

Freestanding Jib Crane

This guide can be used to prepare a bid specification for the incorporation of a Freestanding Jib Crane into a competitive bid project or application.

*Each product specification is organized in three standard sections:

SECTION 1 - GENERAL:

Includes product scope, references, performance requirements, applicable documents, quality assurances, product warranty information, and project conditions and handling practices.

SECTION 2 - PRODUCTS:

Includes a description of materials, products, and accessories to be incorporated into the project.

SECTION 3 – EXECUTION:

Includes provisions for product preparation, installation, field quality control, demonstrating and training, and protection.

***The specifier may need to edit this product specification to reflect the options and applications for a specific project. Notes to assist the specifier in editing this product specification are indicated in brackets. All notes and brackets should be deleted on the final draft.**

SECTION 1 – GENERAL

1.1 SCOPE

- A. **Product:** Spanco Freestanding Jib Cranes are designed for optimal range of capacity and span. Systems include 360-degree rotating boom and mast requiring adequate foundation support. Rotating collector assembly with service entrance and festoon service support provided as indicated.
- B. **General Design Standards:** Spanco Cranes are designed in conformance with the following applicable standards:
 1. **Jib Cranes:** AISC Steel Construction Manual, OSHA 1910.179, ANSI B30.11 as they apply to jib cranes.
- C. **Standard Equipment Specifications:** List other specifications related to the product and application including options, accessories, and customizations [Mounting, Hoists, Electrical].
 1. **Working Span:** [Working span is determined by the amount of actual working area needed. The working distance, or hook distance, is approximately one-half the trolley length from the end of the beam, and is the same distance from the head assembly or vertical support member of the jib.]
 2. **Area of Rotation:** [Freestanding and Mast type Jib Cranes offer 360-degree rotation. Wall mounted types offer 200-degree rotation.]

3. Capacity: [The maximum weight of the application should not exceed the design weight. Load weights should be predetermined to avoid buying unnecessary capacity.]
4. Height: [Under-boom height is considered the distance from the floor to the underside of the boom. The size of the hoist and the lifting distance should also be considered. The overall height is measured at the highest point on the crane after installation.]
5. Construction: Fabricated using ASTM A36 steel sections with finished ends and surfaces.

1.2 REFERENCES

List references referred to in this product specification. List by number and full title, and 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):** ANSI B30.11 – Monorails and Under-hung Cranes
- C. **American Society for Testing and Materials (ASTM) A36:** Carbon Structural Steel
- D. **American Society for Testing and Materials (ASTM) A325:** Structural Bolts, Steel, Heat Treated, 120/150 ksi Minimum Tensile Strength
- E. **American Society for Testing and Materials (ASTM) A490:** Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
- F. **American Society for Testing and Materials (ASTM) B221:** Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube
- G. **American Welding Society (AWS) D1.1:** Structural Welding Code
- H. **American Welding Society (AWS) D1.1:** Certified Shop
- I. **Occupational Safety and Health Administration (OSHA) – Specification 1910.179:** Overhead and Gantry Cranes
- J. **American Recovery and Reinvestment Act (ARRA):** Buy American Clause of May 2009

1.3 PERFORMANCE REQUIREMENTS

- A. **Coverage:** Crane shall provide coverage of circular area of size indicated on drawings and consist of:
 1. Freestanding mast that requires foundation support.
 2. Rotating boom: 360-degree rotation; boom will not drift when at rest.
- B. **Modular, Pre-Engineered Design:** Crane system shall be designed for minimum effort manual rotation.
 1. Crane shall be designed, fabricated, and installed in accordance with ANSI B30.11 and OSHA 1910.179.
- C. **Productivity Ratio:** Crane shall be designed to manually move load with maximum force of 1/100 load weight.
- D. **Deflection Guidelines:** Wall-Mounted Cantilever (300 Series) model and Wall-Mounted Bracket (301 Series) model designed with maximum deflection of L/300. Freestanding (100, 101, and 102 Series), and Mast Style (200 Series) designed with maximum deflection of L/150.
- E. **Crane Operating Temperature:** 5 to 200 degrees F (-15 to 93 C)
- F. **Structural Design:** The crane's structural design is based on live load capacity plus 15 percent for hoist and trolley weight and 25 percent for impact.

Edit the following to reflect project structural design requirements. Contact Spanco, Inc. for assistance specifying cranes that will require seismic and other additional loads or cranes that will operate in high humidity or corrosive environments.

