SECTION 05515

ALUMINUM LADDERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fixed aluminum access ladders.

B. Caged aluminum access ladders.

C. Inclined aluminum access ladders.

1.2 RELATED SECTIONS

A. Section 06100 - Rough Carpentry: Blocking in stud walls and partitions for anchorage of access ladders.

B. Section 07725 - Roof Hatches: Manufactured roof hatch to be accessed by aluminum ladders.

1.3 REFERENCES

A. ANSI A14.3 - Ladders, Fixed, Safety Requirements.

B. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

C. ASTM B211 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.

D. ISO 9001:2000 - Quality Management Systems - Requirements.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be installed, including model number, material, and finish.

C. Shop Drawings: Manufacturer's shop drawings indicating elevations, dimensions, connections, and size and type of fasteners.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with ANSI A14.3.

B. Manufacturer Qualifications: Provide products from a company which is ISO 9001 Registered.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging until ready for installation. Handle in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Acceptable Manufacturer: ACL Industries, Inc.;179 Elm Street, Manchester, NH 03101. ASD. Tel: (603) 668-1276. Fax: (603) 668-9787. Email: shawn@aclindustries.com www.aclindustries.com

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600. Substitutions will only be considered from companies which are ISO 9001 Registered.

2.2 FIXED ALUMINUM ACCESS LADDERS

A. Light Duty, Hatch Access Ladder:
   1. Model Number: ACL-100 by ACL Industries.
   2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
   3. Aluminum Finish: Mill finish.
   4. Nominal Height: As indicated on the Drawings.
   5. Side Rails: 1-3/4 inches (45 mm) wide by 1-1/4 (32 mm) inches deep channels with 0.140 inch (3.5 mm) wall thickness.
   6. Rungs: 1.03 inches (26 mm) wide by 1.442 inches (36 mm) deep channels with 0.080 inch (2 mm) wall thickness with serrated surfaces and capable of 1,000 pound (455 kg) load. Space 12 inches (310 mm) on center. Attach rungs in centerline of side rails by welding.
   7. Rung Length: 18 inches (457 mm).
   8. Rung Length: 24 inches (610 mm).

B. Heavy Duty, Hatch Access Ladder:
   1. Model Number: ACL-200 by ACL Industries.
   2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
   3. Aluminum Finish: Mill finish.
   4. Nominal Height: As indicated on the Drawings.
   5. Side Rails: 1-3/4 inches (45 mm) wide by 3 inch (76 mm) tubes with 1/8 inch (3 mm) wall thickness.
   6. Rungs: 1-1/4 inches (32 mm) wide by 1-1/4 inches (32 mm) tube with serrated surfaces and capable of 1,000 pound (455 kg) load. Space 12 inches (310 mm) on center. Attach rungs in centerline of side rails by welding.
   7. Rung Length: 18 inches (457 mm).
   8. Rung Length: 24 inches (610 mm).

C. Heavy Duty, Roof Over Rail Extension Ladder:
   1. Model Number: ACL-201 by ACL Industries.
   2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
   3. Aluminum Finish: Mill finish.
   4. Nominal Height: As indicated on the Drawings.

5. Side Rails: 1-3/4 inches (45 mm) wide by 3 inch (76 mm) tubes with 1/8 inch (3 mm) wall thickness.
6. Rail Extension Above Roof Line 42 inches (1065 mm).
7. Rail Extension Above Parapet: 42 inches (1065 mm).
8. Extension: At top of side rails provide 19 inch (480 mm) extension, 28 inches (710 mm) high, constructed from 1-1/4 inch (32 mm) square tube grab bars with corrugated surfaces.
9. Rungs: 1-1/4 inches (32 mm) wide by 1-1/4 inches (32 mm) tube with serrated surfaces and capable of 1,000 pound (455 kg) load. Space 12 inches (310 mm) on center. Attach rungs in centerline of side rails by welding.
10. Rung Length: 18 inches (457 mm).
11. Rung Length: 24 inches (610 mm).

