

SECTION 08110
STEEL DOORS AND FRAMES

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes: Metal doors and frames in accordance with the requirements of the Contract Documents, work includes but is not limited to the following:
1. Hollow metal doors
 2. Louver doors.
 3. Metal frames.
 4. Painting.
 5. Installation.
- B. Related Sections:
1. Section 03600 – Grout
 2. Section 04220 – Concrete Unit Masonry
 3. Section 07910 – Joint Fillers Gasket
 4. Section 07920 – Sealants
 5. Section 08510 – Steel Windows
 6. Section 08710 – Door Hardware
 7. Section 08711 – Hardware Set Schedule
 8. Section 08800 – Glazing
 9. Section 09900 – Painting

1.02 REFERENCES

- A. American National Standards Institute (ANSI):
1. ANSI A 115 Sealer : “Specification for Steel Doors and Frames preparation of Hardware”
 2. ANSI A 250.3-2007 : “Test Procedure and Acceptance Criteria for Factory applied Finish Painted Steel surfaces for Steel Doors and Frames”
 3. ANSI A 250.6-2003 : Recommended practice for hardware reinforcing on standard steel doors and frames.
 4. ANSI A 250.4-94 : Swing and twist test
ANSI A 250.5-94
- B. American Society for Testing and Materials (ASTM)
1. ASTM A 36 : “Specifications for Structural Steel”
 2. ASTM A 153-82 (R87) : “Specification for Zinc Coating (Hot Dip) on Iron on Steel Hardware”.
 3. ASTM A 307 : “Specification for Carbon Steel Externally Threaded Standard Fasteners”
 4. ASTM A 366/A 366M-91 : “Specification for Steel Sheet, Carbon Cold-Rolled Commercial Quality”
 5. ASTM A 525-93 : “Specification for General Requirements for Steel Sheet, Zinc Coated (Galvanized) by the Hot-dip Process”
 6. ASTM A 526 : “Specification for Steel Sheet, Zinc Coated (Galvanized) by Hot-Dip Process”

7. ASTM A 568 : “Specification for General Requirements for Steel, carbon and High Strength, Low Alloy Hot Rolled Sheet and Cold Rolled Sheet”.
8. ASTM E 90 : “Method for Laboratory Measurement of Airborne-Sand transmission Loss of Building Partitions”.
9. ASTM E 152 : “Methods for fire tests of doors Assemblies”.
10. ASTM E 413 : Classification for Determination of Sound Transmission Class”.

C. The applicable provisions of the following standard, publications, codes and specifications shall apply throughout the metal door and frames work:

1. National Association of Architectural metal Manufacturers.
 - a. Metal finishes Manual for Architectural and Metal Products 1998.
2. National Fire Protection Association
 - a. NEPA 80-92 : “Fire Doors & Windows”
 - b. NEPA 105-93 : “Installation of Smoke Control Doors Assembling”.
3. Steel Door Institute
 - a. SDI 105-91 : “Recommended Erection Instruction for Steel Frames”
 - b. SDI 108-90 :”Recommended selection and usage Guide for Standard Steel Doors”.
 - c. SDI 111 Series : “IIIA-IIIF Recommended Details, Steel Doors and Frames”
 - d. SDI 112-89 : “Galvanized Standard Steel doors and Frames”
 - e. SDI 117-88 : “Manufacturing Tolerances Standard Steel Doors and Frames”
 - f. SDI 118-76 : “Basic Fire Door Requirements”.

1.03 SUBMITTALS

- A. Product Data: Submit to the Engineer for information only in accordance with the requirements of the Contract Documents copies of manufacturer’s specification for fabrication and shop painting, and instruction for installation of hollow metal doors and frames substantiating that products comply with requirements.
- B. Shop Drawings: Submit to the Engineer with the requirements of the Contract Documents for the fabrication and installation of metal doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items required for installation. Submit manufacturer’s technical product data substantiating that product comply with requirements.
 1. Provide schedule for doors and frames using same reference numbers for details and openings as those on contract drawings.
 2. Indicate coordinate of glazing frames and stops with glass and glazing requirements.

