SECTION 41 22 00

HOISTS AND CRANES

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\*\* NOTE TO SPECIFIER \*\* Gorbel Inc.; bridge, gantry, and jib cranes.  
This section is based on the products of Gorbel Inc., which is located at:600 Fishers RunFishers, NY 14453Toll Free Tel: 800-821-0086Tel: 585-924-6262Fax: 800-828-1808Email: [request info (info@gorbel.com)](https://arcat.com/rfi?action=email&company=Gorbel%252BInc.&message=RE%253A%2520Spec%2520Question%2520(14600gor)%253A%2520&coid=43076&spec=14600gor&rep=&fax=800-828-1808)  
Web: <http://www.gorbel.com/Solutions/architectsandengineers.aspx>   
 [ [Click Here](https://arcat.com/company/gorbel-inc-43076) ] for additional information.  
Gorbel has over 40+ years' experience providing overhead handling solutions to customers in a wide range of industries. We have a comprehensive line of Crane Technology products, including work station bridge cranes, patented track cranes, I-beam jib cranes, gantries, and work station jib cranes. We also have an exciting line of Ergonomic Lifting products, featuring our G-Forceand Easy Arm®Intelligent Lifting Devices, and our GS Series Hoist line. Our Tether Track Fall Arrest Safety Systems provides a turn-key fall protection solution that exceeds OSHA safety standards.  
We pride ourselves on providing high quality products and quick deliveries, backed by an experienced customer service department, and supported by an international network of knowledgeable distributors. Contact us today and we'll work with you to find the best overhead handling solution for your unique application. Gorbel products are manufactured at state-of-the-art facilities in New York,Alabama and Arizona and sold through an extensive distributor network.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Cranes, Hoists and Lifts of the Following Types:
       1. Free standing work stations bridge cranes.
       2. Ceiling mounted work station bridge cranes.
       3. Ceiling mounted workstation steel monorail cranes.
       4. Free standing jib cranes.
       5. Wall cantilever jib cranes.
       6. Mast type jib cranes.
       7. Wall bracket jib cranes.
       8. Free standing work station jib cranes.
       9. Wall cantilever work station jib cranes.
       10. Wall bracket work station jib cranes.
       11. Free standing articulating jib cranes.
       12. Wall mounted articulating jib cranes.
       13. Ceiling mounted articulating jib cranes.
       14. Lifting device and articulating jibs.
       15. Intelligent lift devices.
       16. Enclosed track jib cranes.
       17. Electric chain hoists.
       18. Fall arrest anchor systems.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 03 30 00 - Cast-in-Place Concrete.

\*\* NOTE TO SPECIFIER \*\* Hoist trolley to move lifting device along bridge is provided as part of work station bridge crane. 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. Delete if not required.

* + 1. Section 41 22 23 - Hoists.

\*\* NOTE TO SPECIFIER \*\* Hoist trolley and can be equipped with an optional electric tractor drive. Tractor drives can also be installed on end trucks to move bridge. Delete if not required.

* + 1. Section 26 05 00 - Common Work Results for Electrical.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. American Institute of Steel Construction (AISC) - Manual of Steel Construction, Part 5, Specification for Structural Joints Using ASTM A325 or ASTM A490 Bolts.
    2. American National Standards Institute (ANSI):ANSI B30.11 - Monorails and Underhung Cranes.
    3. ASTM International (ASTM):
       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.
    4. American Welding Society (AWS) D1.1 - Structural Welding Code.
    5. Occupational Safety and Health Administration (OSHA) - Specification 1910.179 - Overhead and Gantry Cranes.
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Product Data: Manufacturer's data sheets on each product to be used, including:
        1. Describe capacities, performance, operation, and applied forces to foundation.
        2. Preparation instructions and recommendations.
        3. Storage and handling requirements and recommendations.
        4. Installation methods.
     3. Shop Drawings: Shop drawings showing configuration, dimensions, service area, and construction and installation details.
  2. QUALITY ASSURANCE
     1. Manufacturer Qualifications: Company specializing in designing and manufacturing cranes with 25 years successful experience.
     2. Installer Qualifications: Company experienced in assembly and installation of cranes with 5 years successful experience and acceptable to crane manufacturer.
        1. Perform welding by certified operators in accordance with AWS D14.1.
        2. Bolted connections shall be in accordance with torque tightening procedures specified in AISC Manual, Part 5.
        3. Clearly label crane with rated load capacity. Place label at height and location easily read from floor level and loading position.
  3. DELIVERY, STORAGE, AND HANDLING
     1. Store products in manufacturer's unopened packaging until ready for installation.
  4. PROJECT CONDITIONS
     1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
  5. WARRANTY
     1. Manufacturer's Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace assemblies and components that fail in materials and workmanship within warranty period from date of Substantial Completion.
        1. 5 years or 10,000 hours warranty for manual push-pull work station crane, jib crane, and gantry crane products to cover defects in materials and workmanship.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph if motorized jib crane or tractor drive for end truck or hoist trolley is required. Delete if not required.

* + - 1. 2 years or 4,000 hours warranty for motorized tractor products.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: Gorbel Inc., which is located at:600 Fishers RunFishers, NY 14453Toll Free Tel: 800-821-0086Tel: 585-924-6262Fax: 800-828-1808Email: [request info (info@gorbel.com)](https://arcat.com/rfi?action=email&company=Gorbel%252BInc.&message=RE%253A%2520Spec%2520Question%2520(14600gor)%253A%2520&coid=43076&spec=14600gor&rep=&fax=800-828-1808);Web: <http://www.gorbel.com/Solutions/architectsandengineers.aspx>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

\*\* NOTE TO SPECIFIER \*\* Delete if bridge cranes not required.

* 1. BRIDGE CRANES
     1. Performance:
        1. Crane shall provide coverage of rectangular area of size indicated on Drawings and consist of:
           1. Support structure requiring only primary structural support without longitudinal or lateral bracing.
           2. Two rigid, parallel runways. Cranes with more than two runways or with articulating runways are not acceptable.
           3. Rigid, single girder bridge moving perpendicular to runways or monorail. Double girder bridges and ones with articulating or threaded connections are not acceptable.
        2. Modular, pre-engineered design: Crane system shall be capable of expansion, disassembly, and relocation, and accepting additional or multiple mixed capacity bridges.
           1. Crane shall be designed, fabricated, and installed in accordance with ANSI B30.11, and OSHA 1910.179.
        3. Productivity ratio: Crane shall be designed to manually move load with maximum force of 1/100 load weight.
        4. Runway and bridge track: Enclosed type limiting dust and dirt collection on rolling surfaces with maximum deflection of 1/450 span based on capacity plus 15 percent for lifting device weight.
        5. Crane operating temperature: 5 to 200 degrees F (-15 to 93 C).
        6. Crane shall be designed to withstand:
           1. Structural design shall include full rated load capacity plus 15 percent for hoist and trolley weight and 25 percent impact factor for speed of lifting device and weight of tooling.
           2. Crane and hoist dead load.

\*\* NOTE TO SPECIFIER \*\* Delete live load capacity not required.

