

## Articulating Jib Crane

This guide can be used to prepare a bid specification for the incorporation of an Articulating 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.**

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## **SECTION 1 - GENERAL**

### **1.1 SCOPE**

- A. Product:** Spanco Articulating Jib Cranes can be freestanding, ceiling-mounted, Bridge-Mounted, or wall-mounted. [Freestanding base plate mounted, manually operated jib crane with articulating boom and arm assembly that covers a circular work area around the mast.] [Ceiling or Bridge-Mounted, manually operated jib crane with articulating boom and arm assembly covering a circular work area.] [Wall-mounted manually operated jib crane cantilevered from vertical support structure with articulating boom and arm assembly covering circular work area.]
- 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 Articulating Jib Cranes offer 360-degree rotation on the outer and inner arms.] [Ceiling or Bridge-Mounted Articulating Jib Cranes offer 360-degree rotation on the outer and inner arms.] [Wall-Mounted Articulating Jib Cranes offer 200-degree rotation on the inner arm, and 360-degree rotation on the outer arm.] \
  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:** Freestanding Articulating Jib Crane shall provide coverage of a circular area of size indicated on drawings and consist of:
  1. Freestanding mast that requires foundation support.
  2. Articulating assembly with pivoting boom and rotating arm.
  3. Rotating boom and secondary arm provide 360-degree rotation.
- B. **Coverage:** Ceiling/ Bridge-Mounted Articulating Jib Crane shall provide coverage of a circular area of size indicated on drawings and consist of:
  1. Head mounting assembly.
  2. Articulating assembly with pivoting boom and rotating arm.
  3. Rotating boom and secondary arm provide 360-degree rotation.

- C. Coverage:** Wall-Mounted Articulating Jib Crane shall provide coverage of a circular area of size indicated on drawings and consist of:
  - 1. Wall-Mounted vertical leg mast.
  - 2. Horizontal boom cantilevered from mast for 200-degree rotation.
  - 3. Assembly with pivoting boom and rotating arm
  - 4. Boom provides 200-degree rotation; secondary arm provides 360-degree rotation.
- D. 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 I
- E. Productivity Ratio:** Crane shall be designed to manually move load with maximum force of 1/100 load weight.
- F. Deflection Guidelines (1):** 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.
- G. Crane Operating Temperature:** 5 to 200 degrees F (-15 to 93 C)
- H. 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 Articulating 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 twenty thousand (20,000) hours for manual crane products to cover defects in materials and execution.
  2. Warranty covers two (2) years or four 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 **ARTICULATING JIB CRANE**

[Spanco Articulating Jib Cranes are available in capacities up to 2,000 pounds and with a standard span of 16 feet.]

- A. Models:** The following are Articulating Jib Cranes manufactured by Spanco, Inc. [Specifier may need to choose an acceptable model based on the list below.]
1. **Model No. 402 (Freestanding Articulating Jib)** as manufactured by Spanco, Inc.
    - a. Freestanding, base plate mounted, manually operated Articulating Jib Crane with stationary mast, pivoting boom, and rotating arm.
    - b. Construction: Fabricated from ASTM A36 steel sections with finished ends and surfaces.
  2. **Model No. 401 (Wall-Mounted Articulating Jib)** as manufactured by Spanco, Inc.
    - a. Wall-Mounted, manually operated articulating jib with vertical mast, pivoting boom, and rotating arm.
    - b. Construction: Fabricated from ASTM A36 steel sections with finished ends and surfaces.
  3. **Model No. 400 (Ceiling or Bridge-Mounted Articulating Jib)** as manufactured by Spanco, Inc.
    - a. Ceiling-Mounted or Bridge-Mounted, manually operated articulating jib with head mounting assembly, pivoting boom, and rotating arm.
    - b. Construction: Fabricated from ASTM A36 steel sections with finished ends and surfaces.
- B. 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.
- C. Service Factor:** All Spanco 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.
- D. Support Structure:** Spanco Articulating Jib Cranes can be base plate mounted to an existing floor or special foundation, mounted to an existing wall or column with structurally adequate support, Ceiling-Mounted to an existing overhead structure, or Bridge-Mounted to a bridge crane.
1. Base plate mount: Hexagonal base plate welded to mast for anchoring crane to concrete foundation.
  2. Wall mount: Wall or column mounted to structurally adequate support.

3. Ceiling or Bridge mount: Circular base plate welded to steel pipe pivot and anchored to overhead support.

## 2.3 **SYSTEM OPTIONS**

**\* The following options are available for Spanco Articulating Jib Cranes. Bridge-Mounted jibs can support nearly any type of manipulator, balancer, or hoist.** [Select required options from the following, or contact Spanco, Inc. if other types of accessories are required.]