- C. Sample: Submit to the Engineer with the requirements of the Contract Documents, 300 x 500 mm cut-away sample door of each type specified or required, with a pair of hinges and corner section of door frame.
- D. Certificate: For door assemblies submit manufacturer's certification stating that each door and frame assembly has been constructed to conform to design, materials, fire-rating and construction equivalent to requirements of the specification.
- E. Suppliers and proposed fire rated doors must have prior approval from Kuwait Fire Department (KFD), and shall be listed in the official list of KFD approved sources before submittal.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide doors and frames manufactured by a firm specializing in the production of hollow metal work.
- B. Regulatory Requirements for Fire-Rated Assemblies: Provide U.L, W.H.I., or F.M. label rated openings where indicated, with label doors having appropriate labeled frames of the type to accommodate hardware specified and meet local code requirements. Label Construction Certification shall be provided on door assemblies required to be fire-rated that exceeds manufacturer's capabilities. Submit manufacturer's certification that each door and frame assembly has been constructed to conform to design, materials and constructed equivalent to requirements for labeled assemblies or products or units tested in accordance with ASTM E152 standards or/and UL 10B/10C.
- C. Provide doors and frames complying with steel door institute "Recommended Specification: Standard steel doors and frames" ANSI/SD1-100 (Latest Edition).

1.05 DELIVERY, STORAGE AND HANDLING

- A. Protect hollow metal units from damage during transit, storage and installation. Tool marks, rust, blemishes and any other damage on exposed surface will not be acceptable. Store material in a dry location, off the ground and in such a manner as to prevent deterioration.

1.06 PROTECTION AND CLEANING

- A. Upon completion of installation, clean exposed surfaces as recommended by manufacturer and leave ready for final painting.
- B. Protect units during construction period so that they show no signs of deterioration, use or damage at time of Substantial Completion.

1.07 WARRANTY

- A. Special Project Warranty: Submit a written warranty executed by the Contractor, manufacturer and installer, agreeing to repair or replace components or entire units Which fail in materials and workmanship within the specified warranty period. Failures include, but not necessarily limited to structural failure including

excessive deflation, excessive leakage or air infiltration, deterioration of metals, metal finishes and other materials beyond normal weathering and defects in hardware, weather-stripping and other components of work.

- B. Warranty period for steel doors and frames shall be five (5) years after the date of substantial completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

1. FRANCE METAL (CECO DOOR PRODUCTS)

Block 111, Zone B3 10th of Ramadan City

Egypt

Tel: +202 22 56 4293

Fax: +202 22 56 4294

2. STEEL CRAFT

IR Security & Safety

9017 Blue Ash Road

Cincinnati, OH 45242

Tel: +1 513 745 6400

Fax: +1 513 745 6446

3. AMWELD INTERNATIONAL

301 S. Northpoint Dr. Suite 400

Coppell, TX 75019-3840

Tel: 888-775-2397

Fax: 888-775-2397

- 4. Other SDI or NAAMM members that conform to the specific requirements of this specification, may be considered, if above listed manufacturers are not available in local market. Decision shall rest with the engineer

2.02 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 366 and A 568, free from scale, pitting or other defects.
- B. Galvanized Sheet Steel: ASTM A 526, galvanized accordance with ASTM A 525, Coating Designation G 90 (275 g/sq. m) zinc coating, phosphatized; stretcher leveled for doors.
- C. Support and Anchoring Devices: Structural steel, ASTM A 36; or sheet steel, ASTM A 366 cold-rolled or ASTM A 569 hot rolled and ASTM A 568; as shown but not less than 16 gauge (1.5mm) fabrication; comply with ASTM A 153, Class B.
- D. Filler: Suitable filler to match fire rating and sound deadening requirements.
- E. Fasteners: Galvanized or cadmium plated steel.
 - 1. Bolts and Nuts: ASTM A 307, Grade A.
 - 2. Expansion Bolts: FS FF-S-325, Group III, expansion shield (self drilling tubular expansion shell bolt anchors), Type 1 or 2 with galvanized bolts.

