

SECTION 14663WALL BRACKET ALUMINUM WORK STATION JIB CRANE

\*\*\*\*\* Gorbel, Inc. manufactures a broad range of material handling cranes including monorail, bridge, gantry, and jib cranes. Numerous work station and industrial models are provided.

This guide can be used to prepare a specification for incorporating wall bracket aluminum work station jib cranes into a competitively bid construction project.

The specification section is organized by placing information in three standard parts:

|                           |  |
|---------------------------|--|
| <u>PART 1 - GENERAL</u>   | Describes administrative and procedural requirements.  |
| <u>PART 2 - PRODUCTS</u>  | Describes materials, products, and accessories to be incorporated into the construction project. |
| <u>PART 3 - EXECUTION</u> | Describes how the products will be installed at the construction site.                           |

Throughout this product guide specification, references are made to other specification sections that might be contained in the project manual. These references are presented as examples and coordination reminders. For each project, these references will need to be revised to reflect actual sections being used.

The specifier will need to edit this product specification for a specific project to reflect the options and applications being used. The guide section has been written so that most editing can be accomplished by deleting unnecessary requirements and options. Options are indicated by [ ]. Notes to assist the specifier in selecting options and editing the specification guide are printed in bold and indicated with \*\*\*\*\*. For final editing, all brackets and notes will need to be deleted from the guide.

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PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes: Wall bracket, manually operated, work station, aluminum jib crane including hoist trolley.

**B. Related sections:**

**\*\*\*\*\* List other specification sections related to work of this section such as the following. \*\*\*\*\***

**\*\*\*\*\* Wall bracket aluminum work station jib cranes require a structurally adequate wall, column, or other vertical member for support. \*\*\*\*\***

1. Section [\_\_\_\_\_] - [\_\_\_\_\_] : Structural [wall] [column] [\_\_\_\_\_] designed to support crane and live loads.

**\*\*\*\*\* Hoist trolley to support and move lifting device along boom is provided as part of wall bracket aluminum work station jib crane. However, lifting devices are typically provided separately from cranes and specified in another section. As an option, Gorbel, Inc. can provide lifting device as a crane component. Contact Gorbel, Inc. for assistance in specifying lifting devices. \*\*\*\*\***

2. Section 14620 - Hoists: [Electric] [Air-powered] [Vacuum] [Manual] lifting device attached to hoist trolley.
3. Section 16100 - Wiring Methods: Electrical supply, conduit, wiring, and other electrical components for powering lifting device.

**1.2 REFERENCES**

**\*\*\*\* List by number and full title reference standards referred to in remainder of the specification section. Delete non-applicable references. \*\*\*\***

- A. American Institute of Steel Construction (AISC): Manual of Steel Construction, Part 5, Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts.
- B. American National Standards Institute (ANSI):
  1. ANSI B30.11 - Monorails and Underhung Cranes.
- C. American Society for Testing and Materials (ASTM) Publications:
  1. ASTM A36 - Carbon Structural Steel.
  2. ASTM A325 - Structural Bolts, Steel, Heat Treated, 120/150 ksi Minimum Tensile Strength.
  3. ASTM A490 - Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.
  4. ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.

D. American Welding Society (AWS):

1. AWS D1.1 - Structural Welding Code.

E. Occupational Safety and Health Administration (OSHA): OSHA Specification 1910.179 - Overhead and Gantry Cranes.

### 1.3 PERFORMANCE REQUIREMENTS

A. Crane shall consist of rotating aluminum beam boom covering a semi-circular area and suspended by brackets and tie rod from vertical support structure.

1. Rotation: 200 degrees.
2. Crane shall be designed for minimum effort manual rotation.
3. Boom shall not drift when at rest.
4. Maximum deflection at boom end: 1/150 span based on capacity plus 15 percent for hoist and trolley weight.
5. Trolley operating temperature: 5 to 200 degrees F.