D. Heavy Duty, Return to Rear of Parapet Ladder:
1. Model Number: ACL-202 by ACL Industries.
2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
3. Aluminum Finish: Mill finish.
4. Nominal Height: As indicated on the Drawings.
5. Cross Over Span: As determined by width of parapet wall and as indicated on the Drawings.
6. Side Rails: 1-3/4 inches (45 mm) wide by 3 inch (76 mm) tubes with 1/8 inch (3 mm) wall thickness. Extend rails 42 inches (1065 mm) above parapet. Provide rails on opposite side mounted to rear of parapet and extending 42 inches (1065 mm) above parapet and below parapet to roof line.
7. Grab Bars: Connect front and rear side rails with 4 pairs of 1-1/4 inch (32 mm) square tube grab bars with corrugated surfaces.
8. Rungs: 1-1/4 inches (32 mm) wide by 1-1/4 (32 mm) inches tube with serrated surfaces and capable of 1,000 pound (455 kg) load. Space 12 inches (310 mm) on center. Attach rungs in centerline of side rails by welding.
9. Rung Length: 18 inches (457 mm).
10. Rung Length: 24 inches (610 mm).

E. Heavy Duty, With Platform and Return to Rear of Parapet Ladder:
1. Model Number: ACL-203 by ACL Industries.
2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
3. Aluminum Finish: Mill finish.
4. Nominal Height: As indicated on the Drawings.
5. Cross Over Span: As determined by width of parapet wall and as indicated on the Drawings.
6. Side Rails: 1-3/4 inches (45 mm) wide by 3 inch (76 mm) tubes with 1/8 inch (3 mm) wall thickness. Extend rails 42 inches (1065 mm) above parapet. Provide rails on opposite side mounted to rear of parapet and extending 42 inches (1065 mm) above parapet and below parapet to roof line.
7. Grab Bars: Connect front and rear side rails with 4 pairs of 1-1/4 inch (32 mm) square tube grab bars with corrugated surfaces.
8. Platform: Provide cross over platform fabricated from 6 inches (152 mm) wide by 1-3/4 inches (45 mm) deep aluminum treads with corrugated surface.
9. Rungs: 1-1/4 inches (32 mm) wide by 1-1/4 inches (32 mm) tube with serrated surfaces and capable of 1,000 pound (455 kg) load. Space 12 inches (310 mm) on center. Attach rungs in centerline of side rails by welding.
10. Rung Length: 18 inches (457 mm).
11. Rung Length: 24 inches (610 mm).

F. Accessories:

1. Wall Brackets: 2 inch (50 mm) by 1/4 inch (6 mm) minimum flat bar aluminum wall brackets.
2. Floor Brackets: Anchor side rails to floor with 2 by 1/4 inch (50 by 6 mm) minimum flat bar aluminum floor brackets. Allow 7 inches (180 mm) minimum clearance from wall to center line of rungs.
3. Security Door: Hinged security door to cover bottom rungs and prevent unauthorized roof access. Fabricate from 11 gage flat aluminum sheet covering front of ladder. Provide side flanges extending toward wall and meeting aluminum flange mounted to wall. Equip door with continuous hinge and padlock hasp.
4. Safety Post Extension:. Post extension for fixed ladders constructed of tubular aluminum sections with adjustable mounting brackets for attachment to top of ladder. Permanently mount operating instructions on safety post to be plainly visible to ladder users.

2.3 CAGED ALUMINUM ACCESS LADDERS

A. Vertical Caged Roof Hatch Rail Extension Ladder:
1. Model Number: ACL-300 by ACL Industries.
2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
3. Aluminum Finish: Mill finish.
4. Nominal Height: As indicated on the Drawings.
5. Side Rails: 1-3/4 inches (45 mm) wide by 3 inch (76 mm) tubes with 1/8 inch (3 mm) wall thickness.
6. Rungs: 1-1/4 inches (32 mm) wide by 1-1/4 inches (32 mm) tube with serrated surfaces and capable of 1,000 pound (455 kg) load. Space 12 inches (310 mm) on center. Attach rungs in centerline of side rails by welding.
7. Rung Length: 18 inches (457 mm).
8. Rung Length: 24 inches (610 mm).

