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ARAB ENGINEERING BUREAU

1 GENERAL

1.1 INTRODUCTION

1.1.1 Scope

- 1 This section provides the specification for preparation of shop drawings, engineering, testing, fabrication, delivery erection and installation of steel doors, roller shutters, Poly vinyl chloride (PVC), Unplasticized poly vinyl chloride (PVC-U), aluminium doors, windows and fly screens, aluminium support and cladding systems and architectural metal work.
- 2 The purpose of QCS is to provide as a general technical guide for acceptable construction work practices in the State of Qatar, considering this; any addition for technology, material, specification, standard that are not mentioned in this section or their modification, shall be subject to approval as stated in the introduction of QCS (00-02).
- 3 Related Sections are as follows:

Section 5	Concrete
Section 14	Roofing
Section 15	Thermal Insulation of Buildings
Section 16	Structural Steelworks
Section 18	Carpentry, Joinery and Ironmongery
Section 25	Glass and Glazing
Section 26	Painting and Decorating

1.1.2 References

- 1 The following standards are adopted and/or referred to in this Part:

ASTM B209/B209M ...Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

ASTM C1381/C1381M Standard Specification for Molded Glass Fiber Reinforced Gypsum Parts

ASTM C1349.....Standard Specification for Architectural Flat Glass Clad Polycarbonate

ASTM D4726.....Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Exterior-Profile Extrusions Used for Assembled Windows and Doors

BS 476.....Fire tests on building materials and structures

BS 644.....Timber windows and doorsets. Fully finished factory-assembled windows and doorsets of various types. Specification

BS 729.....Specification for hot dip galvanized coatings on iron and steel articles (ISO 1461 Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods)

BS 1245.....Metal door frames (steel)

BS 1282.....Pedestrian doorsets and door frames made from steel sheet. Specification.

BS 1449.....Steel plate, sheet and strip.

- BS 1474.....Specification for wrought aluminium and aluminium alloys for general engineering purposes - bars, extruded round tube and sections; (EN 515 Aluminium and aluminium alloys - Wrought products - Temper designations; EN 573 Aluminium and aluminium alloys - Chemical composition and form of wrought products; EN 755 Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles; EN 12020 Aluminium and aluminium alloys - Extruded precision profiles in alloys EN AW-6060 and EN AW-6063)
- BS 1615.....Method for specifying anodic oxidation coatings on aluminium and its alloys; (ISO 7599 Anodizing of aluminium and its alloys — Method for specifying decorative and protective anodic oxidation coatings on aluminium)
- BS 1706.....Method for specifying electroplated coatings of zinc and cadmium on iron and steel (ISO 2081 Metallic and other inorganic coatings — Electroplated coatings of zinc with supplementary treatments on iron or steel; ISO 2082 Metallic and other inorganic coatings — Electroplated coatings of cadmium with supplementary treatments on iron or steel)
- BS 1722.....Fences
- BS 1723.....Brazing; (EN 14324 Brazing - Guidance on the application of brazed joints; EN 12797 Brazing - Destructive tests of brazed joints; EN 12799 Brazing - Non-destructive examination of brazed joints; EN 13134 Brazing - Procedure approval; ISO 13585 Brazing — Qualification testing of brazers and brazing operators)
- BS 1724.....Specification for bronze welding by gas
- BS 2901.....Filler rods and wires for gas-shielded arc welding; (ISO 636 Welding consumables — Rods, wires and deposits for tungsten inert gas welding of non-alloy and fine-grain steels — Classification; ISO 14341 Welding consumables — Wire electrodes and weld deposits for gas shielded metal arc welding of non alloy and fine grain steels — Classification; ISO 14343 Welding consumables — Wire electrodes, strip electrodes, wires and rods for arc welding of stainless and heat resisting steels — Classification; ISO 24373 Welding consumables — Solid wires and rods for fusion welding of copper and copper alloys — Classification; ISO 18273 Welding consumables — Wire electrodes, wires and rods for welding of aluminium and aluminium alloys — Classification; ISO 18274 Welding consumables — Solid wire electrodes, solid strip electrodes, solid wires and solid rods for fusion welding of nickel and nickel alloys — Classification)
- BS 2994.....Specification for cold rolled steel sections (EN 10162 Cold rolled steel sections - Technical delivery conditions - Dimensional and cross-sectional tolerances)
- BS 2997.....Specification for aluminium rainwater goods (BS 8530 Traditional-style half round, beaded half round, Victorian ogee and moulded ogee aluminium rainwater systems. Specification)
- BS 3049.....Specification. Pedestrian guard rails (metal); (BS 7818 Specification for pedestrian restraint systems in metal)
- BS 3083.....Specification for hot-dip zinc coated and hot-dip aluminium/zinc coated corrugated steel sheets for general purposes

