

SECTION 14654WALL BRACKET 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 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. [Depending on project requirements, some additional information will need to be added by the specifier.] 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

\*\*\*\*\* Wall bracket jib cranes can be either manually operated or motorized. \*\*\*\*\*

A. Section includes: Wall bracket [manually operated] [motorized] jib crane.

B. Related sections:

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

following. \*\*\*\*\*

\*\*\*\*\* **Wall bracket jib cranes are very economical. However, they require a structurally adequate wall, column, or other vertical member for support.** \*\*\*\*\*

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

\*\*\*\*\* **Typically fixed or trolley hoists are provided separately from wall bracket jib cranes and specified in another section. As an option, Gorbel, Inc. can provide hoists as a crane component. Contact Gorbel, Inc. for assistance in specifying hoists.** \*\*\*\*\*

2. Section 14620 - Hoists: [Electric] [Air-powered] [Manual] [fixed] [trolley] hoist to be installed on wall bracket jib crane boom.
3. Section 16100 - Wiring Methods: Electrical supply, conduit, wiring, and other electrical components for powering crane.

## 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.
- 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 steel beam boom covering a semi-circular area and suspended by brackets and tie rod from vertical support structure.

1. Maximum rotation: 200 degrees.
2. Crane shall be designed for [minimum effort manual rotation.] [motorized 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.

**\*\*\*\*\* 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: [1/2] [1] [2] [3] [5] ton[s].
3. Inertia forces from crane and load movement.

**\*\*\*\*\* Typically cranes are designed for normal interior operation and design does not include thermal, wind, seismic, and snow loads. Contact Gorbel, Inc. for assistance in specifying cranes requiring these additional loads or cranes operating in high humidity or corrosive environments. Include applicable additional loads. \*\*\*\*\***

4. Wind load: [\_\_\_\_\_] MPH.
5. Thermal load: [\_\_\_\_\_] degrees F temperature range.
6. Snow live load: [\_\_\_\_\_] PSF.
7. Seismic load for [\_\_\_\_\_] seismic zone.

## 1.4 SUBMITTALS

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

1. Product data for crane, [motor operator,] and accessories. Describe capacities, performance, operation, and applied forces to supporting [wall] [column] [\_\_\_\_\_].
2. Shop drawings showing crane configuration, dimensions, [electrical wiring diagrams,] and construction and installation details.
3. Copy of warranty required by Paragraph 1.5 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 JIB CRANE

**\*\*\*\*\* Refer to Gorbel® pre-engineered crane tables in product literature for complete model number based on capacity, span, boom depth, and cap channel. Cranes with other spans and capacities are available using programs at www.gorbel.com or contacting Gorbel, Inc. Edit the following and complete model number to indicate specific wall bracket jib crane and accessories to be specified. \*\*\*\*\***

- A. Type: Wall bracket supported, [manually operated,] [motorized,] steel jib crane with rotating boom, brackets, tie rod, [rotation stops] [tagline festoon system,] and other accessories; Model No. WB100-G[  capacity  ]-[  span  ]-[  boom depth  ]pc[  cap channel  ] as manufactured by Gorbel, Inc.
- B. Span: [8] [10] [12] [14] [16] [18] [20] [24] [30] feet.
- C. Construction: Fabricate from ASTM A36 steel sections with finished ends and surfaces.
  - 1. Boom: Horizontal, adjustable, wide flange steel beam designed for hoist trolley travelling on bottom flange. Reinforce with cap channel as required for lateral stability. [Equip boom with stops to limit movement of trolley.]
  - 2. Top bracket: 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. Brackets with tension welds are not acceptable. Top bracket consists of:
    - a. Steel channel anchored to supporting structure with double shear bolted connections.
    - b. Rotating clevis bracket consisting of steel tube, bronze bushings, wrap-around channel, grease fitting to be field lubricated, oil-impregnated thrust washer, and double shear pivot bolt assembly.
    - c. Formed clevis attached to tie rod with adjusting nut and lockwasher and retained in clevis bracket with double shear pin.

3. Beam bracket to connect tie rod to boom: Consists of formed clevis to receive tie rod, beam channel to be bolted to top flange of boom, and double shear pivot bolt joining clevis and beam channel. Brackets with tension welds are not acceptable.
4. Bottom bracket to absorb downward and compressive boom forces, allow boom rotation, and resist boom drift: Consists of formed channel bolted to supporting structure, boom connector plate and tube assembly, bronze bushings, oil-impregnated bronze thrust washer, double shear pivot bolt, and field lubricated grease fitting.
5. Tie rod: Single, right-hand threaded at each end, ASTM A36 steel rod. Double tie rods are not acceptable.