**\*\*\*\*\* Edit the following to reflect project structural design requirements. \*\*\*\*\***

B. Crane shall be designed to withstand:

1. Crane and hoist dead load.
2. Live load capacity equal to net rated hook load: [150] [250] [500] [1000] [2000] pounds.
3. Inertia forces from crane and load movement.

**\*\*\*\*\* Typically cranes are designed for normal interior operation. Contact Gorbel, Inc. for assistance in specifying cranes requiring seismic and other additional loads or cranes operating in high humidity or corrosive environments. \*\*\*\*\***

### 1.4 SUBMITTALS

A. Provide in accordance with Section 01330 - Submittal Procedures:

1. Product data for crane and accessories. Describe capacities, performance, operation, and applied forces to foundation.
2. Shop drawings showing crane configuration, dimensions, and construction and

installation details.

3. Copy of warranty required by Paragraph 1.6 for review by Architect.
4. Manufacturer's installation instructions.
5. Manufacturer's operation and maintenance manual.

## **1.5 QUALITY ASSURANCE**

- A. Manufacturer: Company specializing in designing and manufacturing cranes with 25 years successful experience.
- B. Installer: Company experienced in assembly and installation of cranes with 5 years successful experience and acceptable to crane manufacturer.
- C. Crane shall be designed, fabricated, and installed in accordance with ANSI B30.11 and OSHA 1910.179.

**\*\*\*\*\* Standard impact factor for crane design is 25 percent. Contact Gorbel, Inc. if increased factor is required for high impact applications. \*\*\*\*\***

- D. Base crane structural design on live load capacity plus 15 percent for hoist and trolley weight and 25 [\_\_\_\_\_] percent for impact.
- E. Perform welding by certified operators in accordance with AWS D14.1.
- F. Bolted connections shall be in accordance with torque tightening procedures specified in AISC Manual, Part 5.
- G. Clearly label crane with rated load capacity. Place label at height and location easily read from floor level and loading position.

## **1.6 WARRANTY**

- A. Provide under provisions of Section 01780 - Closeout Submittals: 5 years warranty for crane to cover defects in materials and workmanship.

## **PART 2 - PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

- A. Gorbel, Inc., P.O. Box 593, Fishers, New York 14453-0593; 800-828-0086; www.gorbel.com.
- B. Requests to use equivalent products of other manufacturers shall be submitted in accordance with Section 01630 - Product Substitution Procedures.

## 2.2 WALL BRACKET ALUMINUM WORK STATION JIB CRANE

**\*\*\*\*\* Refer to Gorbel® pre-engineered crane tables in product literature for complete model number based on capacity and span. Cranes with other capacities and spans are available using programs at [www.gorbel.com](http://www.gorbel.com) or contacting Gorbel, Inc. Edit the following and complete model number to indicate specific crane and accessories to be specified. \*\*\*\*\***

- A. Type: Wall bracket supported, manually operated, work station jib crane with rotating aluminum boom with enclosed track, brackets, tie rod, hoist trolley, [rotation stops] [electrical cable] [air hose] [festoon gliders] [festoon trolleys] [vacuum hose trolleys] and other accessories; Model No. AL-100-GT-[\_\_ capacity in pounds \_\_]-[\_\_ span \_\_] as manufactured by Gorbel, Inc.
- B. Span: [4] [6] [8] [10] [12] [14] [16] [18] [20] feet.
- C. Construction: Fabricate from ASTM B221 extruded aluminum sections and ASTM A36 steel sections with finished ends and surfaces.
  - 1. Boom: Extruded aluminum enclosed track reinforced with extruded aluminum T-beam bolted to track.
  - 2. Track: Enclosed, box track designed for trolleys and festoon carriers to ride on lower inside flanges. Fabricate lower running flanges with 2 degrees taper to center trolley within track. Flat, non-centering tracks are not acceptable.
  - 3. Top pivot bracket: Steel fabrication designed to absorb tie rod pull force and equipped with pivot assembly to allow boom rotation. Bracket bolted to supporting structure and connected to tie rod suspending boom. Bracket consists of steel channel, pivoting clevis, and tie rod clevis.
  - 4. Beam bracket: Steel fabrication designed to connect tie rod to boom. Bracket consists of tie rod clevis and channel bolted to top flange of boom.
  - 5. Bottom bracket: Steel fabrication designed to absorb downward and compressive boom forces, allow boom rotation, and resist boom drift. Bracket consists channel bolted to supporting structure and rotating clevis with boom connector plates.
  - 6. Tie rod: Single, right-hand threaded at each end, ASTM A36 steel, 1 inch diameter rod.
- D. Hoist trolley: Rigid-body trolley designed to ride inside enclosed track and carry hoist and load. Articulating trolleys are not acceptable.
  - 1. Construction: Two-piece stamped steel body with two wheels each side and

