

Mast Jib Crane

This guide can be used to prepare a bid specification for the incorporation of a Mast 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 Mast Jib Cranes are floor supported and top stabilized with a steel beam mast connected to a 360-degree rotating steel beam boom, which covers a circular work area. Mast Jib Cranes can be full cantilever or drop cantilever and manually operated or motorized.
- 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 a circular area of size indicated on drawings and consist of rotating boom attached to steel mast, top and bottom bearing assemblies and other accessories.
- 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 designed with maximum deflection of L/150. Freestanding (100, 101, and 102 Series), Mast Style (200 Series), and Wall-Mounted Bracket (301 Series) models designed with maximum deflection of L/450.
- 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 Mast 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 IBC 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 jib crane products to cover defects in materials and execution.
2. Warranty covers two (2) years or four thousand (4,000) hours for motorized 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 MAST JIB CRANE

[Spanco Mast Jib Cranes are available in capacities up to five tons (standard) with special capacities up to 15 tons and a standard span of 30 feet (longer spans available).]

A. Models: Spanco Mast Jib Cranes are available in two series. [Specifier may need to choose an acceptable model based on the list below.]

1. Model 201 – Drop Cantilever as manufactured by Spanco, Inc.
2. Model 200 – Full cantilever 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 or 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 Mast Jib Cranes are designed for moderate usage (Class C Normal/Industrial service) as defined:
1. System or equipment is used moderately in a normal industrial environment.
 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 Mast Jib Cranes require top and bottom support of the mast to the building floor and overhead building steel. Mast Jib Cranes are available in full cantilever or drop cantilever.
1. Full cantilever utilizes an I-beam or wide-flange beam for the boom and a wide-flange beam for the column. Full cantilever styles utilize two types of bearing arrangements. For the top bearing assembly, a self-aligning spherical bearing is used. For the bottom assembly, a bronze bearing and bronze thrust washer is used. Both bearing assemblies are provided with grease fittings to aid rotation.
 2. Drop cantilever mast Jib Cranes are identical to full cantilever mast Jib Cranes with the addition of side-plate connections, which allow boom to be mounted permanently at any specified height on mast.

2.3 SYSTEM OPTIONS

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

A. Type/ Model

1. Model 200 - Full Cantilever: Allows maximum use of headroom to provide the highest possible lifting distance.
2. Model 201 - Drop Cantilever: Provides additional clearance for overhead obstructions.

B. 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.

C. Rotation Stops

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

D. Power Rotation

2.4 SYSTEM COMPONENTS

A. Boom

1. Horizontal, standard steel I-beam designed for hoist trolley travelling on bottom flange.
 - a. Reinforce with cap channel as required for lateral stability.
 - b. Includes plate welded to inside end of boom to be bolted to outside flange of mast.

- c. Includes plate and gusset welded to top inside end of boom to be bolted to outside flange of mast at specified height.
- d. Equip boom with stops to limit movement of trolley.

B. Mast

- 1. Vertical, standard steel I-beam or wide flange section perpendicular to boom and parallel to crane rotation axis.
 - a. Reinforce with stiffeners at critical stress points.
 - b. Includes steel plate with pivot pin for top and bottom ends of mast.
 - c. Includes plate welded to top of mast to be bolted to top flange of boom.
 - d. Box-in mast by welding steel plate to mast flanges to provide rigidity to withstand operator induced forces.

C. Top and Bottom Bearing Assemblies

- 1. Consist of adequately sized steel mounting plate with self-aligning, radial ball bearing in machined housing, welded to mounting plate and field lubricated grease fitting. Includes bottom bearing assembly with bronze thrust washer.

2.5 SHOP FINISHING

A. Standard Paint Colors:

- 1. All jib cranes painted Spanco Yellow.
- 2. 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

2.1 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/ Support Structure

- 1. Requires top and bottom support of the mast to building floor and overhead building steel.
- 2. Building floor and overhead building steel must be adequate to support crane and its rated load.
- 3. Consult with a qualified architect or engineer to determine structure's adequacy.