* + - * 1. Live load capacity equal to net rated hook load: 250 pounds (113 kg).
        2. Live load capacity equal to net rated hook load: 500 pounds (227 kg).
        3. Live load capacity equal to net rated hook load: 1000 pounds (454 kg).
        4. Live load capacity equal to net rated hook load: 2000 pounds (908 kg).
        5. Live load capacity equal to net rated hook load: 4000 pounds (1816 kg).
        6. Inertia forces from crane and load movement.

\*\* NOTE TO SPECIFIER \*\* 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.  
\*\* NOTE TO SPECIFIER \*\* Gorbel offers runways in aluminum and stainless steel. Refer to manufacturer's literature for availability and specification provisions.  
\*\* NOTE TO SPECIFIER \*\* Delete free standing bridge crane if not required.

* + 1. Free Standing Bridge Crane: Work station, bridge crane with free standing support structure, two runways, bridge moving perpendicular to runways, and equipped with enclosed track, end trucks, hoist trolley, festooning system, bumpers, and other accessories.
       1. Acceptable Manufacturer and Model:

\*\* NOTE TO SPECIFIER \*\* Delete model not required.

* + - * 1. Model GLCS-FS: Cranes with trussed steel runways supported at 20 feet (6 m) maximum as manufactured by Gorbel Inc.
        2. Model GLCSL-FS: Cranes with trussed steel runways supported at 25 feet (7.6 m) maximum as manufactured by Gorbel Inc.
        3. Model GLCSLX-FS: Cranes with trussed steel runways supported at 30 feet (9.1 m) maximum as manufactured by Gorbel Inc.
      1. Construction: Fabricate from ASTM A36 steel sections with finished ends and surfaces.
      2. Support structure: Support crane runways with frames consisting of two columns and horizontal header.
         1. Columns: Square tubes with bottom base plate and top header plate.
         2. Header: Fabricated from two back-to-back channels spaced apart and joined with welded end plates. Provide clamp plates, threaded rods, lock washers, and hex nuts for attaching header to column.
         3. Hanger assemblies: Provide support frames with pairs of hanger assemblies that provide a rigid connection for suspending runways. Assembly to consist of clamp angle, clamp plates, threaded rods, lock washers, and hex nuts.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph to specify trussed steel runways, Models GLCS (20 feet (6 m) maximum support centers), GLCSL (25 feet (7.6 m) maximum support centers), and GLCSLX (30 feet (9.1 m) maximum support centers). Delete if not required.

* + - 1. Runways: Vierendeel truss fabricated from square steel tubes and enclosed steel track.
         1. Track: Enclosed, cold formed, steel box track which serves as bottom cord of runway and permits end trucks 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.
         2. Splice joint: Provide truss splice plates, channel-shaped track splice joint, bolts, lock washers, and nuts for joining runway sections. Splice joints must be located within four feet of a support point.
         3. Runway Cantilevers: Up to 4 feet (1219 mm) of cantilever is allowed from a hanger location to the end of the runway.

\*\* NOTE TO SPECIFIER \*\* A short section of enclosed track can be added to runway track for stacking festoon carriers and not limit full coverage of bridge crane. Include the following paragraph for this option. Delete if not required.

* + - * 1. Festoon stack section: Provide enclosed track extension to provide for stacking festoon carriers at end of runway.

\*\* NOTE TO SPECIFIER \*\* Typical bridge is a Vierendeel truss using the enclosed track as the bottom truss cord. The ends of the track extend beyond the truss to connect to end trucks on the runways. This provides a higher trolley saddle since the bridge is not completely positioned below the runways. For cranes with low capacity and short bridges, a length of enclosed track can serve as the bridge. Refer to Gorbel® product literature for type of bridge used for specific crane being specified. Include the following paragraph to specify trussed steel bridge. Delete if not required.

* + - 1. Bridge: Single girder, Vierendeel truss fabricated from rectangular steel tubes and enclosed steel box track; patented truss design for 1000, 2000, and 4000 lb. capacities.
         1. Track serves as bottom cord of bridge and permits hoist trolley and festoon carriers to ride on lower inside flanges.
         2. Fabricate lower running flanges with 2 degrees taper to center trolley within track. Flat, non-centering tracks are not acceptable.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph to specify enclosed steel track bridge. Delete if not required.

* + - 1. Bridge: Enclosed, cold formed steel box track which permits hoist trolleys and festoon carriers to ride along track lower inside flanges. Fabricate lower running flanges with 2 degrees taper to center trolley within track. Flat, non-centering tracks are not acceptable.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph to specify an aluminum track bridge. Delete if not required.

* + - 1. Bridge: Patented extruded aluminum enclosed track reinforced with extruded aluminum T-beam.
         1. Provide as either one piece extrusion or with separate 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.
      2. End trucks: Rigid frame end truck designed to ride inside enclosed runway track and connect to and suspend bridge.
         1. Construction: Stamped steel fabrication with both vertical and horizontal wheels to prevent binding in runway. Designs with welds in tension are not acceptable.
         2. Wheels: Removable, self-centering wheels with sealed lifetime lubricated bearings. Vertical wheels shall be tapered 2 degrees to match track profile. Non-removable or non-tapered wheels are not acceptable. Duracomp 4 wheel material as provided by Gorbel Inc. Steel wheels are not acceptable.
         3. Drop lugs: Provide on both sides of truck to limit truck drop in the event of wheel, axle, or load bar failure.
         4. Connection to the bridge: Provide a rigid connection between bridge and end truck. Articulating connections with threaded hardware are not acceptable.
         5. Designed for easy attachment of peripherals.
      3. Hoist trolley: Rigid-body trolley designed to ride inside enclosed track of bridge and to 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 manufacturer for specified capacity. Trolleys with non-removable clevis pins are not acceptable. Holes provided in body for mechanical connections.
         2. Wheels: Removable, self-centering wheels with sealed lifetime lubricated bearings. Vertical wheels shall be tapered 2 degrees to match track profile. Non-removable or non-tapered wheels are not acceptable. Duracomp 4 wheel material as provided by Gorbel Inc. Steel wheels are not acceptable.
         3. Drop lugs: Provide on both sides of trolley to limit trolley drop in the event of wheel, axle, or load bar failure.
         4. Designed for easy attachment of peripherals.
      4. End stops: Molded composite, resilient bumper installed in runway and bridge tracks to prevent end trucks, hoist trolley, and festoon carriers from rolling out of track. Bolt stops without energy absorbing bumper are not acceptable.

\*\* NOTE TO SPECIFIER \*\* Delete ceiling mounted bridge crane if not required.

* + 1. Ceiling Mounted Bridge Crane: Ceiling mounted, work station, steel construction, bridge crane with overhead hanger assemblies, two runways, bridge moving perpendicular to runways, and equipped with enclosed track, end trucks, hoist trolley, festooning system, bumpers, and other accessories.
       1. Acceptable Manufacturer and Model:

\*\* NOTE TO SPECIFIER \*\* Delete model not required.

* + - * 1. Model GLC: Cranes with plain enclosed steel track runways supported at 6 feet (1.8 m).
        2. Model GLCS: Cranes with trussed steel runways supported at 20 feet (6 m) maximum as manufactured by Gorbel Inc.
        3. Model GLCSL: Cranes with trussed steel runways supported at 20 to 25 feet (6 m to 7.6 m) maximum as manufactured by Gorbel Inc.
        4. Model GLCSLX: Cranes with trussed steel runways supported at 25 to 30 feet (7.6 m to 9.1 m) maximum as manufactured by Gorbel Inc.
      1. Construction: Fabricate from ASTM A36 steel sections with finished ends and surfaces.

