" **with** "BS EN ISO 3506-1 and BS EN ISO 3506-2" **in sub-clause (2)..**

Replace sub-clause (3) with "Spheroidal graphite cast iron bolts shall be Grade EN-GJS-500-7 complying with BS EN 1563."**.**

(o) Clause 5.18(2) **Replace the sub-clause with** "Elastomeric gaskets for flanged pipes shall be the inside bolt circle type. The gaskets shall be natural rubber with a thickness of 3 mm and with other dimensions complying with BS EN 1514-1.".

(p) Clause 5.21(1) **Replace the first row of the sub-clause with the following:**

Bitumen-based hot-applied coating for corrosion protection of steel pipes and fittings	: BS EN 10300

(q) Clause 5.25 **Replace** "BS 5911" **with** "BS EN 1917 & BS 5911-3"**..**

(r) Clause 5.26 **Replace sub-clause (1) with** "Precast concrete chambers shall comply with BS EN 1917 and BS 5911-4. Cover slabs shall be reinforced as required to comply with the load test requirements stated in BS EN 1917 and BS 5911-4. The types of cement for the manufacture of precast concrete chambers and gullies, and cover slabs shall be as stated in BS EN 1917 and BS 5911-4, or a combination of PFA and PC or PFAC complying with BS EN 197-1. The PFA content shall not exceed 40% by mass of the cementitious content."

Replace "65" **in sub-clause (2) with** "EN 295"**.**

Add a new sub-clause (3) as follows:

(3) Precast concrete gullies shall comply with BS 5911-6.

(s) Clause 5.27 **Replace** "1247" **with** "BS EN 13101" and "6681" **with** "EN 1562"**.**

(t) Clause 5.29 **Replace** "220" **with** "250" **in sub-clause (1)(a).**

Add "BS EN 10088-1" **after** "BS EN 10087" **in sub-clause (1)(b).**

Replace "1400, Grade LG2" **with** "EN 1982, Grade CC491K" **in sub-clause (1)(c).**

Replace "2874, Grade PB 102" **with** "EN12163 & BS EN12167, Grade CW452K" **in sub-clause (1)(d).**

Replace "2874, Grade PB 102" **with** "EN12163 & BS EN12167, Grade CW452K" **and add** "BS EN 10088-1" **after** "BS EN 10087" **in sub-clause (1)(g).**

(u) Clause 5.30 **Replace** "5150" **with** "EN 1171" **in sub-clause (1).**

Replace "220" **with** "250" **in sub-clause (1)(a).**

Replace "LG2" **with** "CC491K" **and** "1400" **with** "EN 1982"**in sub-clause (1)(b).**

Replace "1400" **with** "EN 1982" and "LG2" **with** "CC491K" **in sub-clause (1)(c).**

Replace "2874, Grade CA104" **with** "BS EN12163 & BS EN12167, Grade CW307G" **in sub-clause (1)(d).**

Replace "4504:Part1" **with** "EN 1092-1" **in sub-clause (2).**

Add "BS EN 10088-1" **after** "BS EN 10087" **in sub-clause (5).**

(v) Clause 5.31

Replace "220" **with** "250" **in sub-clause (1)(a).**

Replace "1400 Grade LG2" **with** "EN 1982, Grade CC491K" **in sub-clause (1)(b).**

Replace "4504:Part1" **with** "EN 1092-1" **in sub-clause (3).**

(w) Clause 5.32

Replace "220" **with** "250" **in sub-clause (1)(a).**

Replace "1400 Grade LG2" **with** "EN 1982, Grade CC491K" **in sub-clause (1)(b).**

Replace "2874, Grade CA104" **with** "BS EN12163 & BS EN12167, Grade CW307G" **in sub-clause (1)(c).**

Replace "4504: Section 3.1" **with** "EN 1092-1" **in sub-clause (3).**

(x) Clause 5.33 (3)

Replace "220" **with** "250" **and add** "BS EN 10088-1" **after** "BS EN 10087" **in the sub-clause.**

TESTING: PIPES FOR DRAINAGE WORKS

(y) Clause 5.83

Add "s and European Standards" **after** "British Standard" **in sub-clause (1).**

Replace the table under sub-clause (2) with the following:

Concrete pipes and fittings	: BS EN 1916 and BS 5911-1
Vitrified clay pipes, fittings and joints	: BS EN 295
Ductile iron pipes and fittings	: BS 4772
Grey iron pipes and fittings	: BS 4622
uPVC pipes for industrial purposes	: BS 3506
uPVC soil and ventilating pipes, fittings and accessories	BS 4514 for DN/OD 82 (if adopted by industry); BS EN 1329-1 (for others)
uPVC gravity surface water pipes and fittings above ground	: BS EN 12200 - 1, BS EN 607, BS EN 1462
uPVC storm water pipes and fittings below ground	: BS 4660 & BS EN 13598-1
uPVC pipes and fittings for gravity sewage pipes above ground	: BS 5255, BS EN 1329-1
uPVC pipes and fittings for gravity sewage pipes below ground	: BS EN 1401-1

TESTING: PIPES FOR DRAINAGE WORKS

(z) Clause 5.91 (2) **Replace the table under the sub-clause with the following:**