Crane shall be designed to withstand:

1. Crane and hoist dead load
2. Live load capacity equal to net rated hook load
3. Inertia forces from crane and load movement

1.4 DOCUMENTS

A. Submittal Procedures

1. Product data is included for crane and all accessories. Product data provides capacities, performance, standard operations, and applied forces to foundation.
2. Shop drawings, which outline crane configuration, dimensions, construction, and installation details.
3. Manufacturer's Warranty.
4. Manufacturer's Installation Instructions.
5. Manufacturer's Operation and Maintenance Manual.

1.5 QUALITY ASSURANCE

- A.** Standard cranes shall be designed, fabricated, and installed in accordance with ANSI B30.11, MH27.2, OSHA 1910.179, and IBC. Spanco, Inc. assures the safety and quality of all systems when installed and maintained according to their Installation and Maintenance Manual. All standard Spanco Freestanding Jib Cranes are designed to withstand the worst seismic condition in the U.S. or as defined by the IBC.
 - 1. Applications where cranes will be used in potentially hazardous environments or explosive environments require special consideration. As per the International Building Code, these special conditions must be disclosed prior to placing an order.
 - 2. Application where cranes will be used in essential facilities like fire departments, military buildings, or communications buildings, or at locations closer than 15km to known seismic sources require special consideration. As per the International Building Code, these special conditions must be disclosed prior to placing an order.
 - 3. Custom cranes (cranes modified over and above the standard dimensions or capacities shown within our standard Spanco literature) may need modification to conform to Seismic 4 Uniform Building Code due to the customized and non-standard nature of these designs.
- B.** If different specifications are required, alternate specifications need to be requested before the order is placed. Crane modifications may be required at additional cost to conform to specifications other than IBC and ASNI.
- C. Manufacturer's Qualifications:** A company with more than 30 years of experience successfully designing and manufacturing cranes and material handling solutions for numerous industries
- D. Installer's Qualification:** A company that is acceptable to the crane manufacturer and with five years of experience assembling and installing cranes for multiple applications. Installer should be able to:
 - 1. Perform welding using certified operators in accordance with AWS D1.1.
 - 2. Bolt connections in accordance with torque tightening procedures specified in AISC Manual, Part 5.

3. Clearly label crane with rated load capacity with label visible from floor level and loading position.
4. Perform OSHA Load Test Certification.

1.6 WARRANTY

- A. Manufacturer's Warranty:** Included on manufacturer's standard form and outlines the manufacturer's agreement to repair or replace assemblies and components that fail in materials and/or execution within warranty period from date of substantial completion.
1. Warranty covers ten (10) years or 20 thousand (20,000) hours for manual push-pull Crane products to cover defects in materials and execution.
 2. Warranty covers two (2) years or 4 thousand (4,000) hours for motorized tractor products.

1.7 CONDITIONS/ DELIVERY, STORAGE, HANDLING

A. Project Conditions

1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results.
2. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Delivery, Storage, and Handling

1. Store products in manufacturer's packaging until ready for installation.
2. Store and dispose of solvent-based materials in accordance with requirements of local authorities.

SECTION 2 – PRODUCT

2.1 ACCEPTABLE MANUFACTURERS

A. Spanco, Inc.

604 Hemlock Road, Morgantown, PA 19543; 800-869-2080; www.spanco.com

2.2 FREESTANDING JIB CRANE

[Spanco Freestanding Jib Cranes are available in capacities up to 5 tons (standard) with special capacities up to 15 tons and standard span of 20 feet.]

A. Models: The following are Freestanding Jib Cranes manufactured by Spanco, Inc. [Specifier may need to choose an acceptable model based on the list below.]

1. Model No. 100: Base Plate Mounted Crane manufactured by Spanco, Inc.
2. Model No. 101: Insert Mounted Crane as manufactured by Spanco, Inc.
3. Model No. 102: Sleeve Mounted Crane as manufactured by Spanco, Inc.

B. Construction: Fabricated from ASTM A36 steel sections with finished ends and surfaces.

C. Design Factors: Spanco Jib Cranes are designed to meet all specifications using a 25 percent factor of rated load for impact and 15 percent factor of rated load for hoist and trolley weight. Fifty percent impact factor used for vacuum and magnet applications. The pope mast is designed to give maximum strength and minimum deflection to resist bending, buckling, and crushing, as well as wear by the trunnion roller assembly. The bearings are designed for a 5000-hour B-10 design lift.