\*\* NOTE TO SPECIFIER \*\* Ceiling mounted bridge cranes are typically attached to overhead structural steel framing with hanger assemblies designed to clamp onto wide flange steel beams. Contact Gorbel, Inc. if concrete or other type of support structure is used.

* + - 1. Hanger assemblies: Provide number and type of hanger assemblies required for suspending runways from overhead steel beam support structure.
         1. Equip assemblies with upper hanger bracket adjustable for mounting from 1 to 10 inches (25 mm to 254 mm) flanges and two beam clips.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph if either plain track or trussed runways are suspended by threaded rods below steel support beams. Delete if not required.

* + - * 1. Two-piece hangers suspending runways below support beams shall consist of upper hanger bracket (fits flanges from 1 inches to 10 inches (25 mm to 254 mm)) with beam clips and lower runway bracket connected with threaded B7 alloy steel rod. Provide rods in 20 and 72 inches (508 mm and 1829 mm) lengths for field cutting. Assemblies shall be designed for supporting either plain enclosed steel track runways or trussed steel runways.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph if plain or trussed track runways are flush mounted to steel support beams. Delete if not required.

* + - * 1. Hangers for flush mounting available for plain or trussed track.

\*\* NOTE TO SPECIFIER \*\* Sway bracing is required if runways are suspended by B7 alloy threaded rods below steel support beams. Bracing needs to be designed by architect/engineer, detailed on drawings, and specified in other sections. Gorbel can provide optional sway brace fittings used to connect 1 inch diameter diagonal pipe bracing to top chord of trussed runway. Edit and include the following paragraph if sway bracing is required. Delete if not required.

* + - 1. Sway bracing: Brace runways as detailed on Drawings and specified in Section 05 12 13 - Architecturally-Exposed Structural Steel Framing. Provide runways with sway brace fittings for attachment of diagonal pipe bracing to top chord of trussed runway.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph to specify trussed runway, Models GLCS (20 feet (6 m) maximum support centers), GLCSL (25 feet (7.6 m) maximum support centers), and GLCSLX (30 feet (9.1 m) maximum support centers). Delete if not required.

* + - 1. Runways: Vierendeel truss fabricated from square steel tubes and enclosed steel track.
         1. Track: Enclosed, cold formed, steel box track which serves as bottom cord of runway and permits end trucks 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.
         2. Splice joint: Provide truss splice plates, channel-shaped track splice joint, bolts, lock washers, and nuts for joining runway sections.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph to specify plain enclosed steel track runway, Model GLC (6 feet (1.8 m) maximum support centers). Delete if not required.

* + - 1. Runways: Enclosed, cold formed, steel box track which permits end trucks and festoon carriers to ride along runway.
         1. Fabricate lower running flanges with 2 degrees taper to center truck within track. Flat, non-centering track runways are not acceptable.
         2. Splice joint: Provide channel-shaped track splice joint with bolts, lock washers, and nuts for joining runway sections.

\*\* NOTE TO SPECIFIER \*\* A short section of enclosed track can be added to runway track for stacking festoon carriers so that bridge can cover full runway length. Include the following paragraph for this option. Delete if not required.

* + - 1. Festoon stack section: Provide enclosed track extension to provide for stacking festoon carriers at end of runway.

\*\* NOTE TO SPECIFIER \*\* Depending on crane capacity and bridge length, bridge for ceiling mounted work station bridge crane can be either plain enclosed steel track section of Vierendeel truss. Refer to Gorbel® product literature for appropriate type of bridge.

* + - 1. Include the following paragraph to specify trussed bridge. Delete if not required.
      2. Bridge: Single girder, Vierendeel truss fabricated from rectangular steel tubes and enclosed steel box track. Patented design for 1000, 2000, and 4000 lb. capacities.
         1. Track serves as bottom cord of bridge and permits hoist trolley and festoon carriers to ride on lower inside flanges.
         2. Fabricate track lower running flanges with 2 degrees taper to center trolley within track. Flat, non-centering tracks are not acceptable.
         3. Include the following paragraph to specify plain enclosed steel track bridge. Delete if not required.
      3. Bridge: Enclosed, cold formed, steel box track which permits hoist trolley and festoon carriers to ride along lower inside flanges. Fabricate lower running flanges with 2 degrees taper to center truck within track. Flat, non-centering track bridges are not acceptable.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph to specify an aluminum track bridge. Delete if not required.

* + - 1. Bridge: Patented extruded aluminum enclosed track reinforced with extruded aluminum T-beam.
         1. Provide as either one piece extrusion or with separate 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.
      2. End trucks: Rigid frame end truck designed to ride inside enclosed runway track and connect to and suspend bridge.
         1. Construction: Stamped steel fabrication with both vertical and horizontal wheels to prevent binding in runway. Designs with welds in tension are not acceptable.
         2. Wheels: Removable, self-centering wheels with sealed lifetime lubricated bearings. Vertical wheels shall be tapered 2 degrees to match track profile. Non-removable or non-tapered wheels are not acceptable. Duracomp 4 wheel material as provided by Gorbel, Inc. Steel wheels are not acceptable.
         3. Drop lugs: Provide on both sides of truck to limit truck drop in the event of wheel, axle, or load bar failure.
         4. Connection to the bridge: Provide a rigid connection between bridge and end truck. Articulating connections with threaded hardware are not acceptable.
         5. Designed for easy attachment of peripherals.
      3. Hoist trolley: Rigid-body trolley designed to ride inside enclosed track of bridge 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 manufacturer for specified capacity. Trolleys with non-removable clevis pins are not acceptable. Holes provided in body for mechanical connections.
         2. Wheels: Removable, self-centering wheels with sealed lifetime lubricated bearings. Vertical wheels shall be tapered 2 degrees to match track profile. Non-removable or non-tapered wheels are not acceptable. Duracomp 4 wheel material as provided by Gorbel Inc. Steel wheels are not acceptable.
         3. Drop lugs: Provide on both sides of trolley to limit trolley drop in the event of wheel, axle, or load bar failure.
         4. Designed for easy attachment of peripherals.
      4. End stops: Molded composite, resilient bumper installed in runway and bridge tracks to prevent end trucks, hoist trolley, and festoon carriers from rolling out of track. Bolt stops without energy absorbing bumper are not acceptable.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Ceiling Mounted Monorail Crane: Ceiling mounted, work station, all-steel construction, monorail crane with overhead hanger assemblies, enclosed track, hoist trolley, festooning system, bumpers, and other accessories.
       1. Acceptable Manufacturer and Model:

\*\* NOTE TO SPECIFIER \*\* Delete model not required.

* + - * 1. Model No. GLM: Cranes with plain enclosed steel track monorail supported at 6 feet (1.8 m) as manufactured by Gorbel, Inc.
        2. Model No. GLMS: Cranes with trussed steel monorail supported at 20 feet (6.1 m) maximum as manufactured by Gorbel, Inc.
        3. Model No. GLCML: Cranes with trussed steel monorail supported at 20 to 25 feet (6.1 m to 7.6 m) maximum as manufactured by Gorbel, Inc.
        4. Model No. GLMSLX: Cranes with trussed steel monorail supported at 25 to 30 feet (7.6 m to 9.1 m) maximum as manufactured by Gorbel, Inc.
      1. Construction: Fabricate from ASTM A36 steel sections with finished ends and surfaces.