3. Machine Screws: FS-FF-S-92, Carbon Steel, Type III cross recessed, design I or II recess, style 2c flat head.

F. Sheet Prime Finish

Doors and frames are to be cleaned, and chemically treated to insure maximum finish paint adhesion. All surfaces of the door and frame exposed to view shall receive a factory applied coat of rust inhibiting primer. The prime finish is not intended to be the final layer of protection from elements. Field painting using a good grade of paint to be provided in accordance with the recommendations of the door and frame manufacturer. For specialty types of finished coatings, the paint supplier should also be consulted.

G. Weather/Acoustic Seals: Neoprene.

H. Smoke Seal: Hot smoke seal of chemically inert highly stable expandable graphic strip with multi-directional expansion.

I. Hollow Frame Grout: Cement and sand (1:3)

2.03 FABRICATION

A. Fabricate doors, louver doors and frames to design and dimensions shown in accordance with the shop practices. Unless otherwise shown, fabricate doors and panels to a thickness of 44mm. take field measurements where coordination with adjoining work is necessary.

B. Make hollow metal work strong, rigid, neat in appearance and free from defects. Reinforce corners of doors as required to prevent twisting or sagging.

C. Form exposed surfaces free from warp, wave and buckle, with all corners square, unless otherwise shown. Form moulded members straight and true, with joints coped or mitered, well formed, and in true alignment. Dress welded joints on exposed surfaces smooth so they are invisible after finishing.

D. Provide undercuts and clearances for doors as required and for rated doors and panels within the limitations established by the authority having jurisdiction. Prepare doors and frames to receive weather seals and acoustic seals shown or specified. Drop seals to face uniformly across door width. End pivot type not to be used.

E. Provide a full miter continuously welded on back side at frame corners and stops with edges straight and true. Grind welds smooth and flush on exposed surface.

F. Accurately machine file and fit exposed connections with hairline joints unless otherwise shown.

G. Conceal fastenings unless otherwise shown. Countersinks exposed screws using flat, Philips head screws.

H. Conform to the requirements of the "Structural Welding Code" of the American Welding Society for the welding of the steel. Provide welds of adequate strength and durability.

2.04 HOLLOW METAL FLUSH DOORS

- A. Construct interior doors with 18 gauge (1.2mm) thick cold rolled sheet steel face and exterior doors 16 gauge (1.6mm) galvanized outer sheets. Do not expose seams or joints on door faces, all seams or joints shall be at edge only, without any exposed spot welding.

Filler of leaf shall be:-

- Polyurethane.
- Manufacturer's Standard Kraft paper Honey Comb.
- Fiber Glass insulation reinforced with 22 gauge (0.85mm) inter-locking vertical C-shaped or Z-shaped reinforced members spaced not over 150mm apart and spot welded to outer face sheets.

Provide flush inverted 18 gauge (1.2mm) steel channels welded to outer sheets at top and bottom of door.

- B. Provide flush closer at the top of exterior doors. Weld inverted steel channels to both outer sheets to form integrally with edge construction of door.
- C. Round stiles for double-swing doors. Provide an overlapped steel astragal welded to the active leaf for pairs of exterior doors and pairs of fire doors, unless otherwise shown.
- D. Mortise, reinforce drill and tap doors at factory to receive mortise type hardware in accordance with the contract hardware schedule, Fire Alarm System specifications and templates. Provide reinforcing, drill and tap for doors to receive surface applied hardware, except at push plates and kick plates provide reinforcing only. Use steel secured by spot welding as reinforcement.
Hardware reinforcement shall be as follows:
1. Hinge reinforcements: As per manufacturer's standard.
 2. Lock reinforcement units: 12 gauge (2.6mm) by size as required by hardware manufacturers.
 3. Closer reinforcement: 12 gauge (2.6 mm) one piece channel by size as required by hardware manufacturer.
 4. Other hardware reinforcement: As required for adequate strength and anchorage.
5. In lieu of reinforcement specified, hardware manufacturers recommended reinforcing units may be used.