D. Service Factor: All Spanco Freestanding Jib Cranes are designed for frequent usage (Class C Normal/Industrial service) as defined:

1. System or equipment is used where operational time is up to 100 percent of the work period and lifted load is at 50 percent or below rated capacity
2. System or equipment is used where operational time is less than 50 percent of the work period and lifted load is greater than 50 percent of rated capacity.
3. Applications involving vacuums, magnets, and other high impact lifters are considered severe usage and require special design considerations. Please contact Spanco, Inc. for special design pricing.
4. Consult Spanco, Inc. for usage other than moderate and all instances of high cycle rates or high impact applications such as high speed air or electric hoists, vacuum lifters, or magnets.

E. Support Structure: Spanco Freestanding Jib Cranes are mounted to a permanent concrete foundation. This foundation anchors the crane and acts as a counterweight for the forces exerted by the crane under maximum loading conditions.

1. Base plate mount: Hexagonal base plate reinforced with six knee braces equally spaced on the mast.
2. Foundation mount: Square steel plate welded to bottom of column.
3. Sleeve insert mount: Square steel plate welded to bottom of sleeve.

F. Head Assembly: Designed to transfer boom load to mast and relocate.

1. Construction: Standard plate, angles, and channels to ensure minimum deflection and maximum rigidity.
2. Plate: Reinforced using angles to limit compression and buckling stresses.
3. Lower trunnion roller assembly: Mounted on a channel, which transfers the load to the top of the box.
4. Head Assembly: Designed to inhibit dislodgment due to upward and forward motion. It allows bottom entry electrification inside the head and allows mounting above the boom for top entry electrification.

2.3 SYSTEM OPTIONS

*The following options are available for Spanco Freestanding Jib Cranes. [Select required options from the following, or contact Spanco, Inc. if other types of accessories are required.]

A. Installation Capabilities

1. Base plate mounted.
2. Foundation mounted.
3. Sleeve insert mounted.

B. Air Swivels

1. Bottom Entry Air Swivel
 - a. Air swivel installed in weight bearing channel of head assembly to convey compressed air supply inside mast through mast pivot pin to air powered hoist on boom.
 - b. Swivel allows continuous 360-degree crane rotation.
2. Top Entry Air Swivel
 - a. Air swivel installed on top flange of boom to convey compressed air from overhead source to air-powered hoist on boom.
 - b. Swivel is fitted with pivot arm connected to source hose and allows continuous 360-degree rotation.

C. Air

1. Compressed air for air-powered hoists can be supplied with bottom entry air swivel or top entry air swivel.

D. Collectors

1. Electrical power can be provided for motorized cranes and hoists with either bottom entry collector or top entry collector.
 - a. Bottom entry collector: Electrical collector installed in weight bearing channel of head assembly to conduct electrical power from inside mast through mast pivot pin to motor operator on head assembly and electrically operated hoist on boom. Collector allows continuous 360-degree rotation.
 - b. Top entry collector: Electrical collector installed on top flange of boom to conduct electrical power from overhead electrical source to motor operator on head assembly and electrically operated hoist on boom. Collector is fitted with pivot arm connected to source conduit and allows continuous 360-degree rotation.

E. Tagline Festoon System

1. Attached to boom for supporting electrical cable or compressed air hose supplying trolley hoist. Either S-hooks or wire rope trolleys can be used.
2. Includes system of wire rope tagline, (S-hooks or wire rope trolleys), brackets and eyebolts for attachment to boom. System supports electrical cable and air hose supplying trolley hoist moving along boom

F. Rotation Stops

1. Limit boom rotation.
2. Steel plate stops are welded to formed channels of top and bottom brackets.

G. Power Rotation

H. Anchor Bolts

I. Tie Rods

2.4 SYSTEM COMPONENTS

A. Mast

1. Stationary steel pipe perpendicular to boom.
2. Equip mast top with plate and pivot pin to receive head assembly.

B. Boom

1. Horizontal, standard I-beam bolted to head assembly and designed for hoist trolley travelling on bottom flange.
2. Reinforce with cap channel as required for lateral stability.
3. Equip booms with stops to limit movement of trolley.

C. Head Assembly

1. Utilizes a Timken tapered roller bearing provided with grease fitting for proper lubrication.
2. Welded steel plate and channel fabrication fitted over mast, bolted to boom, and designed to transfer boom load to mast and rotate.
3. Bearings are designed for 5000-hour, B-10 design lift.
4. Allows for installation of head prior to boom attachment and provides maximum hoist lift.
 - a. Top pivot bearing assembly: Designed to connect head assembly to mast and transfer load from boom. Weight bearing channel connects the sides of the head assembly and contains tapered roller bearings that allow for easy rotation.
 - b. Retaining clip: Inserted through mast pivot pin above weight bearing channel to prevent accidentally dislodging head assembly.
 - c. Trunnion roller assembly: Designed to rotate around mast and transmit moment force from boom to mast. Includes trunnion rollers with tapered bearings held in steel

channel with bolts. A mast that is less than 18 inches in diameter will have two rollers, and larger masts will have four rollers. Assembly rotates around mast with full roller face contact. Roller surface is sufficiently large to prevent cutting into mast. Cranes with small rollers or cams requiring wear band on mast are not acceptable.