\*\* NOTE TO SPECIFIER \*\* Ceiling mounted monorail cranes are typically attached to overhead structural steel framing with hanger assemblies designed to clamp onto wide flange steel beams. Contact Gorbel, Inc. if concrete or other type of support structure is used.

* + - 1. Hanger assemblies: Provide number and type of hanger assemblies required for suspending monorail from overhead steel beam support structure.
         1. Equip assemblies with upper hanger bracket adjustable for mounting from 1 to 10 inches (25 mm to 254 mm) flanges and two beam clips.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph if either plain track or trussed monorail is suspended by threaded rods below steel support beams. Delete if not required.

* + - * 1. Two-piece hangers suspending monorail below support beams shall consist of upper hanger bracket (fits flanges from 1 inches to 10 inches (25 mm to 254 mm)) with beam clips and lower monorail bracket connected with threaded B7 alloy steel rod. Provide rods in 20 and 72 inches (508 mm and 1829 mm) lengths for field cutting. Assemblies shall be designed for supporting either plain enclosed steel track monorails or trussed steel monorails.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph if plain track monorails are flush mounted to steel support beams. Delete if not required.

* + - * 1. Hangers for flush mounting plain enclosed steel track monorail shall be one-piece assembly designed for monorail either parallel or perpendicular to support beams.

\*\* NOTE TO SPECIFIER \*\* Sway bracing is required if monorail is suspended by threaded rods below steel support beams. Bracing needs to be designed by architect/engineer, detailed on drawings, and specified in other sections. Gorbel can provide optional sway brace fittings used to connect 1 inch diameter diagonal pipe bracing to top chord of trussed monorail. Edit and include the following paragraph if sway bracing is required. Delete if not required.

* + - 1. Sway bracing: Brace monorail as detailed on drawings, in installation manuals, and specified in Section 05 12 13 - Architecturally-Exposed Structural Steel Framing. Provide monorail with sway brace fittings for attachment of diagonal pipe bracing to top chord of trussed monorail.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph to specify trussed monorail, Models GLCS (20 feet (6.1 m) maximum support centers), GLCSL (25 feet (7.6 m) maximum support centers), and GLCSLX (30 feet (9.1 m) maximum support centers). Delete if not required.

* + - 1. Monorail: Vierendeel truss fabricated from square steel tubes and enclosed steel track.
         1. Track: Enclosed, cold formed, steel box track which serves as bottom cord of monorail and permits hoist trolley 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.
         2. Splice joint: Provide truss splice plates, channel-shaped track splice joint, bolts, lock washers, and nuts for joining monorail sections.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph to specify plain enclosed steel track monorail, Model GLM. Delete if not required.

* + - 1. Monorail: Enclosed, cold formed, steel box track which permits hoist trolley and festoon carriers to ride along monorail.
         1. Fabricate lower running flanges with 2 degrees taper to center trolley within track. Flat, non-centering tracks are not acceptable.
         2. Splice joint: Provide channel-shaped track splice joint with bolts, lock washers, and nuts for joining monorail sections.

\*\* NOTE TO SPECIFIER \*\* A short section of enclosed track can be added to monorail track for stacking festoon carriers. Include the following paragraph for this option. Delete if not required.

* + - 1. Festoon stack section: Provide enclosed track extension to provide for stacking festoon carriers at end of monorail.
      2. Hoist trolley: Rigid-body trolley designed to ride inside enclosed track of bridge 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 manufacturer for specified capacity. Trolleys with non-removable clevis pins are not acceptable. Holes provided in body for mechanical connections.
         2. Wheels: Removable, self-centering wheels with sealed lifetime lubricated bearings. Vertical wheels shall be tapered 2 degrees to match track profile. Non-removable or non-tapered wheels are not acceptable. Duracomp 4 wheel material as provided by Gorbel Inc. Steel wheels are not acceptable.
         3. Drop lugs: Provide on both sides of trolley to limit trolley drop in the event of wheel, axle, or load bar failure.
         4. Designed for easy attachment of peripherals.
      3. End stops: Molded composite, resilient bumper installed in monorail track to prevent hoist trolley and festoon carriers from rolling out of track. Bolt stops without energy absorbing bumper are not acceptable.

\*\* NOTE TO SPECIFIER \*\* Hoist trolley and end truck can be motorized using Gorbel® Tractor Drive. Include this article for this option. Delete model not required.

* + 1. Tractor Drive:
       1. Provide electric tractor drive for motorized operation of hoist trolley and end truck as indicated or scheduled; Tractor Drive as manufactured by Gorbel, Inc.
          1. Type: Variable frequency drive assembly with worm gear reducer, molded polyurethane tread, and adjustable counterbalance to ensure proper drive wheel alignment.

\*\* NOTE TO SPECIFIER \*\* Standard drive speeds are 70, 90, and 120 feet per minute. Other speeds are available as options. Delete speed not required.

* + - * 1. Speed: 70 feet per minute (21.3 m per minute).
        2. Speed: 90 feet per minute (27.4 m per minute).
        3. Speed: 120 feet per minute (36.5 m per minute).
        4. Motor: 1/3 HP, 1800 RPM, 3 phase, 208-460 volt, with thermal overload protection.

\*\* NOTE TO SPECIFIER \*\* Either 120 volt or 24 volt controls can be provided. Control panel is typically field wired to drive motor. As an option, the system can be factory wired. Delete voltage not required.

* + - * 1. Controls: 120 volt control package with transformer, terminal strips, fusing, enclosure, and mounting brackets.
        2. Controls: 24 volt control package with transformer, terminal strips, fusing, enclosure, and mounting brackets.

\*\* NOTE TO SPECIFIER \*\* Control panel is typically field wired to drive motor. As an option, the system can be factory wired. Delete option not required.

* + - * 1. Controls to be field wired to drive motor.
        2. Controls to be factory wired to drive motor.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Festoon Assemblies:

\*\* NOTE TO SPECIFIER \*\* Several accessories are provided as options for bridge cranes. Select required options from the following. Contact Gorbel, Inc. or refer to product literature if other types of accessories are required. If motorized tractor drive or electric or air-powdered lifting device is used, a length of cable or hose can be provided for installation on runway and bridge. Include the following to specify hose or cable.

* + - 1. Provide length of cable and/or air hose to supply lifting device. Supply shall be festooned along bridge and runway. Refer to drawings for type and size.

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

* + - 1. Festoon trolleys: Four-wheeled trolleys with pivoting saddle and applicable attachment to support service run on runway or bridge and allowing festooning as end truck or hoist trolley travels.

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

* + - 1. Festoon gliders: T-shaped gliders with adjustable applicable attachment to support service runs on runway or bridge and allowing festooning as end truck or hoist trolley travels.

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

* + - 1. Festoon clamp: Steel clamp assembly attached to track to prevent festoon trolleys and gliders from exiting track.

\*\* NOTE TO SPECIFIER \*\* Festoon tow clamps are required for festooning electrical cable, air hose, or vacuum hose to prevent festoon from binding under with end truck or trolley.