B. Vertical Caged Roof Over Rail Extension Ladder:
1. Model Number: ACL-301 by ACL Industries.
2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
3. Aluminum Finish: Mill finish.
4. Nominal Height: As indicated on the Drawings.
5. Side Rails: 1-3/4 inches (45 mm) wide by 3 inch (76 mm) tubes with 1/8 inch (3 mm) wall thickness.
6. Rail Extension Above Roof Line 42 inches (1065 mm).
7. Rail Extension Above Parapet: 42 inches (1065 mm).
8. Extension: At top of side rails provide 19 inch (483 mm) extension, 28 inches (710 mm) high, constructed from 1-1/4 inch (32 mm) square tube grab bars with corrugated surfaces.
9. Rungs: 1-1/4 inches (32 mm) wide by 1-1/4 (32 mm) inches tube with serrated surfaces and capable of 1,000 pound (455 kg) load. Space 12 inches (310 mm) on center. Attach rungs in centerline of side rails by welding.
10. Rung Length: 18 inches (457 mm).
11. Rung Length: 24 inches (610 mm).

C. Vertical Caged Return to Rear of Parapet Ladder:
1. Model Number: ACL-302 by ACL Industries.
2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
3. Aluminum Finish: Mill finish.
4. Nominal Height: As indicated on the Drawings.

5. Cross Over Span: As determined by width of parapet wall and as indicated on the Drawings.
6. Side Rails: 1-3/4 inches (45 mm) wide by 3 inch (76 mm) tubes with 1/8 inch (3 mm) wall thickness. Extend rails 42 inches (1065 mm) above parapet. Provide rails on opposite side mounted to rear of parapet and extending 42 inches (1065 mm) above parapet and below parapet to roof line.
7. Grab Bars: Connect front and rear side rails with 4 pairs of 1-1/4 inch (32 mm) square tube grab bars with corrugated surfaces.
8. Rungs: 1-1/4 inches (32 mm) square tube with serrated surfaces and capable of 1,000 pound (455 kg) load. Space 12 inches (310 mm) on center. Attach rungs in centerline of side rails by welding.
9. Rung Length: 18 inches (457 mm).
10. Rung Length: 24 inches (610 mm).

D. Vertical Caged Ladder With Platform and Return to Rear of Parapet:
1. Model Number: ACL-303 by ACL Industries.
2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
3. Aluminum Finish: Mill finish.
4. Nominal Height: As indicated on the Drawings.
5. Cross Over Span: As determined by width of parapet wall and as indicated on the Drawings.
6. Side Rails: 1-3/4 inches (45 mm) wide by 3 inch (76 mm) tubes with 1/8 inch (3 mm) wall thickness. Extend rails 42 inches (1065 mm) above parapet. Provide rails on opposite side mounted to rear of parapet and extending 42 inches (1065 mm) above parapet and below parapet to roof line.
7. Grab Bars: Connect front and rear side rails with 4 pairs of 1-1/4 inch (32 mm) square tube grab bars with corrugated surfaces.
8. Platform: Provide cross over platform fabricated from 6 inches (152 mm) wide by 1-3/4 inches (45 mm) deep aluminum treads with corrugated surface.
9. Rungs: 1-1/4 inches (32 mm) square tube with serrated surfaces and capable of 1,000 pound (455 kg) load. Space 12 inches (310 mm) on center. Attach rungs in centerline of side rails by welding.
10. Rung Length: 18 inches (457 mm).
11. Rung Length: 24 inches (610 mm).

E. Vertical Caged Ladder With Intermediate Platforms and Roof Over Rail:
1. Model Number: ACL-390 by ACL Industries.
2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
3. Aluminum Finish: Mill finish.
4. Nominal Height: As indicated on the Drawings.
5. Configuration: Configure ladder with multiple caged vertical ladder segments offset from each other and connected with intermediate platform with guardrail as indicated on the Drawings.
   a. Lower Segment: _____ feet.
   b. Upper Segment: _____ feet.
6. Side Rails: 1-3/4 inches (45 mm) wide by 3 inch (76 mm) tubes with 1/8 inch (3 mm) wall thickness.
7. Rail Extension Above Roof Line 42 inches (1065 mm).
8. Rail Extension Above Parapet: 42 inches (1065 mm).
9. Extension: At top of upper segment side rails provide 19 inch (483 mm) extension, 28 inches (710 mm) high. Fabricate from 1-1/4 inch (32 mm) square tube grab bars with corrugated surfaces.