### **A. Installation Capabilities**

1. Model 402: Base plate floor mounted.
2. Model 401: Wall or column mounted (cantilevered).
3. Model 400: Base plate mounted to overhead structure.

### **B. Electrical Entry Collectors**

1. Boom Electrical Collector
  - a. Bottom entry type conducts electrical power from source below boom to top of boom.
2. Arm Electrical Collector
  - a. Installed at pivot joint between boom and arm to conduct electrical power from boom to lifting device.

### **C. Air Swivels**

1. Boom Air Swivel
  - a. Air swivel installed on top flange of boom to convey compressed air from overhead source to air-powered hoist on boom.
2. Arm Air Swivel
  - a. Air swivel installed at pivot joint between boom and arm to conduct electrical power from boom to lifting device.

### **D. Rotation Stops**

1. Required for Articulating Jib Cranes with electric or compressed air lifting devices unless electronic entry collectors or air swivels are provided. Cranes with vacuum lifting devices must have stops to limit boom and arm rotation to less than 360 degrees.
2. Boom Rotation Stops
  - a. Steel tube rotation stop welded to bottom side of boom.
  - b. Steel rotation stop blocks welded on boom head mounting assembly to limit boom rotation to less than 360 degrees.
3. Arm Rotation Stops
  - a. Steel tube with rubber bumpers welded to top of arm.
  - b. Connect boom tube to limit arm rotation to less than 360 degrees.

**E. Vacuum:** Can be supplied for any device supported on the end of the boom.

## 2.4 **SYSTEM COMPONENTS**

### **A. Model 402: Freestanding Articulating Jib Crane**

1. Mast
  - a. Stationary steel pipe perpendicular to boom/ arm assembly.
  - b. Equip mast with top plate and base plate.
2. Top Plate
  - a. Circular steel plate with pivot pin to receive boom/arm assembly.
3. Base Plate
  - a. Hexagonal steel base plate welded to mast for anchoring crane to foundation.

4. Articulating Boom and Arm Assembly
  - a. Boom and arm fabricated from rectangular steel tubes connected with pivot joint.
  - b. Inner boom is equipped with steel pipe pivot assembly and circular steel plate is attached to mast and reinforced with gussets.
  - c. Outer arm is equipped with steel plate clevis with 1-1/2 inches (38 mm) diameter hole to receive lifting device.
  - d. Rigid-body trolley designed to move inside enclosed track and carry hoist and load.
  - e. Pivot joints provided with friction brakes to adjust boom and arm rotation.

#### **B. Model 401: Wall-Mounted Articulating Jib Crane**

##### **1. Mast**

- a. Vertical, rectangular steel tube perpendicular to boom/arm assembly and parallel to crane rotation axis. Corner web gusset provided for mast boom joint.

##### **2. Articulating Boom and Arm Assembly**

- a. Boom and arm fabricated from rectangular steel tubes connected with pivot joint.
- b. Factory welded to mast.
- c. Outer arm equipped with steel plate clevis with 1-1/2 inch (38 mm) diameter hole to receive lifting device.

##### **3. Two Mounting Brackets**

- a. Designed to anchor mast to support structure, allow boom rotation, and resist drift. Load-carrying parts will be double sheer and no bolt stress will exceed 10,000 psi (69 MPa). Brackets with tension welds are not acceptable.
- b. Bracket consists of:
  - i. Formed channel to be bolted to support structure and equipped with pivot pin and thrust washer.
  - ii. Fabricated I bracket to be welded to mast and jointed to formed channel with pivot pin. Oil-impregnated bronze bushings and field lubricated grease fitting also provided.

#### **C. Model 400: Ceiling or Bridge-Mounted Articulating Jib Crane**

##### **1. Head Mounting Assembly**

- a. Circular steel base plate welded to steel pivot pipe installed on steel boom/ arm assembly.
- b. Triangular gussets welded to pipe and base plate for stability and reinforcement.
- c. Base plate pre-drilled with bolt holes for anchorage to overhead support.

##### **2. Articulating Boom/ Arm Assembly**

- a. Fabricate boom and arm from rectangular steel tubes connected with pivot joint.
- b. Outer end of arm equipped with steel plate clevis with 1-1/2 inches (38 mm) diameter hole to receive lifting device.
- c. Pivot joints with friction brake bolts provided for adjusting boom and arm rotation.