* + - 1. Festoon tow clamp: Steel clamp assembly attached to track to prevent festoon from binding under with end truck or trolley.

\*\* NOTE TO SPECIFIER \*\* Telescoping bridges and interlock/transfer cranes can also be provided for bridge crane systems. Contact Gorbel, Inc. for product information and assistance in specifying these accessories.  
\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* 1. JIB CRANES
     1. Performance:
        1. Crane shall be designed, fabricated, and installed in accordance with ANSI B30.11 and OSHA 1910-179.
        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.

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

* + - 1. Crane shall be designed to withstand the following:

\*\* NOTE TO SPECIFIER \*\* Free standing jib crane, free standing work station jib crane, wall cantilever work station jib crane, wall bracket aluminum work station jib crane, free standing articulating jib crane, wall mounted articulating jib crane and ceiling mounted articulating jib crane. Delete capacity not required.  
\*\* NOTE TO SPECIFIER \*\* Free standing work station jib crane, wall bracket aluminum work station jib crane and wall cantilever work station jib crane are the only models available in 100 and 1000 pound capacity.  
\*\* NOTE TO SPECIFIER \*\* Wall bracket aluminum work station jib crane is only model available in 2000 pound capacity.

* + - * 1. Live load capacity equal to net rated hook load: 100 pounds (45 kg).
        2. Live load capacity equal to net rated hook load: 150 pounds (68 kg).
        3. Live load capacity equal to net rated hook load: 250 pounds (113 kg).
        4. Live load capacity equal to net rated hook load: 500 pounds (227 kg).
        5. Live load capacity equal to net rated hook load: 1000 pounds (454 kg).
        6. Live load capacity equal to net rated hook load: 2000 pounds (908 kg).

\*\* NOTE TO SPECIFIER \*\* Wall cantilever, wall bracket and mast type jib crane. Wall bracket jib crane not available in 1/4 ton capacity. Delete capacity not required.

* + - * 1. Live load capacity equal to net rated hook load: 1/4 ton (227 kg).
        2. Live load capacity equal to net rated hook load: 1/2 ton (454 kg).
        3. Live load capacity equal to net rated hook load: 1 ton (907 kg).
        4. Live load capacity equal to net rated hook load: 2 ton (1814 kg).
        5. Live load capacity equal to net rated hook load: 3 ton (2721 kg).
        6. Live load capacity equal to net rated hook load: 5 ton (4536 kg).

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

* + - * 1. Base crane structural design on live load capacity plus 15 percent for hoist and trolley weight and 25 percent for impact.

\*\* NOTE TO SPECIFIER \*\* 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.   
\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Free Standing Jib Crane: Crane shall consist of mast requiring foundation support and a 360 degree rotating boom. Provide rotating collector assembly with service entrance and festoon service support as indicated.
       1. Acceptable Manufacturer and Model:

\*\* NOTE TO SPECIFIER \*\* Delete model not required.

* + - * 1. Model No. FS300 as manufactured by Gorbel Inc.: Base plate mounted crane.

Base plate mounting: Provide hexagonal steel base plate welded to mast for anchoring crane to concrete foundation cast flush with floor slab.

* + - * 1. Model No. FS350 as manufactured by Gorbel Inc.: Insert mounted crane.

Insert mounting: Provide square steel base plate welded to mast for anchoring mast to concrete foundation cast below floor slab. Base plate is then embedded with concrete. There shall be no exposed base plate or gussets.

* + - * 1. Model No. FS350S as manufactured by Gorbel Inc.: sleeve mounted crane.

Sleeve mounting: Provide steel pipe sleeve with steel base plate and centering pin of size indicated on shop drawings. Pipe sleeve shall be bolted to concrete foundation cast below floor slab and then embedded with reinforced concrete. Sleeve, base plate, and bolts shall not be exposed. Mast equipped with steel plate end with centering hole shall be inserted in sleeve and permanently secured to prevent rotation.

* + - 1. Construction: Fabricate from ASTM A36 steel sections with finished ends and surfaces.
      2. Mast: Stationary steel pipe, perpendicular to boom. Equip mast top with plate and pivot pin to receive head assembly.
      3. Boom: Horizontal, wide flange steel beam bolted to head assembly and designed for hoist trolley traveling on bottom flange. Reinforce with cap channel as required for lateral stability. Equip boom with stops to limit movement of trolley.
      4. Head assembly: Welded steel plate and channel fabrication fitted over mast, bolted to boom, and designed to transfer boom load to mast and to rotate. Assembly shall allow for installation of head prior to boom attachment and provide maximum hoist lift.
         1. Top pivot bearing assembly: Designed to connect head assembly to mast and transfer load from boom. Weight bearing channel connecting sides of head assembly shall contain tapered roller bearings allowing easy rotation.
         2. Retaining pin: Inserted through mast pivot pin above weight bearing channel to prevent accidentally dislodging head assembly. Cranes without retaining pin are not acceptable.
         3. Trunnion roller assembly: Designed to rotate around mast and transmit moment force from boom to mast. Provide trunnion rollers with tapered bearings held in steel channel with 1 inch (25 mm) diameter bolts. Masts less than 18 inches (457 mm) diameter shall have 2 rollers and larger masts shall have 4 rollers. Assembly shall rotate around mast with full roller face contact. Roller surface shall be sufficiently large to prevent cutting into mast. Cranes with small rollers or cams requiring wear band on mast are not acceptable.

\*\* NOTE TO SPECIFIER \*\* Wall cantilever jib cranes are very cost effective and allow maximum hoist lift. However, they require a structurally adequate wall, column, or other vertical member for support. Delete if not required.

* + 1. Cantilevered Jib Crane: Crane shall consist of wall bracket mounted horizontal boom attached to vertical mast which rotates 200 degrees covering a semi-circular area.
       1. Acceptable Manufacturer and Model:
          1. Model No. WC200-B as manufactured by Gorbel Inc.
       2. Construction: Fabricate from ASTM A36 steel sections with finished ends and surfaces.

\*\* NOTE TO SPECIFIER \*\* Depending on crane size, boom is either factory welded to mast or field bolted. Welding is used when mounting bracket center to center spacing is 72 inches (1829 mm) or less. Cranes with greater spacing are shipped disassembled to be field bolted.

* + - 1. Boom: Horizontal, wide flange steel beam designed for hoist trolley traveling on bottom flange. Reinforce with cap channel as required for lateral stability and stiffeners at critical stress points. Equip boom with stops to limit movement of trolley.
      2. Mast: Vertical, wide flange steel section perpendicular to boom and parallel to crane rotation axis.

\*\* NOTE TO SPECIFIER \*\* Motorized wall cantilever jib cranes require extra rigidity to withstand forces of motorized rotation. This is accomplished by boxing in mast with steel plate. An extended plate and gusset welded to mast bottom is also required to receive motor operator rotation arm. Include the following two paragraphs for if motorized crane is being specified. Delete if not required.