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### 2.3 MOTORIZED OPERATION

\*\*\*\*\* Include this article if wall bracket jib crane is motorized. \*\*\*\*\*

- A. Provide motor operator and lever arm to rotate crane boom. Operator to be bolted to steel plate mounted on support structure directly above bottom bracket.
- B. Type: Variable frequency, rotation lever arm drive allowing single or multiple speed applications, with torque limiter and worm gear reducer in oil bath.
- C. Motor: 1 HP, 1800 RPM, 3 phase, Class B, 40 degrees C ambient continuous, C faced, 30 minutes rated. Motor shall be enclosed and fan cooled.
- D. Controls: Pre-wired controls in NEMA 12 enclosure with magnetic reversing starter, thermal overload protection, voltage transformer, and fuse block. Power supply to be 460 volt, 3 phase, 60 cycle.

### 2.4 ACCESSORIES

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

\*\*\*\*\* Include the following to specify tagline festoon system attached to boom for supporting either electrical cable or compressed air hose supplying trolley hoist. Either S-hooks or wire rope trolleys can be used. \*\*\*\*\*

- A. Tagline festoon system: Provide system of wire rope tagline, [S-hooks] [wire rope trolleys], and brackets and eyebolts for attachment to boom. System shall support [electrical cable] [air hose] supplying trolley hoist moving along boom.

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

- B. Rotation stops: Provide steel plate stops for welding to formed channels of top and bottom brackets in order to limit boom rotation.

## 2.5 SHOP FINISHING

- A. Steam wash steel crane components with iron phosphate solution and apply yellow baked enamel finish.
- B. 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. Bracket connections to supporting structure must also be designed by architect/engineer. \*\*\*\*\***

1. Design and construction of [reinforced concrete] [steel] [\_\_\_\_\_] [wall] [column] [\_\_\_\_\_] supporting wall bracket 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 motorized crane or hoist is being used. \*\*\*\*\***

2. Design and provision of electrical supply, conduit, wiring, disconnect switch, and other electrical components for powering [motorized crane] [electrically operated hoist].

- B. Prior to installation:

1. Verify supporting [wall] [column] [\_\_\_\_\_] is ready to receive wall bracket 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. Tighten mounting bolts to manufacturer recommended torque ratings.
- E. Top bracket: Determine position, drill bolt holes, and bolt bracket to support structure.
- F. Bottom 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.
- G. Lower pivot assembly: Bolt to boom web.
- H. Beam bracket: Bolt to boom top flange.
- I. Bolt tie rod to clevises from top and beam brackets.
- J. Lift boom into place and support on temporary structure.
- K. Attach lower and then upper pivot assemblies. Tighten nuts until lockwashers are compressed.
- L. Level boom and then tighten nuts on tie rod to required torque. Grease pivot assemblies.

\*\*\*\*\* Include the following paragraph if trolley hoist requiring end stops is being used.  
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- M. End stops: In conjunction with hoist trolley installation, bolt end stops to boom ends.

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

- N. Rotation stops: Swing boom to farthest position of use on one side. Weld rotation stop to formed channel with its edge against pivot assembly. Similarly weld upper stop. Repeat procedure for rotation stops on other side of crane.

**\*\*\*\*\* Include the following paragraph if wall bracket jib crane is motorized. \*\*\*\*\***

- O. Motor operator: Install directly above bottom bracket anchoring boom. Bolt operator to steel plate mounted to support structure. Attach rotation lever arm to top flange of boom. Connect to power source.

**\*\*\*\*\* Include the following if tagline festoon system is used. \*\*\*\*\***

- P. Install tagline to boom with brackets and tension wire rope with eyebolts. Run festoon [cable] [air hose] through [S-hooks] [wire rope trolleys] for connection to hoist.

### **3.3 FIELD QUALITY CONTROL**

- A. Move boom through entire travel to ensure boom is clear of obstructions, rotates freely, and does not drift. [Verify motorized operation, controls, and limit switches function properly.]
- B. Inspect installed crane. Verify all bolts are tight and lockwashers fully compressed. Verify and boom is level.
- C. 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 cranes 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 jib crane.

**END OF SECTION**