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ARAB ENGINEERING BUREAU

6 PASSIVE FIRE PROTECTION SYSTEM

6.1 GENERAL

6.1.1 Scope

- 1 This Section specifies the minimum requirements of construction, material, installation and testing for Passive Fire Protection System.

6.1.2 References

- 1 All supplies and services offered in response to this specification shall conform to the latest local regulations, codes and standards subject to the approval of The General Directorate of Civil Defence (Qatar Civil Defence).

- 2 The following Qatar Civil Defence (QCD) Guidelines and Regulations (latest editions) are referred to in this Section:

Qatar Civil Defence - Fire and Life Safety Requirements (latest edition approved by QCD)

Qatar Civil Defence - General Fire Safety Requirement – Guideline Annexes (latest edition approved by QCD)

Qatar Civil Defence - Product Evaluation, Company & Engineers Registration Guidelines (latest edition approved by QCD)

Qatar Civil Defence - Currently Recognized Product Certification Bodies and Testing Laboratories (latest edition approved by QCD)

Qatar Civil Defence – Acceptance Inspection & Testing (latest edition approved by QCD)

Qatar Civil Defence – Inspection, Testing and Maintenance Guidelines M&E (latest edition approved by QCD)

- 3 Other NFPA Codes/Standards and other International Codes/Standards are subject to QCD technical review, evaluation and final approval.

NFPA Codes and Standards

NFPA 1.....Fire Code

NFPA 80.....Standard for Fire Doors and Other Opening Protectives

NFPA 80ARecommended Practice for Protection of Buildings from Exterior Fire Exposures

NFPA 101.....Life Safety Code

NFPA 251.....Standard Methods of Tests of Fire Resistance of Building Construction and Materials

NFPA 252.....Standard Methods of Fire Tests of Door Assemblies

NFPA 253.....Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source

NFPA 255.....Standard Method of Test of Surface Burning Characteristics of Building Materials

NFPA 256.....	Standard Methods of Fire Tests of Roof Coverings
NFPA 257.....	Standard on Fire Test for Window and Glass Block Assemblies
NFPA 285.....	Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components
NFPA 286.....	Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth
NFPA 5000.....	Building Construction and Safety Code®
ANSI/UL 9	Fire Tests of Window Assemblies.
ANSI/UL 10B	Fire Tests of Door Assemblies
ANSI/UL 10C	Positive Pressure Fire Test of Door Assemblies
ANSI/UL 10A	Tin-Clad Fire Doors UL/1784 - Air Leakage
ANSI/UL 263	Standard for Fire Tests of Building Construction and Materials.
ANSI/UL 1479	Fire Tests of Penetration Firestops
ANSI/UL 1709	Rapid Rise Fire Tests of Protection Materials for Structural Steel.
ANSI/UL 2079	Tests for Fire Resistance of Building Joint Systems
ASTM E 84	Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E119	Standard Test Method for Fire Tests of Building Construction and Materials.
ASTM E152	Standard Method of Fire Tests of Door Assemblies
ASTM E 814	Standard Test Method for Fire Tests of Through-Penetration Fire Stops
ASTM E2307	Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus.
BR 135	Fire performance of external thermal insulation for walls of multi-storey buildings
BS 476-4	Fire tests on building materials and structures - Non-combustibility test for materials
BS 476-6	Fire tests on building materials and structures - Method of test for fire propagation for products
BS 476-7	Fire tests on building materials and structures - Method of test to determine the classification of the surface spread of flame of products
BS 476-20	Fire tests on building materials and structures - Method for determination of the fire resistance of elements of construction (general principles).
BS 476-21	Fire tests on building materials and structures - Methods for determination of the fire resistance of loadbearing elements of construction.
BS 476-22	Fire tests on building materials and structures - Method for determination of the fire resistance of non-loadbearing elements of construction.
BS 476-24	Fire tests on building materials and structures - Method for

determination of the fire resistance of ventilation ducts.

