

## **Section 11195**

### **Security Metal Ceilings**

#### **PART 1 - GENERAL**

##### **1.01 SUMMARY**

- A. Section includes security acoustical and non-acoustical pan and plank metal ceilings including installation as scheduled in the contract drawings and as specified herein.

##### **1.02 PRODUCTS PROVIDED UNDER THIS SECTION**

- A. Minimum [Grades 1 & 2] security suspended pan type acoustical and non-acoustical ceiling systems.
- B. Medium [Grades 3 & 4] security single skin plank type acoustical and non-acoustical ceiling systems.
- C. Maximum [Grades 5 & 6] security double skin plank type acoustical and non-acoustical ceiling systems.

##### **1.03 RELATED SECTIONS**

- A. Section 09900 Painting
- B. Division 11 Security Equipment
- C. Division 15 Mechanical
- D. Division 16 Electrical

##### **1.04 REFERENCES**

- A. ASTM A 1008/A 1008M-00, Specification for Steel, Sheet and Strip, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability
- B. ASTM A 1011/A 1011M-00, Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability

- C. ASTM A 653/A 653M-97, Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dipped Process (Commercial Steel)
- D. ASTM A 666-96b, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar
- E. ASTM B 117-97, Standard Practice for Operating Salt Spray (Fog) Apparatus
- F. ASTM D 610-95, Standard Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces
- G. ASTM D 714-87 (1994), Standard Test Method for Evaluating Degree of Blistering of Paints
- H. ASTM D 1735-97, Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus
- I. ASTM C 635-00, Standard Specification for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
- J. ASTM C 636-03, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
- K. ASTM C 423, Standard Test Method for Sound Absorption and Sound Absorption Coefficient by the Reverberation Room Method
- L. ASTM F 2322 Standard Test Methods for Physical Assault on Vertical Fixed Barriers for Detention and Correctional Facilities
- M. ASTM E-84-04, Standard Test Method for Surface Burning Characteristics of Building Materials.
- N. AWS D1.3 Structural Welding Code for Sheet Metal
- O. ISO 9001 International Standards Organization – Standards for Quality Management
- P. CISCA Guidelines

Q. Abbreviations:

1. DEC: Detention Equipment Contractor
2. ASTM: American Society for Testing Materials
3. AWS: American Welding Society
4. CISCA: Ceilings and Interior Systems Construction Association

**1.05 TESTING AND PERFORMANCE**

A. Security grades for each security ceiling type shall be indicated on the reflected ceiling plan.

B. Acoustical Performance

1. Suspended pan type ceiling system shall provide a Noise Reduction Coefficient (NRC) of not less than .80 when tested in accordance with ASTM C 423 and in an E-400 mounting as defined in ASTM E 795.
2. Single skin plank ceiling system shall provide a NRC of not less than .90 when tested in accordance with ASTM C 423.
3. Double skin plank ceiling system shall provide a NRC of not less than .65 when tested in accordance with ASTM C 423.
4. Acoustical fill flame spread index shall not exceed 15 with smoke developed value not exceeding 5 when tested in accordance with ASTM C 84.

C. Security Performance

These test methods are not to provide a measure of resistance for ceiling assemblies subjected to attack by corrosive agents. These test methods are intended to evaluate simulated forced exit resistance of a ceiling assembly to attacks using battering devices and static loading.

The primary purpose of these test methods is to approximate the levels of abuse to which ceiling assemblies may be subjected in the course of a forced exit in a correctional facility. The desired result of its use is to help provide insurance of protection and safety of the inhabitants or occupants of the facility where these ceiling assemblies will ultimately be used.

It is recommended that architects and building design personnel decide which security rating is required for each opening as described in Table 1.

#### D. Test Samples

1. A ceiling assembly covering an 8'-0" x 10'-0" area using the desired ceiling panel system shall be constructed in accordance with Part 2 of this specification and installed in accordance with the manufacturer's instructions.
2. The manufacturer shall permanently mark the test samples and retain them at the manufacturing facility for future reference for a period of one (1) year from date tested. All tests will be verified using an independent agency. Test reports shall include photographs of the testing apparatus and installation instructions including templates for the items of hardware used.