Precast concrete units for manholes	: BS EN 1917 & BS 5911-3
Inspection chambers	: BS EN 1917 and BS 5911-4
Precast concrete gullies	: BS 5911-6
Vitrified clay gullies	: EN 295

REPAIR OF PIPELINES AND CULVERTS BY INTERNAL LINING

(aa) Clause 5.109 (1) **Delete** "Section 4 of Water Industry Specification WIS 4-34-04: "Specification for Renovation of Gravity Sewers by Lining with Cured-in-place Pipes", Water Research Centre, March 1995: Issue 2" **and add** "BS EN ISO 11296-4 "Plastics piping systems for renovation of underground non-pressure drainage and sewerage networks – Part 4: Lining with cured-in-place pipes"" **before** "or equivalent standards." **in the sub-clause .**

(ab) Clause 5.113 (2) **Replace the column under** "Standards" **in the sub-clause with the following:**

Standards
BS EN ISO 178: 2010+A1:2013; BS 2782-10: Method 1005:1977; EN 63:1977; ASTM D790-15e BS 2782-6: Method 630A:1994; ISO 4593:1993; BS 2782-6: Method 631A:1993; ISO 4591:1992

Delete the third paragraph "If the flexural properties are tested according to BS EN ISO 178:1997, BS 2782:Part 3: Method 335A:1993, ISO 178:1993, the cross head displacement rate shall be 10mm/min." **of the sub-clause.**

Replace the fifth paragraph of the sub-clause with the following:

If any result of the above tests on flexural properties of the samples fails to meet the acceptance criteria, the Contractor shall carry out test on samples taken from the finished lining to determine the long term flexural modulus in accordance with Annex C of BS EN ISO 11296-4 for validation against the manufacturer's creep data.

APPENDIX 5.1 –CCTV INSPECTION OF PIPELINES

(ac) Clause 5.1.4 **Replace** "4th Edition (2003)" **with** "5th Edition (2013)" **in sub-clause (1)(b).**

APPENDIX 5.4 – TESTS ON GRAVITY PIPELINES FOR DRAINAGE WORKS

(ad) Clause 5.4.7 **Replace the clause with the following:**

The procedure for the infiltration test shall be in accordance with the following:

After backfilling has been completed and the ground water level has stabilized, the sewer should be checked for infiltration. All live inlets should be sealed and the line inspected from the manholes. Any flow from the pipeline coming into the manholes or within the manholes themselves should be investigated to establish its source. In small pipes the point of infiltration may be located visually with light and mirror or with an inflated rubber plug. When conditions justify it a video camera can be used.

The sewer may normally be acceptable if the infiltration does not exceed 1 litre per hour per metre diameter per metre of pipe run, although this will depend on the judgment of the Engineer and the extent of exfiltration shown by the water test.

VOLUME 2

SECTION 15 STEEL REINFORCEMENT

MATERIALS

(ae) Table 15.03 **Replace** "Other reinforcing steels" **with** "Plain round steel bars" **of Category B and Category C under the heading "Reinforcement".**

TESTING: REINFORCEMENT

(af) Clause 15.32 (1) **Replace the second, third and fourth row of the table under the heading** "Category of reinforcement" **with the following:**

Category of reinforcement
B (Grade 500)
C (plain round steel bars, Grade 250 & d > 12 mm)
D (plain round steel bars, Grade 250 & d ≤ 12 mm)

(ag) Clause 15.33A(2) **Replace** "but excluding bond property" **with** "for bond property, relative rib area only, other surface geometry parameters are optional"**.**

(ah) Clause 15.33A(3) **Add** "Plain round steel bars" **before** "Grade 250 & d > 12 mm".

(ai) Clause 15.33A(4) **Add** "Plain round steel bars" **before** "Grade 250 & d > 12 mm" and **delete** "(but excluding bond property)" **from the second sentence**.

SECTION 25 ENVIRONMENTAL PROTECTION

AIR POLLUTION CONTROL

(aj) Clause 25.16 **Add new sub-clauses (3) to (6) as follows:**

(3) B5 diesel shall be used as fuel for all non-road based construction machinery on the Site. The non-road based construction machinery includes all types of machines and plants which are powered by internal combustion engines, such as air compressors, mobile generators, excavators, crawler cranes, bulldozers, rollers, etc.

(4) B5 diesel shall be Euro V diesel containing a fatty acid methyl ester content of 5%, as determined in accordance with the document published by the European Committee for Standardization commonly known as EN 14078. The Euro V diesel shall be light diesel oil complying with the specifications set out in Chapter 311L Schedule 1 – Air Pollution Control (Motor Vehicle Fuel) Regulation of the Laws of Hong Kong, all applicable legislation in Hong Kong and the requirements of all relevant regulatory authorities in Hong Kong which are effect on the date that the B5 diesel is supplied.

(5) The Contractor shall maintain a proper record of the use of B5 diesel on the Site for inspection by the Engineer whenever necessary.

(6) Notwithstanding Clause (3) above, the Contractor may propose for the Engineer's approval for the use of Euro V diesel instead of B5 diesel should there be a supply shortage or other difficulties in delivering of B5 diesel to the Site.

Quality Management & Standards Unit
Civil Engineering and Development Department
31 December 2018