2.5 SHOP FINISHING

A. Standard Paint Colors:

1. All runways and structural supports are painted with Spanco Standard Grey enamel.
2. All bridges painted Spanco Yellow.
3. Ford® Blue optional.

B. Surface Preparation and Painting Procedures:

1. Spanco adheres to the standards of the Society for Protective Coatings (SSPC) for all product surface preparation.
2. Spanco Crane components are deburred and descaled using power tools equipped with sanding discs and wire wheels prior to painting.
3. Components are washed with high-pressure/ high temperature biodegradable degreaser solution.
4. All components are coated with quick drying, semi-gloss enamel, applied to a minimum dry-film thickness of two to three mils.
5. A finishing coat is applied with a hot, airless, electrostatic spray paint system.
6. Painted components are cured at air temperature.

SECTION 3 – EXECUTION

3.1 PREPARATION

A. DO NOT start installation until support structures are properly prepared.

B. Inventory:

1. Check materials to ensure all parts are present.

C. Motorized Power Rotation:

1. Check electrical supply, conduit, wiring, disconnect switch, and other electrical components.

D. Foundation

1. Mount to a permanent concrete foundation to anchor crane and act as a counterweight for forces exerted by crane under maximum loading conditions.
2. Install recommended concrete (3000# P.S.I.) footing reinforcement and anchor bolts.
3. Ensure accurate anchor bolt patterns are provided for foundation design.

3.2 INSTALLATION

A. Units and accessories should be installed in accordance with manufacturer's instructions and shop drawings.

B. Do not modify crane components without manufacturer's approval.

C. Clearances for moving crane components:

1. Minimum vertical clearance: Three inch (76 mm) from any overhead obstruction.
2. Minimum horizontal clearances: Two inch (51 mm) from any lateral obstruction.

D. Model 100 (Base Plate Mounted)

1. Mast/ Base assembly

- a. Install one set of nuts on anchor bolts with top surface of nut approximately one inch above foundation. Place mast/base unit over anchor bolts resting on leveling nuts.
- b. Bolt pads are tac welded to base plate for easy removal in case of slight misalignment of anchor bolt. Grind a tac area to remove bolt pad(s). Reset mast unit over anchor bolts and leveling nuts. Be sure to replace bolt pad(s) back into place before the second set of nuts. Bolt pads do not require welding once that are removed and replaced.
- c. Install second set of nuts loosely, and insert plumb line arm in pivot shaft located on top of mast. Select position on arm to hang plumb line that is two inches from edge of mast. Measure 60 inches down from top of mast, and use that point to check plumb. Locate arm directly over one anchor bolt (or pairs when 12 bolts are used). Measure from plumb line to edge of mast. Measurement should be two inches. If not, adjust leveling nut. Rotate arm 180 degrees, and check distance. If distance is more or less than two inches, adjust leveling nuts to the same distance on both sides of mast.
- d. Repeat operation at each anchor bolt (60-degree increments). When mast is plumb, float grouting compound under base plate, and tighten locking nuts.

2. Box/Head assembly

- a. Box/head assembly is mounted on main bearing of pivot shaft.
- b. To level box assembly, adjust hex nuts to adjust the position of roller assembly to mast. When box is fairly level, place flat washer over pivot shaft protruding through head assembly of box, and secure with remaining snap ring.

3. Boom assembly

- a. Mount boom assembly to box securing at back plate and beam support angle.
- b. Modify boom by adjusting the roller adjustment nut; lock into position with lock nuts.

E. Model 101 (Foundation Mounted)

1. Mast/ Base assembly

- a. Install one set of nuts on anchor bolts with top surface approximately one inch above foundation. Place mast/ base unit over anchor bolts resting on leveling nuts.
- b. Install second set of nuts loosely, and insert plumb line arm in pivot shaft located on top of mast. Select position on arm to hang plumb line that is two inches from edge of mast. Measure 60 inches down from top of mast, and use that point to check plumb. Locate arm directly over one anchor bolt (or pairs when 12 bolts are used). Measure from plumb line to edge of mast. Measurement should be two inches. If not, adjust leveling nut. Rotate arm 180 degrees, and check distance. If distance is more or less than two inches, adjust leveling nuts to the same distance on both sides of mast.
- c. Repeat operation at each anchor bolt (90-degree increments). When mast is plumb, float grouting compound under base plate, and tighten locking nuts.
- d. Install three braces from top of mast to ground at 120 degrees apart to prevent mast from shifting when concrete foundation is poured. After concrete has hardened proceed with jib assembly.