* + - * 1. Box-in mast by welding steel plate to mast flanges to provide rigidity for withstanding motor operator induced forces.
        2. Weld steel plate and gusset to mast bottom to receive motor operation rotation arm.
      1. Two Mounting Brackets: Designed to anchor mast to support structure, allow boom rotation, resist drift. Load-carrying parts will be double shear and no bolt stress will exceed 10,000 psi (69 MPa). Brackets with tension welds are not acceptable.
         1. Formed channel to be bolted to support structure and equipped with pivot pin and oil-impregnated bronze thrust washer.
         2. Fabricated "I" bracket to be welded to mast and joined to formed channel with pivot pin. Provide with oil-impregnated bronze bushings and field lubricated grease fitting.

\*\* NOTE TO SPECIFIER \*\* Wall bracket jib cranes are very economical. However, they require a structurally adequate wall, column, or other vertical member for support. Delete if not required.

* + 1. Wall Bracket Jib Cranes: Crane shall consist of 200 degree rotating steel beam boom covering a semi-circular area and suspended by brackets and tie rod from vertical support structure.
       1. Acceptable Manufacturer and Model:
          1. Model No. WB100-G as manufactured by Gorbel, Inc.
       2. Construction: Fabricate from ASTM A36 steel sections with finished ends and surfaces.
       3. Boom: Horizontal, adjustable, wide flange steel beam designed for hoist trolley traveling on bottom flange. Reinforce with cap channel as required for lateral stability. Equip boom with stops to limit movement of trolley.
       4. 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 a single tie rod suspending boom. Brackets with tension welds are not acceptable. Top bracket consists of:
          1. Steel channel anchored to supporting structure with double shear bolted connections.
          2. 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.
          3. Formed clevis attached to tie rod with adjusting nut and lock washer and retained in clevis bracket with double shear pin.
       5. 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.
       6. 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.
       7. Tie rod: Single, right-hand threaded at each end, ASTM A36 steel rod. Double tie rods are not acceptable.

\*\* NOTE TO SPECIFIER \*\* Mast type jib cranes are economical, capable of 360 degrees rotation allowing full utilization of working area, and exert smaller forces on supporting structure than any other type of jib crane. However, mast type jib cranes do require foundation support and top stabilization. Delete if not required.

* + 1. Mast Type Jib Crane: Crane shall consist of floor-supported, top-stabilized steel beam mast connected to 360 degree rotating steel beam boom covering circular work area.
       1. Acceptable Manufacturer and Model:

\*\* NOTE TO SPECIFIER \*\* Delete model not required.

* + - * 1. Model MT450 - Drop cantilever as manufactured by Gorbel, Inc.
        2. Model MT400 - Full cantilever as manufactured by Gorbel, Inc.
      1. Construction: Fabricate from ASTM A36 steel sections with finished ends and surfaces.

\*\* NOTE TO SPECIFIER \*\* For Model MT400 boom is attached to top of mast providing maximum hoist lift. For Model MT450 boom can be placed at any level on mast allowing for overhead obstructions such as lighting fixtures, ductwork, and piping. Height under boom will vary with crane configuration, project conditions, and user requirements.

* + - 1. Boom: Horizontal, wide flange steel beam designed for hoist trolley traveling on bottom flange.
         1. Reinforce with cap channel as required for lateral stability.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph for full cantilever configuration, Model MT400. Delete if not required.

* + - * 1. Provide plate welded to inside end of boom to be bolted to outside flange of mast.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph for drop cantilever configuration, Model MT450. Delete if not required.

* + - * 1. Provide plate and gusset welded to top inside end of boom to be bolted to outside flange of mast at specified height.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph if trolley type hoist is used. Delete if not required.

* + - * 1. Equip boom with stops to limit movement of trolley.
      1. Mast: Vertical, wide flange steel section perpendicular to boom and parallel to crane rotation axis.
         1. Reinforce with stiffeners at critical stress points.
         2. Provide steel plate with pivot pin for top and bottom ends of mast.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph for full cantilever configuration, Model MT400. Delete if not required.

* + - * 1. Provide plate welded to top of mast to be bolted to top flange of boom.

\*\* NOTE TO SPECIFIER \*\* Motorized mast type jib cranes require extra rigidity to withstand forces of motorized rotation. This is accomplished by boxing in mast with steel plate. Include the following paragraph for motorized mast type jib crane. Delete if not required.

* + - * 1. Box-in mast by welding steel plate to mast flanges to provide rigidity for withstanding motor operator induced forces.
      1. Top and bottom bearing assemblies: Consist of 3/4 inch (19 mm) thick steel mounting plate with self-aligning, radial ball bearing in machined housing welded to mounting plate and field lubricated grease fitting. Provide bottom bearing assembly with bronze thrust washer.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Free Standing Work Station Jib Crane: Crane shall consist of free standing mast requiring only foundation support and 360 degree rotating boom covering circular work area around mast. Free standing, base plate mounted, manually operated, steel, work station jib crane consisting of stationary mast and rotating boom and equipped with pivot pin, trunnion roller assembly, enclosed track, hoist trolley and other accessories.
       1. Acceptable Manufacturer and Model:
          1. Model No. WSJ360 as manufactured by Gorbel Inc.
       2. Construction: Fabricate from ASTM A36 steel sections with finished ends and surfaces.
       3. Mast: Stationary steel pipe, perpendicular to boom. Equip mast with:
          1. Baseplate: Square or hexagonal steel base plate welded to mast for anchoring crane to concrete foundation. Welded triangular, full-web gusset plates to mast and base plate for stability and reinforcement where required. Cranes with open gussets or base plates made from rings and subject to warping are not acceptable.
          2. Top plate: Circular steel plate with pivot pin to receive boom. Provide retaining pin to prevent accidentally dislodging boom. Cranes without retaining pin are not acceptable.
       4. Boom: Open truss construction fabricated from rectangular steel tubes and enclosed steel track.
          1. Configuration: L-shape with horizontal boom and vertical leg to hold trunnion rollers.
          2. Trolley track: Enclosed, cold formed, steel box track which serves as bottom cord of horizontal boom and permits 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. Trunnion roller or cam follower assembly: Designed to rotate around mast and transmit moment load from boom to mast. Assembly is bolted to steel attachment angle welded to bottom leg of boom and consists of two rollers held in steel bracket with bolts. Assembly shall rotate around mast with full roller face contact. Roller surface shall be sufficiently large to prevent cutting into mast.
          4. Pivot assembly: Attached to extended top cord of boom and fits over mast pivot pin. Provide with tapered roller pivot bearings.
       5. 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. Holes provided in body for mechanical connections.
          2. Wheels: Four, removable, self-centering wheels with sealed lifetime lubricated bearings 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 in the event of wheel, axle, or load bar failure.
          4. Designed for easy attachment of peripherals.
       6. 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.

\*\* NOTE TO SPECIFIER \*\* Free standing work station jib cranes can be provided with a base assembly capable of being lifted with lift truck and transported to multiple locations. Delete if not required.