- BS 3987.....Specification for anodic oxidation coatings on wrought aluminium for external architectural applications
- BS 4147.....Specification for bitumen-based hot-applied coating materials for protecting iron and steel, including suitable primers where required; (EN 10300 Steel tubes and fittings for onshore and offshore pipelines - Bituminous hot applied materials for external coating).
- BS 4254.....Specification for two-part polysulphide-based sealants; (ISO 11600 Building construction — Jointing products — Classification and requirements for sealants)
- BS 4255.....Rubber used in preformed gaskets for weather exclusion from buildings
- BS 4300.....Wrought aluminium and aluminium alloys for general engineering purposes (supplementary series); (EN 573 Aluminium and aluminium alloys - Chemical composition and form of wrought products; EN 515 Aluminium and aluminium alloys - Wrought products - Temper designations; EN 485 Aluminium and aluminium alloys - Sheet, strip and plate; EN 755 Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles; EN 754 Aluminium and aluminium alloys - Cold drawn rod/bar and tube; ISO 18273 Welding consumables — Wire electrodes, wires and rods for welding of aluminium and aluminium alloys — Classification).
- BS 4315.....Methods of test for resistance to air and water penetration
- BS 4873.....Aluminium alloy windows and doorsets. Specification
- BS 5368.....Method of testing windows; (EN 1026 Windows and doors - Air permeability - Test method; EN 1027 Windows and doors - Water tightness - Test method; EN 12211 Windows and doors - Resistance to wind load - Test method).
- BS 5707.....Specification for preparations of wood preservatives in organic solvents.
- BS 6213.....Selection of construction sealants. Guide
- BS 6375-1Performance of windows and doors - Classification for weathertightness and guidance on selection and specification
- BS 6375-2Performance of windows and doors - Classification for operation and strength characteristics and guidance on selection and specification
- BS 6375-3Performance of windows and doors - Classification for additional performance characteristics and guidance on selection and specification
- BS 6496.....Specification for powder organic coatings for application and stoving to aluminium alloy extrusions, sheet and preformed sections for external architectural purposes, and for the finish on aluminium alloy extrusions, sheet and preformed sections coated with powder organic coatings (AMD 7182); (EN 12206-1 Paints and varnishes - Coating of aluminium and aluminium alloys for architectural purposes - Part 1: Coatings prepared from thermosetting coating powder; ISO 18768-1 Organic coatings on aluminium and its alloys — Methods for specifying decorative and protective organic coatings on aluminium — Part 1: Powder coatings)

- BS 6497.....Specification for powder organic coatings for application and stoving to hot-dip galvanized hot-rolled steel sections and preformed steel sheet for windows and associated external architectural purposes, and for the finish on galvanized steel sections and preformed sheet coated with powder organic coatings; (EN 13438 Paints and varnishes - Powder organic coatings for hot dip galvanised or sherardised steel products for construction purposes).
- BS 6510.....Steel-framed windows and glazed doors. Specification
- BS 7036.....Power operated pedestrian doorsets. Safety in use - Code of practice for risk assessment and risk reduction
- BS 7412.....Specification for windows and doorsets made from unplasticized polyvinyl chloride (PVC-U) extruded hollow profiles
- BS 7722.....Surface covered PVC-U profiles for windows and doorsets. Specification.
- BS 7773.....Code for practice for cleaning and preparation of metal surfaces; (ISO 27831-2 Metallic and other inorganic coatings — Cleaning and preparation of metal surfaces — Part 2: Non-ferrous metals and alloys; ISO 27831-1 Metallic and other inorganic coatings — Cleaning and preparation of metal surfaces — Part 1: Ferrous metals and alloys)
- BS 8214.....Code of practice for fire door assemblies.
- BS 8529.....Composite doorsets. Domestic external doorsets. Specification
- EN 288Specification and approval of welding procedures for metallic materials; (ISO 15607 Specification and qualification of welding procedures for metallic materials — General rules; ISO 15609-1 Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 1: Arc welding; ISO 15614-1 Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys; ISO 15614-2 Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 2: Arc welding of aluminium and its alloys; 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 15612 Specification and qualification of welding procedures for metallic materials — Qualification by adoption of a standard welding procedure specification; ISO 15613 Specification and qualification of welding procedures for metallic materials — Qualification based on pre-production welding test;)
- EN 477Plastics - Poly(vinyl chloride) (PVC) based profiles - Determination of the resistance to impact of profiles by falling mass.
- EN 478Plastics. Poly(vinyl chloride) (PVC) based profiles. Determination of the appearance after exposure at 150°C.
- EN 479Plastics - Poly(vinyl chloride) (PVC) based profiles - Determination of heat reversion.
- EN 485Aluminium and aluminium alloys - Sheet, strip and plate