tapered clevis positioning hoist hook at center of trolley so load weight is evenly distributed to all four trolley wheels. Provide removable clevis pin of type and size determined by manufacture for specified capacity. Trolleys with non-removable clevis pins are not acceptable.

2. Wheels: Four, removable, self-centering wheels with sealed lifetime lubricated bears and tapered 2 degrees to match track profile. Non removable or non-tapered wheels are not acceptable.
  3. Drop lugs: Provide on both sides of trolley to limit trolley dropping 1 inch maximum in event of wheel, axle, or load bar failure.
- E. End stops: Molded composite, resilient bumper installed in track at boom end to prevent hoist trolley and festoon carriers from rolling out of track. Bolt stops without energy absorbing bumper at not acceptable.

### 2.3 ACCESSORIES

**\*\*\*\*\* Several accessories are provided as options for wall bracket aluminum work station jib cranes. Select required options from the following. Contact Gorbel, Inc. or refer to product literature if other types of accessories are required. \*\*\*\*\***

**\*\*\*\*\* If electric or air-powdered lifting device is used, a length of cable or hose can be provided for attachment to boom. Include the following to specify hose or cable. \*\*\*\*\***

- A. Provide length of [[flat] [round] electrical cable] [[1/2] [3/8] inch diameter air hose] to supply lifting device and festoon along boom.

**\*\*\*\*\* Either festoon trolleys or gliders can be provided to support electrical cable, air hose, or vacuum hose on boom and allow festooning as hoist trolley travels. Electrical and air trolleys are equipped with U-bolt clamps. Vacuum trolleys have straps with velcro. Include the following paragraph to specify festoon trolleys. \*\*\*\*\***

- B. Festoon trolleys: Four-wheeled trolleys with pivoting saddle and [U-bolt clamp] [velcro strap] to support [electrical cable] [air hose] [vacuum hose] on boom and allowing festooning as hoist trolley travels.

**\*\*\*\*\* Include the following paragraph to specify festoon gliders. Electrical and air gliders are equipped with clamps. Vacuum gliders have straps with velcro. \*\*\*\***

- C. Festoon gliders: [\_\_material\_\_], T-shaped gliders with adjustable [clamp bar] [velcro strap] to support [electrical cable] [air hose] [vacuum hose] on boom and allowing festooning as hoist trolley travels.

**\*\*\*\*\* Festoon clamps are required for festooning electrical cable, air hose, or vacuum hose to prevent festoon trolleys and gliders exiting track. \*\*\*\*\***

- D. Festoon clamp: Steel clamp assembly attached to track to prevent festoon [trolleys] [gliders] exiting track.

**\*\*\*\*\* Include the following paragraph if rotation stops are required to limit boom rotation. \*\*\*\*\***

- E. Rotation stops: Provide steel plate stops for welding to top and bottom pivot brackets to limit boom rotation.

## 2.4 SHOP FINISHING

- A. Aluminum boom and track: Mill finished aluminum.