* + - 1. Portable base: Provide steel base assembly to anchor mast and allow crane to be transported to multiple locations with lift truck.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Wall Cantilever Work Station Jib Crane: Wall cantilever work station jib crane including hoist trolley. Crane shall consist of wall mounted, manually operated, horizontal boom cantilevered from vertical leg mast which rotates 200 degrees covering a semi-circular area.
       1. Acceptable Manufacturer and Model:
          1. Model No. WSJ200 as manufactured by Gorbel Inc.
       2. Construction: Fabricate from ASTM A36 steel sections with finished ends and surfaces.
       3. Configuration: L-shape with horizontal boom and vertical leg mast. Provide with top and bottom pivots pins.
       4. Trolley track: Enclosed, cold formed, steel box track which serves as bottom cord of horizontal boom and permits 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.
       5. Top and bottom pivot mounting assemblies: Designed to anchor boom/mast to support structure, allow boom/mast rotation and resist drift. Assembly consists of steel bracket, bearings, and cotter pins.
       6. 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. Holes provided in body for mechanical connections.
          2. Wheels: Four, removable, self-centering wheels with sealed lifetime lubricated bearings 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 drop in the event of wheel, axle, or load bar failure.
          4. Designed for easy attachment of peripherals.
       7. 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 are not acceptable.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Wall Bracket, Manually Operated, Work Station, Aluminum Jib Crane: Crane shall consist of 200 degree rotating aluminum beam boom covering a semi-circular area and suspended by brackets and tie rod from vertical support structure. Wall bracket supported, manually operated, work station jib crane with rotating aluminum boom with enclosed track, brackets, tie rod, hoist trolley, and other accessories;
       1. Acceptable Manufacturers and Model:
          1. Model No. AL-100-GT as manufactured by Gorbel, Inc.
       2. Construction: Fabricate from ASTM B221 extruded aluminum sections and ASTM A36 steel sections with finished ends and surfaces.
       3. Boom: Extruded aluminum enclosed track reinforced with extruded aluminum T-beam bolted to track.
       4. 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.
       5. 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.
       6. 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.
       7. Bottom bracket: Steel fabrication designed to absorb downward and compressive boom forces, allow boom rotation, and resist boom drift. Bracket consists of a channel bolted to supporting structure and rotating clevis with boom connector plates.
       8. Tie rod: Single, right-hand threaded at each end, ASTM A36 steel, 1 inch diameter rod.
       9. 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. Holes provided in body for mechanical connections.
          2. Wheels: Four, removable, self-centering wheels with sealed lifetime lubricated bearings 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 drop in the event of wheel, axle, or load bar failure.
          4. Designed for easy attachment of peripherals.
       10. 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.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Free Standing, Manually Operated, Articulated Arm Jib Crane: Crane shall consist of free standing mast requiring only foundation support and articulating assembly consisting of 360 degree pivoting boom with 360 degree rotating arm allowing loads to be rotated close to mast and positioned around an obstruction or through a door opening.
       1. Acceptable Manufacturer and Model:
          1. Model No. AJ360-F as manufactured by Gorbel, Inc.
       2. Construction: Fabricate from ASTM A36 steel sections with finished ends and surfaces.
       3. Mast: Stationary steel pipe, perpendicular to boom/arm assembly. Equip mast with:
          1. Hexagonal steel base plate welded to mast for anchoring crane to concrete foundation. Weld triangular, full-web gusset plates to mast and base plate for stability and reinforcement. Cranes with open gussets or base plates made from rings and subject to warping are not acceptable.
          2. Circular steel top plate to receive boom/arm assembly.
       4. Articulating boom/arm assembly: Fabricate boom and arm from rectangular steel tubes connected with pivot joint.
          1. Equip inside boom end with steel pipe pivot assembly with circular steel plate for attachment to mast and reinforced with gussets.
          2. Equip arm outside end with steel plate clevis with 1-1/2 inches (38 mm) diameter hole to receive lifting device.
          3. Provide pivot joints with friction brake bolts for adjusting boom and arm rotation.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Manually Operated, Wall Mounted Jib Crane with Articulating Arm: Crane shall consist of wall mounted cantilevered mast and articulating assembly consisting of 200 degree pivoting boom with 360 degree rotating arm allowing loads to be rotated close to mast and positioned around an obstruction and through a door opening.
       1. Acceptable Manufacturer and Model:
          1. Model No. AJ200 as manufactured by Gorbel, Inc.
       2. Construction: Fabricate from ASTM A36 steel sections with finished ends and surfaces.
       3. Mast: Vertical, rectangular steel tube perpendicular to boom/arm assembly and parallel to crane rotation axis. Provide corner web gusset for mast boom joint.
       4. Articulating boom/arm assembly: Fabricate boom and arm from rectangular steel tubes connected with pivot joint.
          1. Factory weld to mast.
          2. Equip arm outside end with steel plate clevis with 1-1/2 inches (38 mm) diameter hole to receive lifting device.
          3. Provide boom/arm pivot joint with friction brake bolts for adjusting boom and arm rotation.
       5. Two mounting brackets: Designed to anchor mast to support structure, allow boom rotation, and resist drift. Load-carrying parts will be double shear and no bolt stress will exceed 10,000 psi (69 MPa). Brackets with tension welds are not acceptable. Bracket consists of:
          1. Formed channel to be bolted to support structure and equipped with pivot pin and thrust washer.
          2. Fabricated I bracket to be welded to mast and joined to formed channel with pivot pin. Provide with oil-impregnated bronze bushings and field lubricated grease fitting.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Ceiling Mounted, Manually Operated, Jib Crane with Articulating Arm: Crane shall consist of head mounting assembly and articulating assembly consisting of 360 degree pivoting boom with 360 degree rotating arm allowing loads to be rotated close to ceiling mount and positioned around an obstruction and through a door opening.
       1. Acceptable Manufacturer and Model:
          1. Model No. AJ360-C as manufactured by Gorbel, Inc.
       2. Construction: Fabricate from ASTM A36 steel sections with finished ends and surfaces.
       3. Head mounting assembly: Circular steel base plate welded to steel pipe pivot factory installed on steel boom/arm assembly.
          1. Weld triangular, full-web gusset plates to pipe and base plate for stability and reinforcement. Cranes with open gussets or base plates made from rings and subject to warping are not acceptable.
          2. Pre-drill base plate with bolt holes anchorage to overhead support.
       4. Articulating boom/arm assembly: Fabricate boom and arm from rectangular steel tubes connected with pivot joint.
          1. Equip arm outside end with steel plate clevis with 1-1/2 inches (38 mm) diameter hole to receive lifting device.
          2. Provide pivot joints with friction brake bolts for adjusting boom and arm rotation.

\*\* NOTE TO SPECIFIER \*\* Include this article if jib crane is motorized. Delete if not required.

* + 1. Motorized Operation:
       1. Provide motor operator to rotate crane boom and arm.
       2. Type: Variable frequency, direct drive allowing single or multiple speed applications, with torque limiter and worm gear reducer in oil bath.
       3. 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.
       4. 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.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Festoon Assemblies:

\*\* NOTE TO SPECIFIER \*\* 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.

* + - 1. Provide length of cable and/or air hose to supply lifting device. Supply shall be festooned along boom.

\*\* NOTE TO SPECIFIER \*\* 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.

* + - 1. Festoon trolleys: Four-wheeled trolleys with pivoting saddle and applicable attachment to support service run on boom. Allow festooning as hoist trolley travels.

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

* + - 1. Festoon gliders: T-shaped gliders with adjustable applicable attachment to support service runs on boom and allowing festooning as hoist trolley travels.