2.05 LOUVER DOORS

- A. Provide minimum 20 gauge steel louvers of type shown complete with frame. Where noted or where required for fire rating by codes or by authorities having jurisdiction, provide louvers with operable blades and fusible links.

2.06 HOLLOW METAL DOOR FRAMES

- A. Steel Door Frames: Comply with ANSI/SDI 100. Provide metal frames for doors, Transoms, sidelights, borrowed lights, and other openings, of types and styles as shown (or not shown) in drawings and schedules. Conceal fastenings, unless otherwise indicated. Mechanical interlock joint (Knock-down) is acceptable on

masonry frame corners with a fine hairline seam or on frame corner face, or when face of frame is welded and grounded smooth. Drywall frames with mechanical interlock (Knock-down) are acceptable with a fine hairline seam on frame corner face. Frame types, anchor requirements, and locations shall be detailed on plans. Frames shall comply with ANSI/SDI 119-1983, Level A, one million cycle swing test performance for a 4070 door frame.

- Interior and Acoustic frames: Cold Rolled minimum 16 gauge.
- Exterior frames galvanized, minimum 16 gauge unless noted.

Grout solid all frames in masonry or concrete walls. Provide steel plaster guards or mortar boxes, welded to frame, at back of hardware cutouts where installed in concrete, masonry or plaster openings. Protect inside throat of each frame grout filled wall conditions or where antifreeze additives are used in fill, with a waterproof undercoating type material 1/8" thick, field applied by installer. All frames shall be bonderized and finished as per paint schedule.

- B. Anchor frame jambs to concrete or masonry which has been placed prior to setting of frames with 9mm countersunk flat head bolts into expansion type shields or inserts, minimum of 4 per jamb. Face of frame shall be dimpled to accept counter-sunk bolt head. Reinforce frame with spacer to prevent bowing. Bolt head shall be set slightly below soffit face and ground smooth at time of installation.
- C. Provide 16 gauge (1.5mm) steel channels spreaders at the bottom of all 3 sided frames to prevent distortion during shipment and storage and to hold frames in proper position until anchorage and adjacent construction has been completed.
- D. Terminate bottom of frames at the indicated finished floor level. Where floor fill or setting beds occur support frame by 14 gauge (1.9mm) metal strap welded to frame and adjustable anchored to the structural substrate. Floor anchor strips shall be 14 gauge (1.9mm), punched for two (2) 6mm fasteners.
- E. Provide mullions and transom bars of closed or tubular construction, or as otherwise shown. Attach members to heads and jambs of frames with butt-welded joints unless shown to be removable. Reinforce the joints with conceal clip angles of the same thickness as the frame.
- F. Reinforce head of frames over 900mm wide with 12 gauge (2.6mm) steel channel unless a structural lintel is provide to support the wall construction above the frame or unless there is no wall construction above the frame.
- G. Mortise, reinforce, drill and tap frames for mortise type hardware. Provide internal reinforcement for surface mounted hardware which is to be field drilled and tapped. Locate hardware in frames to match location shown or specified for doors and in accordance with the hardware schedule and templates. Provide the following:
 1. Hinge reinforcement: Not less than 32 x 228 mm or 1-1/4" x 9".
 2. Strike reinforcements: 4mm by size as required by hardware manufacturer.
 3. Closer and holder reinforcement: 12 gauge (2.6mm), by size as required by Hardware manufacturer.
 4. Full enclosing steel cover boxes over all mortises: Provide removable access

plates in the heads of frames to receive concealed door closers. Offset reinforcement so that faces of hinges or keepers are flush with face of the frame rebate.

5. Holes of rubber door silencers: 3 for single doors and 2 for pairs of doors. Install plastic plugs in silencer holes clear during installation.

2.07 WEATHER/ACOUSTIC SEALS

- A. Comply with specifications herein for hollow metal door frames, and form to the profiles shown to receive weather seals and acoustic seals.
- B. Install seals in single lengths for each side with uniform exposure of 10mm, using adhesive and other attachments as detailed and as recommended by the seal manufacturer.