10. Rungs: 1-1/4 inches (32 mm) square tube with corrugated surfaces and capable of 1,000 pound (455 kg) load. Space 12 inches (310 mm) on center. Attach rungs in centerline of side rails by welding.
11. Rung Length: 18 inches (457 mm).
12. Rung Length: 24 inches (610 mm).
13. Intermediate Platform: Provide intermediate cross over platform fabricated from 6 inches (152 mm) wide by 1-3/4 (5 mm) inches deep aluminum treads with corrugated surface.
14. Guardrail: At intermediate platform provide guardrail fabricated from 1-1/4 inch (32 mm) square tube grab bars with corrugated surfaces. Guardrail shall be 42 inches (1065 mm) high and connect side rails of two ladder segments as detailed on the Drawings and approved shop drawings.

F. Safety Cage:
1. Equip ladders with safety cages as details on the Drawings and approved shop Drawings. Fabricate from 2 inches (50 mm) wide by 1/4 inch (6 mm) thick aluminum vertical strips and horizontal loops welded for form a cage around the ladder.
   a. Bottom Loop Radius: 17-1/2 inches (445 mm).
   b. Radius of Other Loops: 13-1/2 inches (343 mm).
   c. Vertical Strips: 7 vertical strips equally spaced around perimeter of cage.
   d. Horizontal Loops: 48 inches (1220 mm) maximum spacing.
2. Minimum clearance from ladder to back of cage shall be 27 inches (686 mm).
3. Start of Cage:
   a. Cage Start Above Grade: 7 feet (2135 mm).
   b. Cage Start Above Grade: 8 feet (2440 mm).
   c. Cage Start Above Intermediate Platform: 7 feet (2135 mm).
   d. Cage Start Above Intermediate Platform: 8 feet (2440 mm).
   e. Cage Start Above Roof Level: 7 feet (2135 mm).
   f. Cage Start Above Roof Level: 8 feet (2440 mm).
4. Extend safety cage 42 inches (1065 mm) minimum above top rung and attach to side rails as detailed on the Drawings and approved shop drawings.

G. Accessories:
1. Wall Brackets: 2 inch (50 mm) by 1/4 inch (6 mm) minimum flat bar aluminum wall brackets.
2. Security Door: Hinged security door to cover bottom rungs and prevent unauthorized roof access. Fabricate from 11 gage flat aluminum sheet covering front of ladder. Provide side flanges extending toward wall and meeting aluminum flange mounted to wall. Equip door with continuous hinge and padlock hasp.
3. Safety Post Extension:. Post extension for fixed ladders constructed of tubular aluminum sections with adjustable mounting brackets for attachment to top of ladder. Permanently mount operating instructions on safety post to be plainly visible to ladder users.

2.4 INCLINED ALUMINUM ACCESS LADDERS

A. Ship Ladder with Handrail:
1. Model Number: ACL-501 by ACL Industries.
2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
3. Aluminum Finish: Mill finish.
4. Accommodation Height: As indicated on the Drawings.
5. Accommodation Height: _____ feet (_____ mm).
6. Angle of Inclination: As indicated on the Drawings.
7. Angle of Inclination: 75 degrees.

8. Treads: 6 inches wide by 1-3/4 inches (45 mm) deep by 24 inches (610 mm) long aluminum channel shaped section. Equally space treads. Connect treads to stringers with bolts to allow for future replacement.
9. Tread Surface: Corrugated.
10. Tread Surface: Abrasive filled.
11. Stringers: 6 inches (152 mm) by 2 inches (50 mm) aluminum channel.
12. Handrail: 1-1/4 inches (32 mm) diameter aluminum pipe.
    a. Form returns with 6 inch (152 mm) radius.
    b. Attach rail to stringer with pipe sections spaced at approximately 30 inches (760 mm) on center such that rail projects approximately 6 inches (152 mm) above stringer.
    c. Locate bottom of handrail 36 inches (915 mm) above finished floor.
    d. Extend rail above ladder such that top of rail is 42 inches (1065 mm) above roof level.