BS 8414-1	Fire performance of external cladding systems - Test method for non-loadbearing external cladding systems fixed to, and supported by, a masonry substrate
CAN/ULC S104	Standard Method for Fire Tests of Door Assemblies
CAN/ULC S115	Fire Tests of Fire Stop Systems
EN 1364-1	Fire resistance tests for non-loadbearing elements - Part 1: Walls.
EN 1634-2	Fire resistance and smoke control tests for door, shutter and openable window assemblies and elements of building hardware - Part 2: Fire resistance characterisation test for elements of building hardware.
EN 1634-3	Fire resistance tests for non-loadbearing elements - Part 3: Curtain walling - Full configuration (complete assembly).
EN 1364-4	Fire resistance tests for non-loadbearing elements - Part 4: Curtain walling - Part configuration.
EN 1366-3	Fire resistance tests for service installations - Part 3: Penetration seals.
EN 1366-4	Fire resistance tests for service installations - Part 4: Linear joint seals.
EN 1634-1	Fire resistance and smoke control tests for door and shutter assemblies, openable windows and elements of building hardware - Part 1: Fire resistance test for door and shutter assemblies and openable windows
EN 12101-1	Smoke and heat control systems - Part 1: Specification for smoke barriers.
EN 13162	Thermal insulation products for buildings - Factory made mineral wool (MW) products - Specification.
EN 13501-1	Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests.
EN 13501-2	Fire classification of construction products and building elements - Part 2: Classification using data from fire resistance and/or smoke control tests, excluding ventilation services.
EIMA 99A	Exterior Insulation and Finish Systems (EIFS).
ETAG 026	Guideline for European Technical Approval for Fire Stopping and Fire Sealing Products.
FM Approvals 4435	Edge Systems Used with Low Slope Roofing Systems
FM Approvals 4450	Class 1 Insulated Steel Deck Roofs
FM Approvals 4451	Profiled Steel Panels for Use as Decking in Class 1 Insulated Roof Construction
FM Approvals 4454	Lightweight Insulating Concrete for Use in Class 1 and Noncombustible Roof Constructions
FM Approvals 4470	Single-Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR) and

Liquid Applied Roof Assemblies for Use in Class 1 and Noncombustible Roof Deck Construction	
FM Approvals 4471	Class 1 Panel Roofs
FM Approvals 4881	Class 1 Exterior Wall Systems.
FM Approvals 4924	Pipe and Duct Insulation.
FM Approvals 4990	Firestopping
LPS 1158	Requirements and tests for fire resistant glazing system",
LPS 1181 Part 1	Requirements and tests for built up cladding and sandwich panel systems for use as the external envelope of building
LPS 1208	Fire resistance requirements for elements of construction used to provide compartmentation
ISO 1182	Reaction to fire tests for products — Non-combustibility test.
ISO 1716	Reaction to fire tests for products — Determination of the gross heat of combustion (calorific value)
ISO 3009	Fire-resistance tests — Elements of building construction — Glazed elements
SS 332	Specification for fire doors.
TS25	Fire Resistant Glass, Glazing Systems and Materials
UL 9	Standard for Fire Tests of Window Assemblies
UL10B	Fire Tests of Door Assemblies.
UL 10C	Positive Pressure Fire Test of Door Assemblies. UL 10B - Fire Tests of Door Assemblies.
UL 10D	Standard for Fire Tests of Fire-Protective Curtain Assemblies.
UL 723	Standard for Safety Test for Surface Burning Characteristics of Building Materials,
UL1479	Standard for Safety for Fire Tests of Through- Penetration Fire Stops
UL 1784	Standard for Air Leakage Tests of Door Assemblies and Other Opening Protectives.
UL 2079	Standard for Tests for Fire Resistance of Building Joints Systems.
ULC S134	Standard Method of Fire Test of Exterior Wall Assemblies
Other related NFPA Codes / Standards and other equivalent International Codes / Standards	

6.1.3 Passive Fire Protection System

- 1 Passive Fire Protection System
 - (a) Structural Fire Protection
 - (b) Compartmentation
 - (c) Opening Protection

- (d) Fire Stopping Materials
 - (e) Other Passive Fire Protection
- 2 Other products related Passive Fire Protection System/Products/Material and new innovations not included in this list shall be referred to QCD Safety Systems Division for review and evaluation.

6.1.4 Authority Having Jurisdiction

- 1 All works, regulatory requirements and approvals related to Passive Fire Protection System in Qatar shall be under the jurisdiction of Qatar Civil Defence.

6.1.5 Company Registration

- 1 The Company responsible for the supplies & trading, installation & maintenance of Passive Fire Protection System shall be registered and on the approved list of Qatar Civil Defence and Ministry of Commerce and Industry. For details on the updates of the latest licensing and registration requirements, consult Qatar Civil Defence.

6.1.6 Engineer & Technicians Registration

- 1 The Engineer/Technician in charge for the Design, Supervision of Installation, Testing and Maintenance of the Passive Fire Protection System shall be registered and licensed based on the latest regulatory requirements of Qatar Civil Defence. For details on the updates of the latest licensing and registration requirements, consult Qatar Civil Defence.
- 2 All installation / inspection works for Passive Fire Protection System shall be done by a QCD Registered Passive Fire Protection Technician/Supervisor, Designated Responsible Individual (DRI) and other internationally recognized license/registration subject to the approval of Qatar Civil Defence.

