Section 8

Codes and Standards

1 General

It is not necessary for the Inspector to carry a wide range of codes and standards in the performance of his/her duties. Normally the specification or more precisely the contract specification is the only document required. However the contract specification may reference supporting codes and standards and the inspector should know where to access these *normative documents*.

The following is a list of definitions relating to codes and standards which the Inspector may come across whilst carrying out inspection duties.

2 Definitions

Normative document: A document that provides rules, guidelines or characteristics for activities or their results. The term *normative document* is a generic term, which covers documents such as standards, technical specifications, codes of practice and regulations.*

Standard: A document that is established by consensus and approved by a recognised body. A standard provides, for common and repeated use, guidelines, rules, characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.*

Harmonised standards: Standards on the same subject approved by different standardising bodies, that establish interchangeability of products, processes and services, or mutual understanding of test results or information provided according to these standards.*

Code of practice: A document that recommends practices or procedures for the design, manufacture, installation, maintenance, utilisation of equipment, structures or products. A code of practice may be a standard, part of a standard or independent of a standard.*

Regulation: A document providing binding legislative rules that is adopted by an authority.*

Authority: A body (responsible for standards and regulations legal or administrative entity that has specific tasks and composition) that has legal powers and rights.*

Regulatory authority: Authority that is responsible for preparing or adopting regulations.*

Enforcement authority: Authority that is responsible for enforcing regulations.*

Specification: Document stating requirements. Meaningful data and its supporting medium stating needs or expectations that are stated, generally implied or obligatory.**

Procedure: Specified way to carry out an activity or a process*. Usually it is a written description of all essential parameters and precautions to be observed when applying a technique to a specific application following an established standard, code or specification.

Instruction: A written description of the precise steps to be followed, based on an established procedure, standard, code or specification.

Quality plan: A document specifying which procedures and associated resources shall be applied by whom and when to a specific project, product, process or contract.*

* ISO IEC Guide 2 – Standardization and related activities – General vocabulary
** EN ISO 9000 – 2000 – Quality management systems – Fundamentals and vocabulary

3 Summary

Application standards and codes of practice ensure that a structure or component will have an acceptable level of quality and be fit for the intended purpose.

Applying the requirements of a standard, code of practice or specification can be a problem for the inexperienced inspector. Confidence in applying the requirements of one or all of these documents to a specific application only comes with use over a period of time.

If in doubt the inspector must always refer to a higher authority in order to avoid confusion and potential problems.

BS number	Title
BS 499: Part 1	**Glossary of welding terms**
BS 709	Methods of destructive testing fusion welded joints and weld metal in steel.
BS 1113	Specification for design and manufacture of water-tube steam generating plant.
BS 1453	Specification for filler materials for gas welding.
BS 1821	Specification for Class I oxyacetylene welding of ferritic steel pipe work for carrying fluids.
BS 2493	Low alloy steel electrodes for MMA welding.
BS 2633	Specification for Class I arc welding of ferritic steel pipe work for carrying fluids.
BS 2640	Specification for Class II oxyacetylene welding of carbon steel pipe work for carrying fluids.
BS 2654	Specification for manufacture of vertical steel welded non-refrigerated storage tanks with butt-welded shells for the petroleum industry.
BS 2901: Part 3	Filler rods and wires for copper and copper alloys.
BS 2926	Specification for chromium and chromium-nickel steel electrodes for MMA
BS 3019	TIG welding.
BS 3604	Steel pipes and tubes for pressure purposes; Ferritic alloy steel with specified elevated temperature properties for pressure purposes.
BS 3605	Specification for seamless tubes.
BS 4515	**Specification for welding of steel pipelines on land and offshore.**
BS 4570	Specification for fusion welding of steel castings.
BS 4677	Specification for arc welding of austenitic stainless steel pipe work for carrying fluids.
BS 4872 Part 1:	Approval testing of welders when procedure approval is not required. Fusion welding of steel.
BS 4872 Part 2:	TIG or MIG welding of aluminium and its alloys.
BS 6323	Specification for seamless and welded steel tubes for automobile, mechanical and general engineering purposes.
BS 6693	Method for determination of diffusible hydrogen in weld metal.
BS 6990	Code of practice for welding on steel pipes containing process fluids or their residues.
BS 7191	Specification for weldable structural steels for fixed offshore structures.
BS 7570	Code of practice for validation of arc welding equipment.