#### E. Specimen Preparation

1. The construction and size of the test ceiling assemblies consisting of single or double skin ceiling panels, wall mounting channels and angles, compression struts, main runners, cross tees, hangers, and fasteners shall be representative of the application under investigation and the desired security classification needed for the application. The same basic construction and size of test assemblies shall apply to all tests.
2. The test assembly shall be installed in a fixture typically constructed from steel tube, I-beam, angles, and 2" x 6" wood members. The fixture shall simulate the rigidity normally provided to a ceiling system in a building by the roof, floor and walls and shall be constructed in a manner that will not contribute to the deflection of the ceiling assembly when under static loading or impact loading. Figure 1 shows an acceptable fixture.
3. Mount the ceiling assembly under test in the rough opening in accordance with the manufacturer's installation instructions.

#### F. Procedures

1. Ceiling Assembly Impact Testing
  - a. Impact testing under this section is performed using the methods and testing equipment described in ASTM F 2322.
  - b. Scope: These tests are designed to evaluate a ceiling assembly's ability to resist repetitive impact forces at the designated critical areas. The same assembly used for the static load tests may be reused for this test, or another assembly may be used if so desired.

- c. Significance of use: This test method is intended to closely simulate a sustained battering ram-style attack and provide an evaluation of the assembly's capability to prevent, delay and frustrate forced exit. This impacting simulates a person using a sledgehammer or another battering implement to escape or exit through the ceiling system.
- d. Apparatus: The test fixture described in paragraph 1.05.B.2 and shown in Figure 1 shall be used in this test.
  - i. Ram: The ram shall be a pendular system with a steel weight capable of delivering horizontal impact of up to 200 ft. lbf. The weight of the ram shall be 80 lb. +/- 0.25 lb. The striking nose of the ram shall be made from C1010-1020 carbon steel, the striking surface area of which shall be 4.0 +/- 0.04 in sq. Refer to Figure 5 Steel Impact Ram found in ASTM F 2322.
- e. Procedure: Subject each location on the sample ceiling to the number of blows at the required impact energy found in Table 1 and Figure 2. The impactor shall deliver the required impacts at the specified foot pounds per impact. Repeatability of impact location during each series shall be no more than +/- 2 inches horizontally and vertically from the designated impact target. Testing shall take no longer than 60 minutes. Specimen fails if a 5" x 5" x 8" rectangular box can pass through the wall following impacts.

## 2. Static Load Testing (uplift)

- a. Scope: This test is designed to evaluate the capability of a ceiling assembly to resist a steadily increasing force applied at corner points, joints between ceiling panels, and the ceiling assembly's central point.
- b. Significance of Use: This test method is intended to simulate a ceiling assembly's resistance to uplift at vulnerable locations.
- c. Apparatus: The test fixture and wall described in paragraph 1.05.B.1 shall be used in this test.
  - i. A hydraulic ram and pump equipped with a gauge or load cell shall be used to provide the static load. The pump ram and gauge shall be calibrated by the testing laboratory and a chart provided that converts pounds-force per square-inch gauge (kilograms per square meter) to pounds-force (Newton's). If a load cell is used, it shall be certified by the testing laboratory prior to use. (see figure 3 Static Load Apparatus)

- d. Procedure: Apply static load to the attack side of the component at the locations and magnitude appropriate to the security rating desired in accordance with that specified in Table 1. Specimen fails when the desired load cannot be achieved without physical failure or the ability for egress.
- e. Record the pass / fail results at 100 lb. increments to produce a graph, static load versus failure. Increase the load until target loads for each sample are reached.

**TABLE 1**

Static Load (up lift) Test					Impact Test			
Security Grade	Panel Material Thickness	@ Corner Lbs / in <sup>2</sup>	@ Joint Lbs / in <sup>2</sup>	@ Center of Panel @ Center of Room Lbs / in <sup>2</sup>	Impact Energy of Each Blow Ft. Lbs.	@ Corner Number of Blows	@ Panel Joint Number of Blows	@ Center of Panel @ Center of Room Number of Blows
1	0.042	600	600	600	60	10	10	10
2	0.053	800	800	800	90	20	20	20
3	0.053	800	800	800	120	75	75	75
4	0.067	1000	1000	1000	150	100	100	100
5	0.053	2000	2000	2000	200	200	200	200
6	0.067	3000	3000	3000	200	400	400	400

**1.06 QUALITY ASSURANCE**

**A. Manufacturer's Qualification**

1. Manufacturer shall provide evidence of having personnel and plant equipment capable of fabricating ceiling assemblies of the type specified herein. Manufacturer shall provide current documentation of the number of employees, a listing of their production equipment, and a description of their manufacturing facility.