6.1.7 Contractor's Responsibility

- 1 The Contractor shall arrange for a QCD Registered Specialty Contractor to supply, install, test, commission and maintain the Passive Fire Protection System based on approved plan, products and installation subject to the approval of Qatar Civil Defence.

6.1.8 Quality Assurance

Products, equipment and materials in this part shall obtain QCD Product Approval thru the Safety Systems Division of Qatar Civil Defence. An approved and registered Passive Fire Protection System Contractor that employs QCD Registered Engineers shall be in charge for the installation, testing and commissioning of the project.

6.1.9 Plan Review

- 1 The Engineering Design for Passive Fire Protection System shall be submitted to Qatar Civil Defence for evaluation, technical review and approval. Refer to the latest guidelines of Plan Review Section for further details.

6.2 PRODUCTS

6.2.1 Product Approval

- 1 Products for Passive Fire Protection System shall be QCD Approved. It shall meet listing requirements, appropriate standards, technical specifications, certified and tested by a QCD Recognized Product Certification Body or Testing Laboratory as per Qatar Civil Defence Regulations.
- 2 The following Passive Fire Protection System products, equipment and materials shall be required to obtain QCD Approval.
 - (a) Structural Fire Protection
 - (b) Compartmentation
 - (c) Opening Protection
 - (d) Fire Stopping Materials
 - (e) Other Passive Fire Protection
- 3 Other related Passive Fire Protection System products / materials and new innovations not included in this list shall be referred to QCD Safety Systems Division for review and evaluation.
- 4 A guide (sample standards) regarding acceptable product standards for Passive Fire Protection System are indicated from 6.2.2 to 6.2.6 of this Section.
- 5 Products that complies with equivalent BS; EN standards or other international standards are subject to QCD Engineers technical review and for the final approval of QCD Officers / Head of Section.

6.2.2 Structural Fire Protection

- 1 Structural fire protection. Structural fire protection guards essential structural components (such as structural steel and joint systems) from the effects of fire. This is accomplished with a fireproofing material (spray-on thin-film intumescent, endothermic materials like gypsum-based plasters and cementitious products, mineral wool wraps and insulation, and fireproofing cladding) or building the structure out of concrete products.

Product	Standard
Fire Proofing Materials	ANSI/UL 263, "Fire Tests of Building Construction and Materials ANSI/UL 1709, "Rapid Rise Fire Tests of Protection Materials for Structural Steel." BS476: Part 21:1987 - Fire Tests on Building Materials and Structures. Methods for determination of the fire resistance of load bearing elements of construction. BS476:Part 24:1987 - Fire Tests on Building Materials and Structures. Methods for determination of the fire resistance of ventilation ducts. BS 476: Part 20: 1987 - Fire Tests on Building Materials and Structures. Methods for determination of the fire resistance of the elements of construction (general principle).

6.2.3 Compartmentation

- 1 Compartmentation. Fire barriers, firewalls, fire partitions, and smoke barriers are all included in compartmentation. Fire barriers include fire-rated walls, floors, and ceilings (often made of concrete, combination wood, gypsum, or masonry). These barriers are used to limit the spread of fire in a building and allow safe egress. Walls extend from a fire-rated floor to the fire-rated ceiling above, and continue into concealed spaces for full protection.

Product	Standard
Fire Rated Wall & Floor Assembly	ASTM E119-12a Standard Test Method for Fire Tests of Building Construction and Materials. ANSI/UL 263, Fire Tests of Building Construction and Materials. BS 476: Part 22 - Fire Tests on Building Materials and Structures, Method for determination of the fire resistance on non-loadbearing elements of construction. FM CLASS 4881 - Class 1 Exterior Wall Systems. LPS 1208 - Non-loadbearing Compartment Wall and Partitions EN 1364-1: 2015 - Fire Resistance Tests for non-loadbearing elements. Walls.

6.2.4 Opening Protection

- 1 Opening protection. Fire doors and windows are installed in an opening of a fire barrier to maintain its fire resistance. "Doors, builders' hardware, and frames work together to form an effective smoke and fire barrier." Fire-rated glazing/glass and framing are tested as a complete assembly that maintains the protection of the fire barrier. Additionally, fire and smoke dampers (often used in duct systems) are considered "opening protection" and complete the fire barrier where air ducts penetrate fire-rated and/or smoke-resistant assemblies.