2.08 SHOP PAINTING

- A. Clean, treat and paint surfaces of fabricated hollow metal work, inside and out, whether exposed or concealed in the construction.
- B. Thoroughly clean all metal surfaces of loose scale, shavings, filings, dirt and other deleterious materials by use of wire brushes or other effective means. Remove grease and oil by one of the methods specified in SSPC-SP-1-63 "Solvent Cleaning". Fill as required to seal seams in edges.
- C. Apply one coat of metal primer to all reinforcement and attachment steel and framing which will be in contact with masonry or concrete.
- D. Chemically treat surfaces with phosphate compound to assure maximum paint adhesion. Apply a sufficient number of coats of approved enamel filler, baked on, to obtain uniformly smooth exposed surfaces. In addition, apply one coat of light-colored primer, baked on, to both inside and outside surfaces. Touch-up surfaces or bear spots.
- E. Provide minimum mil thickness of coatings as recommended by the paint manufacturer.

2.09 FINISH HARDWARE

- A. Finish hardware generally for all types of doors is specified in Section 08711 "Hardware Set Schedule".

2.10 GLASS AND GLAZING

- A. See Section 08800 "Glazing" for specification applicable to glass and glazing system shown. Fire rated door construction shall conform to Kuwait fire department regulations.

- B. Provide an approved type desiccant material for prevention of condensation.

2.11 SOURCE QUALITY CONTROL

- A. Test: Provide hollow metal doors and frames for fire rated openings manufactured by a firm whose units are inspected and tested for fire rated doors, by a nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine all supports for fixing both on drawings at the time of bidding and at actual time of fixing on site and ensure that all are satisfactory and completely adequate. Report any deficiencies to the Engineer.
- B. Assure that frame openings corresponding to dimensions of frame furnished.
- C. Check that surfaces to contact frames are free of debris.

3.02 INSTALLATION

- A. Install hollow metal units in accordance with manufacturer's instructions and final shop drawings. Fit doors to frames and floors with proper clearances to achieve the maximum operational effectiveness and appearance of each unit S.D.I. 105-87 "Recommended Erection Instruction for Steel Frames" or "The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors and Builders Hardware" as published by the DHI are recommended guidelines.
- B. Set hollow metal frames at locations shown, in perfect alignment and elevation, plumb, level, straight, true and free from rack, brace frames to prevent displacement.
- C. Extend frame anchorages below fills and finishes, except over membrane waterproofed areas. Anchor bottom of frames to floors with anchor bolts or with power driven fasteners. Coordinate the installation of built-in anchors for wall and partition construction as required with other work.
- D. After wall construction has been completed, remove temporary braces, including spreaders at base of 3 sided frames. Leave surfaces smooth and undamaged.
- E. Apply hardware in accordance with hardware manufacturer's instruction and fully coordinate with him in making the necessary door and frame preparations for and fixing all hardware. Drill and tap metal door and frames for machine screws as required, and do not use self tapping sheet metal screws. Anchor transom panels in place with concealed fasteners. Adjust door installation to provide uniform clearance at head and jambs, and to contact stops uniformly. Remove and replace doors which

are found to be warped, bowed or otherwise damaged and cannot be properly fitted in frames.

- F. Remove hardware before painting and refix after painting of doors is completed. Adjust and lubricate hardware for proper operation at completion and throughout the Contract Defects Liability Period, and instruct Employer's staff in the proper maintenance and adjustment of all hardware supplied.

3.03 TOLERANCES

- A. Maximum Diagonal Distortion: 1.5mm measured with straight edge, corner to corner.

3.04 ADJUSTING

- A. Adjust hardware to smooth and balanced door movement.
- B. Upon completion of installation clean exposed metal surfaces as recommended by manufacturer and leave ready for final painting.
- C. Protect doors and frames during construction period so that they will be without any indication of deterioration use or damage at time of substantial completion.

END OF SECTION