2.2 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 inches (76 mm) from any overhead obstruction.
 - 2. Minimum horizontal clearance: Two inches (51 mm) from any lateral obstruction.
- D. **Mast**
 - 1. Before installation of any foundation, reinforcement, leveling plate, and anchor bolts, refer to the dimensions sheet included with the installation manual.
 - 2. Verify the exact height of the mast assembly. Verify that the jib mast will fit into the space provided, while maintaining the 3/8 inch space between top bearing housing and shaft shoulder of the upper bearing assembly (3/8 inch space is provided to accommodate ceiling sag due to snow or other loading conditions on the roof). The jib crane should be installed when snow and other loading conditions are not present.
 - 3. Clamp the top bearing housing to the proposed support location. Level the housing in two directions. Use the housing as a template to mark the location of the bolt-holes. Remove the bearing housing and find the center of the bracket by scribing an "X" through the marked centers.
 - 4. Use a plumb bob to find the center location for the lower-bearing housing bracket. Bearing center tolerance is required to be within (+/-) 1/16 inch from the top to the bottom bracket.
 - 5. Place the bottom bearing housing to the center location established in the step above. Level the housing in two directions. Mark mounting hole locations using the housing as a template.
 - 6. Drill mounting holes for the bottom bearing housing using the housing as a guide.
 - 7. Relocate and clamp top bearing housing and drill required holes using housing as a guide.
 - 8. Assemble the top and bottom bearing housing on the mast and stand the mast upright. Slide the mast assembly into position and bolt the housings to the floor and to the upper support system.
 - 9. Check the mast to verify that it is plumb in line with all four bolts. If the measurement is not consistent with the full length of the mast, adjust the bearing housings accordingly.
 - 10. When mast is plumb, tighten the locking nuts.
- E. **Boom**
 - 1. Do not install the boom until the mast is installed properly and plumbed.
 - 2. Raise boom to mounting location on mast and install as follows:
 - a. **For the 200 Series:**
 - Locate the boom to the mast and install using the bolts provided with the jib crane. Insert the top plate bolts and loosely tighten. Install the lower bolts to the mast and loosely tighten
 - Level the boom with the mast using a minimum six-foot level. Shim stock may be used at the lower bolts for leveling.
 - b. **For the 201 Series:**

- Locate the boom to the mast and install using Drop Boom Pin and the bolts provided with the jib crane. Insert the Drop Boom Pin. Install the lower bolts to the mast and loosely tighten.
 - Level the boom with the mast using a minimum six-foot level. Shim stock may be used at the lower bolts for leveling.
3. Tighten all bolts
 4. Re-check for plumb and level. Adjust as needed.
 5. Apply grout if the jib crane requires it at the base plate.

2.3 **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.
2. Before the unit is placed into service, it is important to review and follow procedures outlines in chapters 11 and 12 of ANSI B30.11 regarding inspection, testing, and maintenance.

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

D. Maintenance

1. To keep a jib crane in good operating order, engineers recommend establishing a schedule of inspection and lubrication. All parts should be inspected, all loose parts adjusted, and worn parts replaced at once.
2. During the first month after a new installation, a weekly inspection should be performed. All nuts, bolts, and screws should be checked for tightness. All end stops, cotter pins, and hoist trolleys should be checked for abnormal wear or breakage.
3. After the first month, a complete inspection of all fasteners and connections should be performed monthly. Heavier conditions of use will require more frequent inspections.
4. Operators should conduct a visual inspection of the system before each use.
5. The bearings in the brackets are pre-lubricated at the factory. Field lubrication of those bearings is required based upon usage of the crane. Spanco recommends that the bearings be lubricated at least once a year. The grease should be lithium soap based grease (NLGI No. 1 or No. 2).
6. Recommended lubrication schedule varies based on crane use/ application. A crane that operates daily for multiple hours should be lubricated weekly. Operating a crane at “standard duty” requires lubrication once every two weeks. Operating a crane on “standby classification” requires lubrication once every six months. The interval of lubrication depends on the application.

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.