2. Manufacturers shall be ISO 9001:2000 certified and shall be required to present their Certificate of Registration upon request. The manufacturer's registrar shall be nationally recognized and shall provide the manufacturer with periodic factory follow up audits reaffirming the manufacturer's continuing compliance with their written quality program.
3. Manufacturer's production welders shall be qualified under AWS D1.3 and upon request shall provide copies of Welders Certifications in accordance with AWS D1.3.
4. Manufacturers shall have a minimum of five (5) years experience successfully producing security ceiling systems of the types and sizes required in the contract documents. Upon request the manufacturer shall provide a list of successfully completed projects and the dates they were completed.
5. Manufacturers shall have written test reports of their having passed the testing requirements of section 1.05 and using their current materials and production processes.

B. Subcontractor (DEC) qualifications

1. Refer to qualifications in section 11190
2. Technically qualified and experienced in furnishing and installing detention security acoustical panel.
3. Welders and tackers shall be qualified by the American Welding Society's procedure AWS D1.3.
4. Has full time employees with a minimum of 5 years experience in furnishing and installing detention equipment and detention security systems.
5. Direct distributor or dealer for the manufacturer of detention security acoustical panel system specified or approved.
6. Submit evidence of prior experience in the installation of metal security ceiling systems.

### C. Quality Criteria

1. All ceiling construction shall be in accordance with construction of assemblies which meet the testing requirements of Section 1.05.
2. Fabrication methods and product quality shall meet standards specified herein.
3. Job Site Check
  - i. At the owner's option, a ceiling panel at the job site shall be selected at random and sawed in half or otherwise taken apart as deemed necessary for verification that construction is in accordance with these specifications. The manufacturer shall include the cost of the replacement panel in their quotation. If the panel construction does not conform to these specifications the non-conforming panels shall be repaired or replaced at the manufacturer's expense.

### 1.07 SUBMITTALS

#### A. Submittal Drawings

1. Submit in accordance with Division 1.
2. Provide detailed drawings including: layout of ceiling systems, details of construction, gauges of metal, anchoring details, conditions at openings, installation details and methods, and other data pertinent to the installation, including illustration of sequence of installation to accomplish interlocking panels.
3. Do not begin fabrication of material until shop drawings have been reviewed by the architect.

#### B. Samples (if required)

1. Supply a 1'-0" x 1'-0" section of each ceiling system being supplied showing wall mounting members and panel sections.
2. All samples submitted shall be of the production type and shall represent in all respects the minimum quality of work to be furnished by the manufacturer. No work represented by the samples shall be fabricated until the samples are approved, and any downgrading of quality demonstrated by the samples can be cause for rejection of the work.

C. Test Report

1. Manufacturer shall submit to the architect, ten (10) days prior to bid date, an independent testing laboratory report certifying that ceiling assemblies meet the performance requirements of Paragraph 1.05 and are constructed in accordance with Paragraphs 2.01 of these specifications.

D. Qualifications

1. Manufacturer shall submit to the architect, ten (10) days prior to bid date, his qualifications as described in section 1.06.A.

**1.08 WARRANTY**

All ceiling systems work shall be warranted from defects in workmanship and quality for a period of one (1) year from shipment.

**PART 2 - PRODUCTS**

**2.01 SECURITY CEILING SYSTEMS**

**A. PRE-APPROVED ACCEPTABLE MANUFACTURERS**

4. Security Grade 1 and 2 suspension pan type ceiling systems as manufactured by Trussbilt under the SecureDek trade name.
5. Security Grade 3 and 4 single skin inter-locking plank ceiling systems as manufactured by Trussbilt under the BarrierDek trade name.
6. Security Grade 5 and 6 double skin ship-lap joint plank ceiling systems as manufactured by Trussbilt under the TrussDek trade name.