## **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. Model 402: Freestanding Articulated Jib - Base plate mounted to minimum six-inch reinforced concrete floor or special foundation. Ensure accurate anchor bolt patterns are provided for foundation design. **Spanco recommends 3,000-PSI concrete foundation, reinforcement, and anchor bolts. Customer responsible for adequacy of floor or foundation.**
  2. Model 401: Wall-Mounted Articulating Jib – Wall to structurally adequate support. Verify accurate crane applied forces and anchor bolt patterns are provided for structural design.
  3. Model 400: Ceiling-Mounted Articulating Jib: Ceiling or Bridge-Mounted to an existing overhead structure. Verify overhead structure provides adequate support.

### 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 inches (76 mm) from any overhead obstruction.
  2. Minimum horizontal clearance: Two inch (51 mm) from any lateral obstruction.
- D. Mast:**
  1. Skip this section to install a Ceiling-Mounted or Wall-Mounted Articulating Jib Crane.
  2. Refer to installation manual to find dimensions for a specific model jib crane.
  3. Install one set of leveling nuts on the anchor bolts with the top surface approximately one inch above the foundation. Place the mast assembly over the anchor bolts resting on leveling nuts. Install the second set of nuts with plate washers and flat washers. Clamp the plumb fixture to mast top plate.
  4. Select a position on the fixture arm to hang a plumb line. Measure 60 inches down from the top of the mast and use this point to check the two-inch dimension for mast plumb.

5. Position fixture arm directly over one anchor bolt, and measure from the plumb line to the edge of the mast. If this measurement is not two inches, adjust the leveling nut directly below. Turn leveling nut up if greater than two inches, down if less than two inches.
6. Rotate the fixture arm 180 degrees and recheck mast for plumb. Adjust the leveling nuts until you have the same distance on each side of the mast. Repeat this operation at each anchor bolt.
7. When mast is plumb, tighten the locking nuts. Do not grout until installation of boom is complete.

#### **E. Boom**

1. There is no adjustment in the boom; the mast or other support structure must be properly installed (plumb) prior to boom installation.
2. The boom comes from the factory fully assembled. If the bottom entry power option is used, it should be connected before the boom is set in its final position.
3. IF ROTATION STOPS ARE USED, SEE INSTRUCTIONS FOR ROTATION STOPS BEFORE COMPLETING THE NEXT STEP.
4. Place boom into position and attach with (6) one-inch diameter Grade 5 bolts or ASTM A325 flat washers, lock washers, and hex nuts. Tighten until lock washers are fully flattened.
5. Tune friction brakes to their desired level of resistance by adjusting the pads and locking them in place with jam nuts.

#### **F. Wall-Mounted Boom**

1. Hold wall bracket against supporting column in its proper location with a C-clamp or other supporting method.
2. Establish the correct distance from top wall bracket to bottom wall bracket. Hold bottom wall bracket against supporting column with a C clamp or supporting method.
3. Use plumb bob to check alignment of bottom bracket with top bracket in two planes. Alignment must be within 1/16 inch from top bolt hole center to bottom bolt hole center.
4. Using wall brackets as a template, mark established hole locations.
5. Drill holes in column for wall brackets.
6. Mount wall brackets and shims (if applicable) to column with bolts supplied by installer. Ensure all bolts are properly tightened.
7. Lift jib assembly (with bearings attached) into place. Insert the hex head bolt through the bracket. Ensure that the thrust plate is properly located at the bottom of each bearing. Install the lock washer and hex nut onto the bolts. Tighten until lock washers are fully flattened.
8. Connect the hoist to its source of power (either air or electric) if required, as per hoist manufacturer's manual.

#### **G. Ceiling or Bridge-Mounted Boom**

1. Place boom into position and attach with (six) one-inch diameter Grade 5 bolts or ASTM A325 flat washers, lock washers, and hex nuts. Tighten until lock washers are fully flattened.

#### **H. Rotation Stops**

1. **Base rotation stops** must be installed at the same time as boom. Place stops in general location and install with mounting bolts. Use the slots to make final adjustments to stops.
2. **Knuckle rotation stops** are installed using the bearing mounting bolts. Remove (2) bolts at general location of stop and discard. Install rotation stop in orientation shown and attach using bolts and flat washers provided with the stops. Lok-Tite should be used on all bearing bolts. DO NOT substitute lock washers for Lok-Tite and proper torque ratings.

### 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. Grease the base and knuckle bearings. To grease the bearings, remove the socket screw from the side of the bearing. Install the grease fitting. After the bearing is greased, the grease fitting must be removed to prevent interference with the friction brake. Replace the setscrew to protect the bearing from dirt, etc.
4. The bearing bolts should be check for torque level where accessible. Bearing bolts should be torqued as: [5/16 inch Bolts = 18 foot-pounds] [½ inch Bolts = 80 foot-pounds]

#### **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.