Product	Standard
Fire Doorset & Fire Window set	ANSI/UL 10B - Fire Tests of Door Assemblies ANSI/UL 10C-Positive Pressure Fire Test of Door Assemblies ANSI/UL 10A - Tin-Clad Fire Doors UL/1784 - Air Leakage BS 476 Part 22 - Fire Test on Building Materials and Structures EN 1634-1-Fire Resistance Tests for Door and Shutter Assemblies EN 1634-3 - Fire Resistance and Smoke Control Tests for Door and Shutter Assemblies, openable windows and elements of building hardware. Smoke control test for door and shutter. Can/ULC S104 (2010)-Method for Fire Tests of Door Assemblies NFPA 252 (2012)-Standard Method of Fire Tests of Door Assemblies ASTM E152- Standard Method of Fire Tests of Door Assemblies

Product	Standard
	<p>BS 476: Part 22 - Fire Tests on Building Materials and Structures, Method for determination of the fire resistance on non-loadbearing elements of construction.</p> <p>NFPA 252- Standard Method of Fire Tests of Door Assemblies</p> <p>ASTM E119- Standard Test Method for Fire Tests of Building Construction and Materials .</p> <p>ANSI/UL 263 - Standard for Fire Tests of Building Construction and Materials.</p> <p>EN 1634-2:2008 Fire Resistance and Smoke Control tests for door, shutter and openable window assemblies and elements of building hardware.</p> <p>.SS 332:2007 - Specification for Fire Doors, Fire-resistance of building materials and elements, Doors and Windows.</p> <p>ANSI/UL 9, "Fire Tests of Window Assemblies."</p>
Smoke Barrier	<p>EN 12101-1:2005 - Smoke and Heat Control Systems- Specifications for Smoke Barriers.</p> <p>UL 1784(2004) - Standard for Air Leakage Tests of Door Assemblies and Other Opening Protectives.</p> <p>NFPA 252 - Standards Methods of Fire Tests of Door Assemblies.</p> <p>UL 10C -Positive Pressure Fire Test of Door Assemblies.</p> <p>UL 10B - Fire Tests of Door Assemblies.</p> <p>UL 10D - Standard for Fire Tests of Fire-Protective CurtainAssemblies.</p>
Fire Rated Glass and Glazing	<p>UL 10C "Positive Pressure Fire Tests of Door Assemblies", UL 10B "Fire test of door assemblies" , UL 9, TS 25, LPS 1158 "Requirements and tests for fire resistant glazing system", ANSI/UL 263, Standard for Fire Tests of Building Construction and Materials, ISO 3009:2003 "Fire resistance test -Elements of building construction - Glazed elements"</p>

6.2.5 Fire Stopping Materials

- 1 Firestopping materials. These materials are used to limit fire spread through penetrations in a fire barrier.

Product	Standard
Fire Stopping Materials	<p>ANSI/UL 1479, "Fire Tests of Penetration Firestops ",</p> <p>ANSI/UL 2079, "Tests for Fire Resistance of Building Joint Systems," and</p> <p>ANSI/ASTM E2307, "Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus".</p> <p>ETAG 026 Guideline for European Technical Approval of Fire Stopping and Fire Sealing Products.</p> <p>EN 13501-2 - Fire Classification of Construction products and building elements.</p>

Product	Standard
	<p>FM Approval Class Number 4990 - Wall & Floor Penetration Fire Stops CAN/ULC S115 - Fire Tests of Fire Stop Systems</p> <p>ASTM E 814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops UL1479 - Standard for Safety for Fire Tests of Through-Penetration Fire Stops EN 1366-3:2004 - Fire Resistance Tests for Service Installation, Penetration Seals. EN 1366-4:2006 - Fire Resistance Tests for Service Installation, Linear Joint Seals.</p> <p>FM CLASS-4990 - Wall & Floor Penetration Fire Stops BS 476: Part 20: 1987 - Fire tests on building materials and structures - Method for determination of the fire resistance of elements of construction (general principles). EN 1364-4 - Fire resistance tests for non-loadbearing elements - Part 4: Curtain walling - Part configuration ETAG 026-3 - Guideline for European Technical Approvals for Fire Stopping and Fire Sealing Products. ETAG 026-2 - Guideline for European Technical Approvals for Fire Stopping and Fire Sealing Products. UL 2079 - Standard for Tests for Fire Resistance of Building Joints Systems. CAN/ULC S115 (2005) - Fire Tests of Fire Stop Systems. BS 476: Part 20: 1987 - Fire Tests on building materials and structures. Method of determination of the fire resistance of elements of construction (general principles).</p>