4. Products other than those specified or approved will be considered if the following items are submitted to the Architect at least 10 days prior to bid due date.
  - a. Physical samples
  - b. Catalog and technical information
  - c. References (including name and telephone number or person to contact)
  - d. Notarized certification that the product conforms to the requirements, quality, and durability of the products specified herein
  - e. Notarized certification that manufacturer conforms to the manufacturer's qualifications required in this specification
  - f. Agreement to reimburse the Architect or Owner for costs associated with changing from the specified products. If a substitution is approved, it will be in the form of an addendum to the bidding documents.

## **B. MATERIAL**

1. Panel face sheet thicknesses shall be for [Grade 1 - 0.042 in., Grade 2 - 0.053 in., Grades 3 - 0.053 in., Grade 4 - 0.067 in., Grades 5 - 0.053 in., and Grade 6 - 0.067 in.] minimum thickness.
2. Panel face sheets shall be made of commercial quality, level, cold-rolled steel conforming to ASTM A 1008 / A 1008M CS Type B and shall have a zinc coating applied by the hot-dip process conforming to ASTM A 653/A653M Commercial Steel (CS), coating designation A40. The steel shall be free of scale, pitting, coil breaks or other surface blemishes. It shall also be free of buckles, waves or any other defects caused by the use of improperly leveled sheets.
3. For severely corrosive conditions and where specified, face sheets and components shall be stainless steel conforming to ASTM A 666, Type 304.

## **C. CONSTRUCTION**

1. Suspended Metal Pan Ceiling – Security Grades 1 and 2
  - a. Ceiling pans: Shall be nominally 24" x 24" (or 24" x 48") x 1" deep with sloping vertical legs on all four sides. All ceiling pans shall be factory formed and shall be perforated with .080" diameter holes on .220" staggered 45 degree centers.

- b. When installed, the face of the pans shall rest on the inside surface of the exposed horizontal flanges of the main runner and cross tees. The sloping vertical legs of the pans shall snap-in and lock positively and continuously under the bottom surface of the rectangular bulb of the tee sections, and lock into the perimeter channel by a 20 gauge galvanized hold-down clip, thereby providing a visual concealment barrier without the use of exposed clips or fasteners.
- c. Main runners and cross tees: Shall conform to the requirements of a system wide, duty classification in accordance with ASTM C635. They shall be a roll-formed double web with rectangular bulb, using A40 galvaneal steel, minimum .018” thick, to an overall height of 1½” with a flange width of 15/16”. The structural member will incorporate double lateral rotary stitching to provide a more homogeneous component exhibiting increased columnar and torsional strength. The cross tee shall provide a positive mechanical lock into the main runners and locking splice. When assembled, the system shall carry performance characteristics in keeping with those necessary to achieve a Zone 4 seismic rating.
- d. Hangers: The main runners shall be supported from the structural ceiling by 12 gauge galvanized, pre-stretched, soft annealed, steel wire hung at points not exceeding 48” on center.
- e. Compression Struts: Shall be composed of telescoping ½” diameter and ¾” diameter steel tubing. The ¾” diameter tube shall extend down to rest on the bulb of the main runner. At the other end, a length of ½” diameter tube is to be telescoped into the top portion of the ¾” diameter tube and screw fastened to it with two (2) No.10 x 1 ¼” screws so the top of the 1/2” diameter tube bears on the structure above and the bottom of the ¾” diameter tube fits snugly upon the bulb of the main runner. A compression strut is required at each hanger wire at a maximum of 48” on center.
- f. Wall Perimeter channels: Exposed wall perimeter channel shall be of the same material and have the same finish as the suspension system runners. The perimeter channel shall also be roll-formed into a “C” profile to accommodate a 20 gauge hold-down clip, thereby providing a concealed fastener system. Each hold-down clip shall be locked onto perimeter channel with two spring clips.
- g. Fasteners: Any exposed fasteners shall be a minimum No.10 size, pin Torx®, tamper-proof security screws. Fasteners for securing the wall moldings to the wall shall be furnished by the ceiling manufacturer.