B. Ship Ladder with Roof Access Hatch:
1. Model Number: ACL-502 by ACL Industries.
2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
3. Aluminum Finish: Mill finish.
4. Accommodation Height: As indicated on the Drawings.
5. Accommodation Height: _____ feet (_____ mm).
6. Angle of Inclination: As indicated on the Drawings.
7. Angle of Inclination: 75 degrees.
8. Treads: 6 inches (152 mm) wide by 1-3/4 inches (45 mm) deep by 24 inches (610 mm) long aluminum channel shaped section. Equally space treads. Connect treads to stringers with bolts to allow for future replacement.
9. Tread Surface: Corrugated.
10. Tread Surface: Abrasive filled.
11. Stringers: 6 inches (152 mm) by 2 inches (50 mm) aluminum channel.
12. Handrail: 1-1/4 inches (32 mm) diameter aluminum pipe.
    a. Form returns with 6 inch (152 mm) radius.
    b. Attach rail to stringer with pipe sections spaced at approximately 30 inches (610 mm) on center such that rail projects approximately 6 inches (152 mm) above stringer.
    c. Locate bottom of handrail 36 inches (915 mm) above finished floor.
    d. Extend rail above ladder such that top of rail is 36 inches (915 mm) above roof level.

C. Ship Ladder with Cross Over Access:
1. Model Number: ACL-503 by ACL Industries.
2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
3. Aluminum Finish: Mill finish.
4. Accommodation Height: As indicated on the Drawings.
5. Accommodation Height: _____ feet (_____ mm).
6. Angle of Inclination: As indicated on the Drawings.
7. Angle of Inclination: 75 degrees.
8. Treads: 6 inches (152 mm) wide by 1-3/4 inches (45 mm) deep by 24 inches (610 mm) long aluminum channel shaped section with corrugated surface. Equally space treads. Connect treads to stringers with bolts to allow for future replacement.
9. Configuration: Two opposing inclined ladders connected by cross over platform as shown on the Drawings and approved shop drawings.
    a. Distance Between Base of Opposing Ladders: As indicated on the Drawings.
    b. Distance Between Base of Opposing Ladders: _____ feet (_____ mm).
    c. Cross Over Span: As indicated on the Drawings.

d. Cross Over Span: _____ inches (_____ mm).

10. Stringers: 6 inches (152 mm) by 2 inches (50 mm) aluminum channel. Top of opposing stringers shall be connected with 6 inch (152 mm) by 2 inch (50 mm) channel which forms support for platform.
11. Platform: Cross over platform at top of ship ladder fabricated from 6 inch (152 mm) wide by 1 inch (25 mm) deep aluminum treads with corrugated surfaces.
12. Handrail and Guardrail: 1-1/4 (32 mm) inches diameter aluminum pipe.
    a. Form returns with 6 inch (152 mm) radius.
    b. Provide 42 inch (1065 mm) high guardrail on either side of cross over platform.
    c. Attach rail to stringer with pipe sections spaced at approximately 30 inches (760 mm) on center such that rail projects approximately 6 inches (152 mm) above stringer.
    d. Locate bottom of handrail 36 inches (915 mm) above finished floor.
    e. Extend rail above ladder such that rail intersects and joints top of guardrail.

D. Ship Ladder with Platform:
1. Model Number: ACL-504 by ACL Industries.
2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
3. Aluminum Finish: Mill finish.
4. Accommodation Height: As indicated on the Drawings.
5. Accommodation Height: _____ feet (_____ mm).
6. Angle of Inclination: As indicated on the Drawings.
7. Angle of Inclination: 75 degrees.
8. Treads: 6 inches (152 mm) wide by 1-3/4 inches (45 mm) deep by 24 inches (610 mm) long aluminum channel shaped section with corrugated tread surface. Equally space treads. Connect treads to stringers with bolts to allow for future replacement.
9. Stringers: 6 inches (152 mm) by 2 inches (50 mm) aluminum channel. Top of stringers shall return horizontally to wall and form support for platform.
10. Platform: Provide 24 inch (610 mm) wide platform at top of ship ladder fabricated from 6 inch wide by 2 inch (50 mm) deep aluminum treads with corrugated surface.
    a. Platform Length: As indicated on the Drawings.
    b. Platform Length: _____ feet (_____ mm).
11. Handrail and Guardrail: 1-1/4 inches (32 mm) diameter aluminum pipe.
    a. Form returns with 6 inch (152 mm) radius.
    b. Provide 42 inch (1065 mm) high guardrail on either side of cross over platform.
    c. Attach rail to stringer with pipe sections spaced at approximately 30 inches (760 mm) on center such that rail projects approximately 6 inches (152 mm) above stringer.
    d. Locate bottom of handrail 36 inches (915 mm) above finished floor.
    e. Extend rail above ladder such that rail intersects and joints top of guardrail.