6.2.6 Other Passive Fire Protection

Product	Standard
External Cladding Materials	NFPA 285 and ASTM E 84 Note: Regulations shall be as per NFPA 5000 requirement
Exterior Insulation and Finish Systems (EIFS)	EIMA99A, Exterior Insulation and Finish Systems (EIFS).
Curtain Wall System	<p>EN1364-1 Fire Resistance Tests for Door and Shutter Assemblies NFPA 251 - Standard Methods of Tests of Fire Resistance of Building Construction and Materials. EN 1634-3 Fire Resistance and Smoke Control Tests for Door and Shutter Assemblies, openable windows and elements of building hardware. Smoke control test for door and shutter.</p> <p>EN 1634-1 -Fire Resistance and Smoke control tests for door and shutter assemblies, openable windows and elements of building hardware. BS 476: Part 22 Fire Tests on Building Materials and Structures, Method for determination of the fire resistance on</p>

	non-loadbearing elements of construction. UL10B - Fire Tests of Door Assemblies. UL10C - Positive Pressure Fire Test of Door Assemblies. ANSI/UL263 - Standard for Fire Tests of Building Construction and Materials.
Interior Finish	NFPA 286 ULC S134 ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials Standard, UL 723 Test for Surface Burning Characteristics of Building Materials, BS 476 Part 6 Fire tests on building materials and structures. Method of test for fire propagation for products, BS 476-7 Part 7 Fire tests on building materials and structures. Method of test to determine the classification of the surface spread of flame of products, TS 19 BS 8414-1:2015 / BR 135 Third Edition, TBW Scheme SD03 BS 476-4, LPS 1208 "Fire resistance requirements for elements of construction used to provide compartmentation", LPS 1181 Part 1 "Requirements and tests for built up cladding and sandwich panel systems for use as the external envelope of building", UL 723 - Standard for Test of Surface Burning Characteristics ISO 1182 - Reaction to Fire Tests for products. Non-combustibility test. ISO 1716 - Reaction to Fire Tests for products. Determination of the gross heat of combustion (calorific value.) EN 13501-1 - Fire Classification of Construction products and building elements. Classification using test data from reaction to fire tests. FM CLASS-4924 - Pipe and Duct Insulation. TS EN 13162 + A1 - Specification, Thermal insulation products for buildings. Factory made mineral wool products. NFPA 286
Roofing Materials	LPS 1181: Part 1 , FM Approval Class Numbers 4435, 4450, 4451, 4454, 4470, 4471

Standards used to evaluate other products/components for Passive Fire Protection System shall be reviewed and subject to the final approval of Qatar Civil Defence.

6.3 INSPECTION, TESTING & MAINTENANCE

- 1 The UPDA Certified Supervising Consultant that oversees the Registered Contractor shall arrange inspection and testing of the Passive Fire Protection System of the new buildings / premises / structures with Qatar Civil Defence during the building completion stage of the project as a prerequisite for the issuance of an Occupancy Permit.

- 2 The Owner or Owner's Representative shall arrange inspection, testing and maintenance of the Passive Fire Protection System of the existing buildings / premises / structures with Qatar Civil Defence done by a Registered Contractor during the building maintenance stage as a requirement for the issuance of a Building Commercial Permit or License Renewal.
- 3 Inspection, Testing and Maintenance of Passive Fire Protection System shall be based on:
- Qatar Civil Defence – Acceptance Inspection & Testing Guidelines (latest edition approved by QCD)
- Qatar Civil Defence – Inspection, Testing and Maintenance Guidelines M&E (latest edition approved by QCD)
- Qatar Civil Defence Guidelines (latest edition approved by QCD)
- 4 Reference to NFPA Codes/Standards and other International Codes/Standards are subject to QCD technical review, evaluation and final approval.
- NFPA 1.....Fire Code
- NFPA 80.....Standard for Fire Doors and Other Opening Protectives
- NFPA 80ARecommended Practice for Protection of Buildings from Exterior Fire Exposures
- NFPA 101.....Life Safety Code
- NFPA 251.....Standard Methods of Tests of Fire Resistance of Building Construction and Materials
- NFPA 252.....Standard Methods of Fire Tests of Door Assemblies
- NFPA 253.....Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
- NFPA 255.....Standard Method of Test of Surface Burning Characteristics of Building Materials
- NFPA 256.....Standard Methods of Fire Tests of Roof Coverings
- NFPA 257.....Standard on Fire Test for Window and Glass Block Assemblies
- NFPA 285.....Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components
- NFPA 286.....Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth
- NFPA 5000.....Building Construction and Safety Code®
- Manufacturer's Listing Instructions
- Manufacturer's Recommendation / Published Instructions
- 5 The final approval for works related to Passive Fire Protection System shall be as per the acceptance of the Authority Having Jurisdiction known as Qatar Civil Defence.

END OF PART