- h. Acoustical material: The inside surface of all perforated ceiling pans shall be covered with a Class “A” poly-encapsulated fiberglass insulation of sufficient thickness and density to provide the acoustical requirements as outlined in Section 1.05 of this specification.
  - i. Lights, HVAC: All light and air units are to be sized to fit into and trim off full module openings and shall be independently supported from above by the trade requiring the opening.
  - j. Finish: All components of the panel and suspension system visible from the floor side shall have a factory applied finish. Prior to painting, all surfaces shall be cleaned of rust, oil and other impurities by receiving a multi stage pre-treatment consisting of degrease and phosphate coating, clear water rinse and non-chromate sealer and rinse, to condition the surface of the metal to resist and inhibit corrosion and promote paint adhesion. Finish to be applied after perforation to insure coating of the perforated holes. Panels shall be coated with DuPont TGIC Polyester or equal, white powder coat, applied at a minimum of 2 mils thickness (dry). The main runners, cross tees, and wall perimeter channels shall be coated with epoxy white powder matching the ceiling panels
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- 2. Single Skin inter-locking plank ceiling system – Security Grades 3 and 4
    - a. Ceiling planks: Shall be 24 in. wide and supplied in manufacturer’s standard lengths of 8 ft., 10 ft., and 12 ft. All ceiling planks shall have factory formed inter-locking edges and shall be perforated with 0.125 in. diameter holes, staggered .218 in. on center for a 29% open area.
    - b. Wall perimeter angles: Shall be formed angles 0.094 in. minimum thickness and punched 16 in. on center for 3/8 in. expansion anchors. Panels shall be secured to the wall angles using 12 ga. concealed angle clips.
    - c. Interim Tee supports: Tee supports shall be two wall mounting angles bolted back-to-back using 3/8 – 16 bolts, 24 in. on center.
      - i. Suspension for Tee supports shall be 3/8 in. galvanized threaded rod, bolted to the above structure and the Tee support, 36 in. on center.
    - d. Fasteners: Any exposed fasteners shall be a minimum No.10 size, pin Torx®, tamper-proof security screws or blind rivets. Wall anchor bolts shall be 3/8 in diameter (Rawl 5015 or equivalent) and shall be placed 16 in. on center. Anchors for securing the wall moldings to the wall shall be furnished by the ceiling manufacturer.

- e. Acoustical material: The inside surface of all perforated ceiling pans shall be covered with a Class “A” poly-encapsulated fiberglass insulation of sufficient thickness and density to provide the acoustical requirements as outlined in Section 1.05 of this specification.
  - f. Lights, HVAC: All light and air units are to be sized to fit into and trim off to full panel width openings and shall be independently supported from above by the trade requiring the opening.
  - g. Finish: All components of the panel and suspension system visible from the floor side shall have a factory applied finish. Prior to painting, all surfaces shall be cleaned of rust, oil and other impurities by receiving a multi-stage pre-treatment consisting of degrease and phosphate coating, clear water rinse and non-chromate sealer and rinse, to condition the surface of the metal to resist and inhibit corrosion and promote paint adhesion. Finish to be applied after perforation to insure coating of the perforated holes. Panels and components shall be coated with DuPont TGIC Polyester or equal, white powder coat, applied at a minimum of 2 mils thickness (dry).
3. Double skin ship-lap joint plank ceiling system – Security Grades 4 and 5
- a. Ceiling panels: Shall be 24 in. wide and supplied in manufacturer’s standard lengths of 6 ft, 8 ft. or 10 ft. All ceiling planks shall have factory formed ship-lap edges and shall be perforated with 0.125 in. diameter holes, staggered .218 in. on center for a 29% open area.
  - b. Panel core construction: Panels shall be stiffened using one of the follow core systems.
    - i. Continuous steel truss design core material, .015 in. minimum, having truncated triangular sections extending continuously from one panel face to the other, spot welded to each face sheet 2.75 in. on center horizontally and 3 in. on center vertically. Core material shall extend full height and width of panel.
    - ii. Rolled or formed 1/8 in. steel channels extending full length of panel and continuous from one face to the other, spaced not more than 4 in. on center and spot welded to panel faces not more than 3 in. on center vertically.