2. Box/ Head assembly

- a. Box/ head assembly is mounted on main bearing of pivot shaft.
- b. To level box assembly, adjust hex nuts to adjust the position of roller assembly to mast. When box is fairly level, place flat washer over pivot shaft protruding through head assembly of box, and secure with remaining snap ring.

2. Boom assembly

- a. Mount boom assembly to box securing at back plate and beam support angle.
- b. Modify boom by adjusting the roller adjustment nut; lock into position with lock nuts.

F. Model 102 (Foundation Mounted with Sleeve Insert)

1. Mast/ Base assembly

- a. Install one set of nuts on anchor bolts with top surface approximately one inch above foundation. Place insert sleeve base over anchor bolt resting on leveling nuts.
- b. Install second set of nuts loosely; plumb sleeve and tighten locking nuts; secure top of sleeve to ground with three braces at 120 degrees to prevent sleeve from shifting while second foundation is poured.
- c. After concrete has hardened, insert crane mast into sleeve and over sleeve aligning pin, making sure that aligning pin is fully engaged with hole in bottom mast plate.
- d. Insert plumb line arm in main pivot located on top of mast. Select position on arm to hang plumb line that is two inches from edge to mast. Measure down from top of mast 60 inches; use this point to check plumb.
- e. Insert steel wedges between sleeve and mast at 90-degree increments. Locate arm directly over one wedge, and measure from plumb line to edge of mast. If more or less than two inches, adjust wedges, rotate arm 180 degrees, and check distance again. If more or less than two inches, adjust wedges for same measurement on each side of mast. Repeat operation at each wedge (90-degree increments).
- f. When mast is plumb, weld wedges into place and proceed with jib assembly.

2. Box/ Head assembly

- a. Box/ head assembly is mounted on main bearing of pivot shaft.
- b. To level box assembly, adjust hex nuts to adjust the position of roller assembly to mast. When box is fairly level, place flat washer over pivot shaft protruding through head assembly of box, and secure with remaining snap ring.

3. Boom assembly

- a. Mount boom assembly to box securing at back plate and beam support angle.
- b. Modify boom by adjusting the roller adjustment nut; lock into position with lock nuts.

3.3 FIELD QUALITY CONTROL

*Perform field quality control testing as recommended by manufacturer.

A. Inspection

1. Verify all bolts are tight and lock washers fully compressed.

B. Field Test

1. Ensure crane operates properly (movement is smooth and consistent).
2. Verify motorized operation and controls function properly.
3. Make adjustments as needed, and correct inadequacies.

C. Acceptance Test

1. After the enclosed track crane system has been installed, OSHA requires an acceptance test before operating and also after any modifications. An authorized dealer or installer should perform acceptance tests.

D. Maintenance

1. To keep a jib crane in good operating order, engineers recommend establishing a regular schedule of inspection and lubrication. All parts should be inspected, all loose parts adjusted, and worn parts replaced at once.
2. Recommended lubrication schedule varies based on crane use/ application. A crane that operates daily for multiple should be lubricated weekly. Operating a crane at "standard duty" requires lubrication once every two or three weeks. Operating a crane on "standby"

classification" requires lubrication once every six months. The interval of lubrication depends on the application.

3. The points that require lubrication are the main pivoting bearing and trunnion roller bearing.

E. Clean Surfaces

1. Touch up scratches and blemishes with matching paint from manufacturer.
2. Keep surfaces clean and clear of build-up and residue.

F. Protect Crane

1. Protect installed products until completion of project.
2. Touch up, repair, or replace damaged products before substantial completion.

G. Quality Standards

1. Spanco, Inc. is an ISO 9001-2008 Registered Corporation.
2. Spanco Cranes are manufactured to standards ensuring safety, reliability, and the highest quality.
3. Spanco products are manufactured in the United States of America at facilities located in Morgantown, Pennsylvania and Las Vegas, Nevada.
4. Spanco certifies that all goods are in full compliance with the Buy American Clause of the American Recovery and Reinvestment Act (ARRA) of May 2009.