E. Folding Mezzanine-Access Ship Ladder:
1. Model Number: ACL-505 by ACL Industries.
2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
3. Aluminum Finish: Mill finish.
4. Accommodation Height: As indicated on the Drawings.
5. Accommodation Height: _____ feet (_____ mm).
6. Angle of Inclination: As indicated on the Drawings.
7. Angle of Inclination: 75 degrees.
8. Treads: 1-1/4 inch (32 mm) square tubes by 24 inches (610 mm) long with corrugated surfaces. Equally space treads. Attach treads to stringers by welding.
9. Operation: Folding ladder shall store against wall with stringers in vertical position. Top of ladder shall pivot with sliding hinge assembly with pin to use inclined position

10. Stringers: 3 inches by 1 inch (76 mm by 25 mm) aluminum channel. Equip bottom of stringer with non-skid rubber foot. Top of stringers shall be supported by wall bracket fabricated from 3 inches by 1/4 inch (76 mm by 6 mm) thick aluminum plate.
11. Handrail and Guardrail: 1-1/4 (32 mm) inches diameter aluminum pipe.
    a. Form returns with 6 inch (152 mm) radius.
    b. Attach rail to stringer such that rail projects approximately 6 inches (152 mm) above stringer.
    c. Locate bottom of handrail 36 inches (915 mm) above finished floor.
    d. Extend rail above ladder to form guardrail extending 42 inches (1065 mm) above top tread.

F. Counterbalanced Swing Down Ship Ladder:
1. Model Number: ACL-507 by ACL Industries.
2. Materials: ASTM B221, Alloy 6063, Temper T-6, non-spark extruded aluminum and ASTM B209, Alloy 6063 Temper T-6 sheet aluminum.
3. Aluminum Finish: Mill finish.
4. Accommodation Height: As indicated on the Drawings.
5. Accommodation Height: _____ feet (_____ mm).
6. Angle of Inclination: As indicated on the Drawings.
7. Angle of Inclination: 75 degrees.
8. Operation: Swing down ladder attached to upper structure with pivoting counterbalanced mechanism. Ladder shall store horizontally and be placed in inclined access position with pull rope.
9. Stringers: 6 inches by 2 inches (152 mm by 50 mm) aluminum channel. Attach lead counterweights to top sides of stringers. Design ladder such that stingers project above upper floor level when ladder is inclined position. Equip stringer extensions with safety chain guards.
10. Handrail and Guardrail: 1-1/4 inches (32 mm) diameter aluminum pipe.
    a. Form returns with 6 inch (152 mm) radius.
    b. Attach rail to stringer such that rail projects 36 inches (915 mm) above treads when ladder is in inclined position.
11. Operating Mechanism: Pivoting hinged counterbalanced mechanism attached to support structure with brackets.

G. Accessories:

1. Support Brackets: Top wall brackets and bottom floor brackets fabricated from 2 inch (50 mm) by 1/4 inch (6 mm) minimum flat bar aluminum.

PART 3 EXECUTION

3.1 PREPARATION

A. Do not begin installation until substrates have been properly prepared. Notify Architect of unsatisfactory conditions before commencing work.

B. Field verify required dimensions. Coordinate with supporting construction to ensure adequate blocking and support.

C. Coordinate with requirements of roof hatch to ensure height and position of ladder is compatible with roof hatch curb and required clearances.

D. Isolate dissimilar metals to prevent electrolysis with bituminous paint or non-absorptive isolation pad to prevent contact.

3.2 INSTALLATION

A. Install ladders and accessories in accordance with manufacturer's instructions and approved submittals.
   1. Securely anchor support brackets with fasteners of type and size recommended by manufacturer.
   2. Place brackets at top and bottom and at 48 inches (1219 mm) maximum intermediate points.
   3. Allow 7 inches (180 mm) minimum clearance from wall to center line of rungs.
   4. Inspect ladder to verify proper and secure installation.

B. Install security door assembly and adjust for smooth operation.

C. Install safety post extension by attaching to top 2 rungs of ladder, centered between side rails. Adjust post to extend 42 inches (1065 mm) above top rung when roof hatch is open and post is fully extended.

3.3 CLEANING

A. Clean ladders as recommended by manufacturer. Do not use abrasive agents, steel wool or chemicals.

END OF SECTION