- B. Steel components:

1. Steam wash steel crane components with iron phosphate solution and apply yellow baked enamel finish.
2. Provide spray can of matching color, air-drying paint for field touch-up.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Coordinate provision of crane with:

**\*\*\*\*\* Reinforced concrete, steel or other type of supporting wall, column, or other vertical structure must be designed by architect/engineer to absorb outward, downward, and inward applied forces from crane; detailed on drawings; and specified in other sections. Pivot mounting assembly connections to supporting structure must also be designed by architect/engineer. \*\*\*\*\***

1. Design and construction of [reinforced concrete] [steel] [\_\_\_\_\_] [wall] [column] [\_\_\_\_\_] supporting wall cantilever jib crane as detailed on Drawings and specified in other sections. Ensure that accurate crane applied forces and bolt patterns are provided for structural support design.

**\*\*\*\*\* Include the following paragraph if electric lifting device is being used. \*\*\*\*\***

2. Provision of electrical supply, conduit, wiring, disconnect switch, and other electrical components for powering electrically operated lifting device.

**B. Prior to installation:**

1. Verify supporting [wall] [column] [\_\_\_\_\_]is ready to receive wall cantilever jib crane.
2. Verify type and location of power supply.
3. Inventory parts. Verify all required components are available and undamaged.

### **3.2 INSTALLATION**

- A. Install crane and accessories in accordance with manufacturer's instructions and shop drawings.
- B. Do not modify crane components in any manner without advance, written approval by crane manufacturer.
- C. Clearances for moving crane components:
  1. 3 inches minimum vertical clearance from any overhead obstruction.
  2. 2 inches minimum horizontal clearance from any lateral obstruction.
- D. Top pivot bracket: Determine position, drill bolt holes, and bolt bracket to support structure.
- E. Bottom pivot bracket: Determine position and temporary clamp to support structure. Align top and bottom brackets with plumb bob through pivot holes. Shim as required to ensure vertical alignment is plumb. Bolt bracket to support structure.
- F. Beam bracket: Bolt to boom top flange and attach tie rod to clevis.
- G. Lift boom into place and support on temporary structure.
- H. Attach boom to bottom bracket. Then attach tie rod to top bracket. Level boom and tighten nuts to required torque.

**\*\*\*\*\* Include the following paragraph if boom rotation stops are required. \*\*\*\*\***

- I. Rotation stops: Swing boom to farthest position of use on one side. Weld rotation stop to top bracket with its face flush against pivoting clevis. Similarly weld bottom stop. Repeat procedure for rotation stops on other side of crane.

**\*\*\*\*\* Include the following if electric, air, or vacuum festoon system is used. \*\*\*\*\***

- J. Festoon system: At inside boom end, bolt festoon clamp to enclosed track. Slide festoon [trolleys] [gliders] through open end of boom track. Thread [electrical cable] [air hose] [vacuum hose] through festoon [trolleys] [gliders]. Equally space [trolleys] [gliders] along boom and secure [cable] [hose] with [clamps] [velcro straps].
- K. Hoist trolley: Attach lifting device to hoist trolley saddle clevis. Secure clevis pin with cotter pin. Roll hoist trolley into open end of track.
- L. End stop: Install stop on open end of boom track.

**3.3 FIELD QUALITY CONTROL**

- A. Move boom through entire travel to ensure boom is clear of obstructions, rotates freely, and does not drift.
- B. Inspect installed crane. Verify all bolts are tight and lockwashers fully compressed. Verify mast is plumb and boom is level.
- C. Field test crane and accessories for operating functions. Ensure crane movement is smooth and proper. Adjust as required and correct deficiencies.
- D. Clean surfaces. If necessary, touch-up paint damage, scratches, and blemishes with manufacturer provided matching paint.
- E. Protect crane from other construction operations.

**3.4 DEMONSTRATING AND TRAINING**

- A. In accordance with Section 01755 - Starting, Adjusting, and Demonstrating, provide demonstration and training session for Owner's representative covering operation and maintenance of wall bracket aluminum work station jib crane.

**END OF SECTION**