- EN 513Plastics - Poly(vinyl chloride) (PVC) based profiles - Determination of the resistance to artificial weathering.
- EN 514Plastics - Poly(vinyl chloride) (PVC) based profiles - Determination of the strength of welded corners and T-joints.
- EN 10142Continuously hot-dip zinc coated low carbon steels strip and sheet for cold forming - Technical delivery conditions; (EN 10346 Continuously hot-dip coated steel flat products for cold forming - Technical delivery conditions).
- EN 10143Continuously hot-dip coated steel sheet and strip - Tolerances on dimensions and shape
- EN 10152Electrolytically zinc coated cold rolled steel flat products for cold forming - Technical delivery conditions
- EN 12608-1Unplasticized poly(vinyl chloride) (PVC-U) profiles for the fabrication of windows and doors - Classification, requirements and test methods - Part 1: Non-coated PVC-U profiles with light coloured surfaces

1.2 SUBMITTALS

1.2.1 Samples

- 1 The Contractor shall submit samples and mock-ups in accordance with the relevant provisions of Section 1, General, and as follows:
- (a) submit samples of all materials and finishes including the following:
 - (i) samples matching the appearance, colour, texture, and other characteristics of each finish required.
 - (ii) finished samples of panels and major extrusions.
 - (iii) range samples showing the complete range of variation in colour, texture, and other characteristics resulting from the manufacture, finishing, fabrication, delivery, assembly, installation, and cleaning processes.
 - (iv) samples showing finishes over welds and over materials welded.
 - (b) the size of all samples to be agreed with the engineer or as noted in the contract documents
 - (c) the Contractor shall submit any pre-printed or prepared manufacturer's performance data.

1.2.2 Protection Materials

- 1 The Contractor shall provide information or direction for application and removal procedures for all protection materials used on or for samples during shipping, storage, and installation.

1.2.3 Mock-ups

- 1 The Contractor shall provide test mock-ups as indicated in the Project Documentation, and as required for tests
- 2 The Contractor shall provide visual mock-up as indicated in the Project Documentation.

1.2.4 Engineering Calculations

- 1 The Contractor shall submit engineering calculations as directed in the Project Documentation
- 2 Engineering calculations shall be submitted concurrently with the corresponding shop drawings.
- 3 All engineering calculations are to bear the stamp of a professional engineer.

1.2.5 Test Reports

- 1 The Contractor shall submit test reports for all tests specified herein. Test reports shall be submitted in a timely manner and prior to execution of any Works.
- 2 Product test reports: a qualified independent testing agency approved by the Engineer shall be used to indicate and interpret test results on tests on components and assemblies relative to compliance with the requirements of the Project Documentation.
- 3 Reconstruction test reports: a qualified independent testing agency approved by the Engineer shall be used to indicate and interpret test results on test mock-ups relative to compliance with the requirements of the Project Documentation.
- 4 Field test reports: a qualified independent inspecting and testing agency approved by the Engineer shall be used to indicate and interpret field test results relative to compliance with the requirements of the Project Documentation.

1.2.6 Inspection and Production Testing Programs

- 1 The Contractor shall submit to the Engineer a detailed description of inspection and production testing programmes and inspection reports for all types of coating of aluminium or aluminium alloy.

1.2.7 Shop Drawings

- 1 Shop Drawings, shall be prepared in accordance with the relevant provisions of Section 1, General. Shop Drawings shall be prepared and approved by the Engineer prior to the fabrication of any off-site item.

1.2.8 Maintenance Manual

- 1 A maintenance manual describing the various materials, equipment, and procedures for cleaning and maintaining the parts of the Works included in this Section shall be submitted to the Engineer for approval upon completion of the Project.

1.2.9 As-Built Drawings

- 1 As-Built Drawings, prepared in accordance with the relevant provisions of Section 1, General, shall be submitted to the Engineer for approval upon completion of the Project.

END OF PART