BS EN Number	Title
BS EN 287 Part 1:	Qualification test of welders - Fusion welding **-** Steels.
BS EN 440	**Wire electrodes and deposits for gas shielded metal arc of non-alloy and fine grain steels.**
BS EN 499	Covered electrodes for manual metal arc welding of non-alloy and fine grain steels.
BS EN 3834 - Parts 1 to 5	**Quality requirements for fusion welding of metallic materials.**
BS EN 756	Wire electrodes and flux wire combinations for submerged arc welding of non-alloy and fine grain steels.
BS EN 760	Fluxes for submerged arc welding.
BS EN 910	Destructive tests on welds in metallic materials-Bend tests.
BS EN 970	**Non-destructive examination of fusion welds – visual examination.**
BS EN 12072	Filler rods and wires for stainless steels.
BS EN ISO 18274	Aluminium and aluminium alloys and magnesium alloys. Nickel and nick alloys.
Note: The inspector should have an awareness of standards that are printed in bold.	

BS EN Number	Title
BS EN 1011 **Part 1,** **Part 2,** Part 3, Part 4.	**Welding recommendations for welding of metallic materials.** **General guidance for arc welding.** **Arc welding of ferritic steels.** Arc welding of stainless steels. Arc welding of aluminium and aluminium alloys.
EN 1320	Destructive tests on welds in metallic materials.
EN 1435	Non-destructive examination of welds – Radiographic examination of welded joints.
BS EN 10002	Tensile testing of metallic materials.
BS EN 10020	Definition and classification of grades of steel.
BS EN 10027	Designation systems for steels.
BS EN 10045	Charpy impact tests on metallic materials.
BS EN 10204	Metallic products – Types of inspection documents.
BS EN 22553	**Welded, brazed and soldered joints – Symbolic representation on drawings.**
BS EN 24063	**Welding, brazing, soldering and braze welding of metal. Nomenclature of processes and reference numbers for symbolic representation on drawings.**
BS EN 25817	**Arc welded joints in steel. Guidance on quality levels for imperfections.**
BS EN 26520	**Classification of imperfections in metallic fusion welds, with explanations.**
BS EN 26848	Specification for tungsten electrodes for inert gas shielded arc welding and for plasma cutting and welding.

ISO Number:	Title
ISO 857 - 1	Welding and allied processes – Vocabulary – Part 1 - Metal welding processes.
ISO 6947	**Welds – Working positions – Definitions of angles of slope and rotation.**
ISO 9606 - 2	Qualification test of welders – Fusion welding. Part 2 Aluminium and aluminium alloys.
ISO 15607	**Specification and qualification of welding procedures for metallic materials – General rules.**
ISO 15608	**Welding – Guidelines for a metallic material grouping system.**
ISO 15609 - 1	**Specification and qualification of welding procedures for metallic materials – Welding procedure specification – Part 1: Arc welding.**
ISO 15610	Specification and qualification of welding procedures for metallic materials. Qualification based on tested welding consumables.
ISO 15611	Specification and qualification of welding procedures for metallic materials. Qualification based on previous welding experience.
ISO 15613	Specification and qualification of welding procedures for metallic materials. Qualification based on pre-production-welding test.
ISO 15614	**Specification and qualification of welding procedures for metallic Materials – Welding procedure test.**
Part 1 Part 2 Part 3 Part 4 Part 5 Part 6 Part 7 Part 8 Part 9 Part 10 Part 11 Part 12 Part 13	Arc and gas welding of steels and arc welding of nickel and nickel alloys. Arc welding of aluminium and its alloys.* Welding procedure tests for the arc welding of cast irons.* Finishing welding of aluminium castings.* Arc welding of titanium, zirconium and their alloys. Copper and copper alloys.* Not used. Welding of tubes to tube-plate joints. Underwater hyperbaric wet welding.* Hyperbaric dry welding.* Electron and laser beam welding. Spot, seam and projection welding.* Resistance butt and flash welding.*
Note: The inspector should have an awareness of standards that are printed in bold. *Proposed	

Section 9

Welding Symbols