- iii. Continuous vertical hat sections, one such hat section welded to each face of the panel, .053 in., with vertical webs no more than 4 in. apart. Hat sections shall be welded to each other at least 6 in. on center on both sides in order to prevent separation.
  - iv. Spaces between stiffeners shall be filled with fiberglass or mineral rock wool batt-type material.
- c. Start and ending panels: shall be 0.093 in. minimum thickness, single skinned non-perforated material and shall be cut to size in the field by the installing contractor.
- d. Wall perimeter angles: Shall be formed angles 0.123 in. minimum thickness and punched 16 in. on center for 3/8 in. expansion anchors. Panels shall be welded to the wall angles 1 in. weld 12 in. on center.
- e. Interim Tee supports: Tee supports shall be two wall mounting angles bolted back-to-back using 3/8" – 16 bolts, 24 in. on center.
  - i. Suspension for Tee supports shall be 3/8 in galvanized threaded rod, bolted to the above structure and the Tee support, 36 in (914 mm) on center.
- f. Fasteners: Any exposed fasteners shall be a minimum No.10 size, pin Torx®, tamper-proof security screws or blind rivets. Wall anchor bolts shall be 3/8 in. diameter (Rawl 5015 or equivalent) and shall be placed 16 in. on center. Anchors for securing the wall moldings to the wall shall be furnished by the ceiling manufacturer.
- g. Acoustical material: The inside surface of all perforated ceiling pans shall be covered with a Class "A" poly-encapsulated fiberglass insulation of sufficient thickness and density to provide the acoustical requirements as outlined in Section 1.05 of this specification.
- h. Lights, HVAC: All light and air units are to be sized to fit into and trim off to full panel width openings and shall be independently supported from above by the trade requiring the opening.

- i. Finish: All components of the panel and suspension system visible from the floor side shall have a factory applied finish. Prior to painting, all surfaces shall be cleaned of rust, oil and other impurities by receiving a multi stage pre-treatment consisting of degrease and phosphate coating, clear water rinse and non-chromate sealer and rinse, to condition the surface of the metal to resist and inhibit corrosion and promote paint adhesion. Finish to be applied after perforation to ensure coating of the perforated holes. Panels shall be coated with Clay 2K High Solids Urethane primer by Four Seasons Paint (a division of Diamond Vogel Paints), applied at 1.5 mils + or - ½ mil thickness (dry).

## **PART 3 - EXECUTION**

### **3.01 DELIVERY, STORAGE AND HANDLING**

- A. Protect panels from damage during transit to job storage.
- B. Inspect panels upon delivery for damage. Minor damage may be repaired provided finish items are equal in respect to new work and acceptable to Architect/Engineer. Otherwise, remove and replace with new material.

### **3.02 INSTALLATION**

- A. General
  1. Install ceiling system using the approved submittal drawings and contract documents. Install using the manufacturer's installation instructions.
  2. Accurately locate partitions, holes, cut outs and verify locations with other trades.
  3. Set closures and steel supports with anchors to suit condition.
  4. Erect true and level with close fitting tolerances.
  5. Bearing at ends shall be a minimum of 1 in.
- B. Welding – Security Grades 5 and 6
  1. Execute welding in accordance with the American Welding Society's "Structural Welding Code AWS D1.3". Arc welding shall be used in fabrication and erection work where practical.
  2. Welders and tackers shall be qualified by the American Welding Society's testing procedure.

3. Surfaces to be welded shall be cleaned of loose scale, rust, oil, grease, paint and other foreign matter.
4. Welds shall be neat, have a clean appearance and be deep penetration. Joints shall be tight and true.
5. Welds shall be uniform section and smoothness without overlaps and a minimum of craters, porosity and clinkers.
6. Projecting burrs, edges or rough spots shall be removed by grinding. Plug welds shall be ground smooth where exposed to view.
7. Visual inspection of edges, end fillets and butt joints shall show good fusion width and penetration into base metals.
8. Take precautions to minimize stress and distortions due to heat.
9. Repairing of defective welds by adding new material over the defects is not permitted.

#### C. Fastenings

1. Fasten supporting members to each other and to building construction as detailed or as otherwise required to provide a secure, permanent installation.
2. Where fastening spacings and sizes are not shown, use spacings and sizings of bolts, screws and welds which will develop the full strength of the members before failure occurs in the fastenings.

#### D. Touch-up Painting

1. Immediately after installation, areas where prime or finish coat has been damaged and where welding has occurred shall be sanded smooth and touched up with same primer or finish touch up paint as applied by the manufacturer.
2. Remove rust before touch up primer is applied.

### **3.03 FIELD QUALITY CONTROL**

- A. Hold a meeting with other trades to review installation procedures and workmanship with a special emphasis on unusual conditions to ensure correct installation procedures.
- B. Security panel system shall be installed in place under the supervision of a qualified supervisor, trained and furnished by installer.

**END OF SECTION**

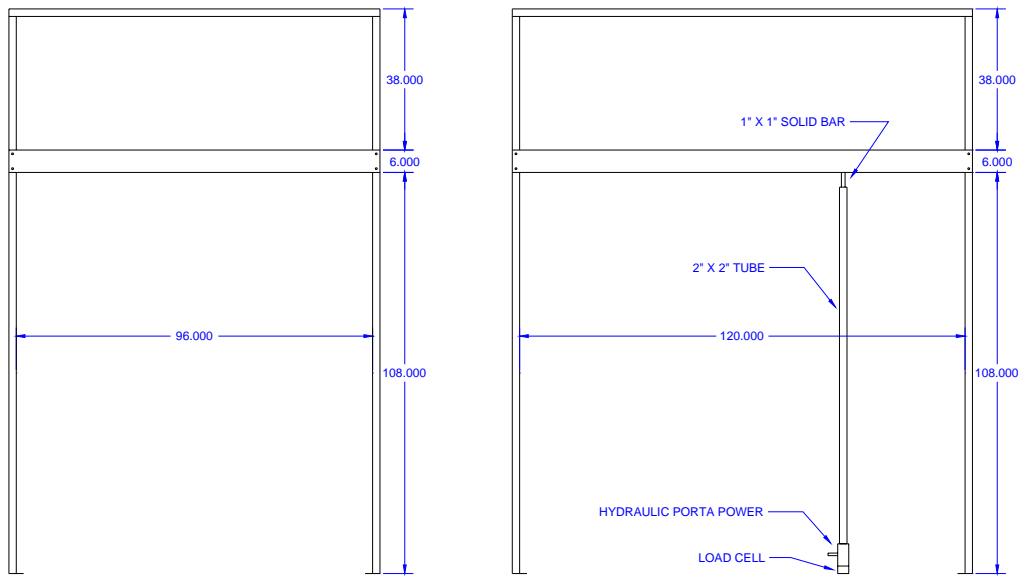


FIGURE 1  
Test Assembly Elevation

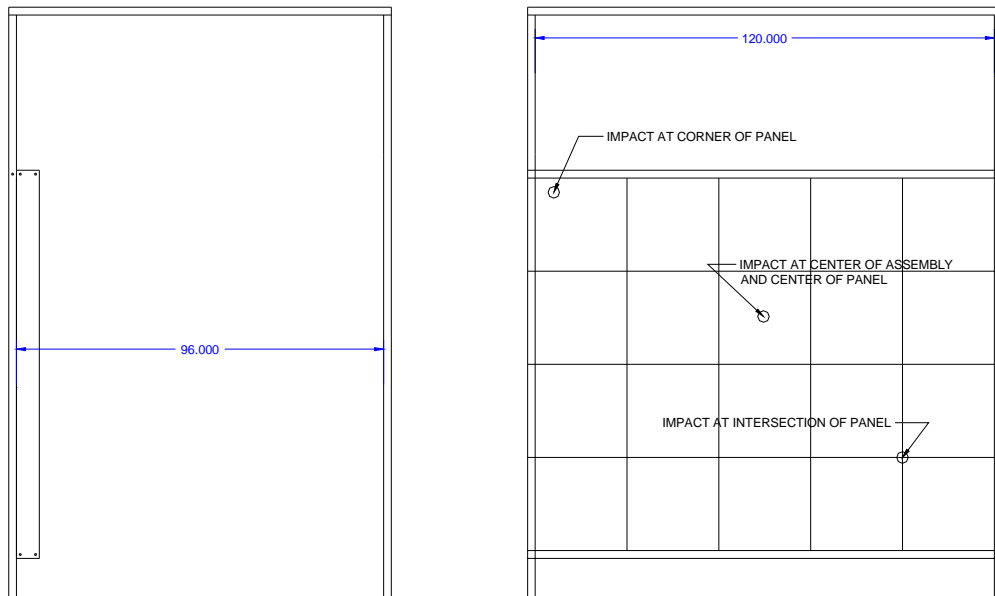


FIGURE 2  
Test Assembly Impact Points