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

* + - 1. Festoon clamp: Steel clamp assembly attached to track to prevent festoon trolleys and gliders from exiting track.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* 1. LIFTING DEVICE AND ARTICULATING JIBS

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Free Standing Easy Arm: Intelligent lifting device and articulating jib in one unit. Processor controlled servo drive system lifting device for human operator.
       1. Height under Hook and Span: 6 feet (1829 mm) height, 6 feet (1829 mm) span.
       2. Height under Hook and Span: 6 feet (1829 mm) height, 8 feet (2438 mm) span.
       3. Height under Hook and Span: 6 feet (1829 mm) height, 10 feet (3048 mm) span.
       4. Height under Hook and Span: 8 feet (2438 mm) height, 6 feet (1829 mm) span.
       5. Height under Hook and Span: 8 feet (2438 mm) height, 8 feet (2438 mm) span.
       6. Height under Hook and Span: 8 feet (2438 mm) height, 10 feet (3048 mm) span.

\*\* NOTE TO SPECIFIER \*\* Delete options not required.

* + - 1. Required Options:
         1. Float mode.
         2. Portable base.
         3. Soft Touch pendant handle.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Under Hung Easy Arm: Intelligent lifting device and articulating jib in one unit. Processor controlled servo drive system lifting device for human operator.
       1. Span and Secondary Boom Span: 6 feet (1829 mm) span, 36 inch (914 mm) secondary boom span.
       2. Span and Secondary Boom Span: 8 feet (2438 mm) span, 48 inch (1219 mm) secondary boom span.
       3. Span and Secondary Boom Span: 10 feet (3048 mm) span, 60 inch (1524 mm) secondary boom span.

\*\* NOTE TO SPECIFIER \*\* Delete options not required.

* + - 1. Required Options:
         1. Float mode.
         2. Soft Touch pendant handle.

\*\* NOTE TO SPECIFIER \*\* The Gorbel® PIVOT PRO jib crane is pre-engineered for vacuum lift operation. The lift tube weight allowance is 40 pounds (for example, a jib crane rated for 150 pounds allows for a 150 pound live weight plus 40 pounds for the weight of the lift tube). There is also an allowance of 50% of the crane capacity for impact caused by vacuum use. Delete if not required.

* + 1. Pivot Pro Articulating Jib Crane as manufactured by Gorbel, Inc.

\*\* NOTE TO SPECIFIER \*\* Delete type not required.

* + - 1. Type: Floor mounted - free standing.

\*\* NOTE TO SPECIFIER \*\* Delete height not required.

* + - * 1. Height Under Boom: 8 feet (2.4 m).
        2. Height Under Boom: 10 feet (3 m).
        3. Height Under Boom: 12 feet (3.7 m).
      1. Type: Wall/column mount.

\*\* NOTE TO SPECIFIER \*\* Delete capacity not required.

* + - 1. Capacity: 50 lbs (23 kg).
      2. Capacity: 75 lbs (34 kg).
      3. Capacity: 100 lbs (45 kg).
      4. Capacity: 150 lbs (68 kg).

\*\* NOTE TO SPECIFIER \*\* Delete coverage not required.

* + - 1. Coverage: Circular, spans to 8 feet (2.4 m).
      2. Coverage: Circular, spans to 10 feet (3 m).
      3. Coverage: Circular, spans to 12 feet (3.7 m).
      4. Rotation: 360 degree rotation on primary boom and 300 degree on secondary arm.

\*\* NOTE TO SPECIFIER \*\* Options and Accessories:

* + - 1. Provide portable base for free standing column mount.
      2. Provide vacuum filter mounting bracket.
      3. Provide vacuum blower platform.
      4. Provide smart hook mounted to mast to store tube filter.
      5. Provide additional hose, clamps, and mounting hardware as indicated or required.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* 1. INTELLIGENT ASSIST DEVICES
     1. Motorized Lifting Assembly: Processor controlled servo drive system lifting and moving device for human operator.

\*\* NOTE TO SPECIFIER \*\* Delete capacity not required.

* + - 1. Maximum Capacity (Load & Tool): 1320 lb (600 kg).
         1. Maximum Lifting Speed Fully Loaded: 21 ft/minute (6.40 m/minute).
         2. Maximum Lift Range: 5.5 ft (1.68 m).
      2. Maximum Capacity (Load & Tool): 660 lb (300 kg).
         1. Maximum Lifting Speed Fully Loaded: 42 ft/minute (12.80 m/minute).
         2. Maximum Lift Range: 11 ft (3.35 m).
      3. Maximum Capacity (Load & Tool): 330 lb (150 kg).
         1. Maximum Lifting Speed Fully Loaded: 75 ft/minute (23 m/minute).
         2. Maximum Lift Range: 11 ft (3.35 m).
      4. Maximum Capacity (Load & Tool): 165 lb (75 kg).
         1. Maximum Lifting Speed Fully Loaded: 125 ft/minute (38 m/minute).
         2. Maximum Lift Range: 11 ft (3.35 m).
      5. Lift Voltage/Amps: 220 VAC/10.
      6. Motor Duty Cycle: H5.
      7. Lifting Media: Preformed stainless steel wire rope.
      8. Operating Temperature/Humidity Range: 41 to 122 degrees F (5 to 50 degrees C)/ 35 to 90 % non-condensing.

\*\* NOTE TO SPECIFIER \*\* Standard Input/Output functionality makes the product suitable for more applications out of the box Delete if not required.

* + - 1. Model G-Force - Q Series Intelligent Assist Device as manufactured by Gorbel Inc.:

\*\* NOTE TO SPECIFIER \*\* Options and Accessories. Delete features not required.

* + - * 1. Provide float mode lifting function.
        2. Provide slide or pendant handle.
        3. Provide teachable virtual limits.
        4. Provide speed reduction points.
        5. Provide shock absorbing end stop.
        6. Provide latch hook.
        7. Provide extended wire rope drop.
        8. Provide slide on air hose.
        9. Provide transformer.
        10. Provide universal trolley adapter.

\*\* NOTE TO SPECIFIER \*\* Enhanced model with I/O Actuator, handle with I/O module and power for tooling not available on Q series. Teachable virtual limits function is standard on the iQ model. Input/Output functionality makes the product suitable for more applications out of the box Delete if not required.

* + - 1. Model G-Force - iQ Series Intelligent Lifting Device as manufactured by Gorbel Inc.:
         1. Power available for tooling: 24VDC @ 0.5A.

\*\* NOTE TO SPECIFIER \*\* Options and Accessories. Delete features not required.

* + - * 1. Provide float mode lifting function.
        2. Provide remote mount slide handle.
        3. Provide suspended pendant control handle.
        4. Provide remote mount pendant control handle.
        5. Provide remote mount slide handle bracket.
        6. Provide remote mount handle clamp collar.
        7. Provide shock absorbing end stop.
        8. Provide latch hook.
        9. Provide extended wire rope drop.
        10. Provide slide on air hose.
        11. Provide transformer.
        12. Provide universal trolley adapter.
  1. ENCLOSED TRACK JIB CRANES

\*\* NOTE TO SPECIFIER \*\* Designed to be smaller, lighter and more cost effective for applications with suspended tools

* + 1. Tool Solutions Jib Crane - Free Standing:
       1. No foundation required.
       2. 4 bolt installation allows for easy adjustment of the height under boom.
       3. Small bracket centers allow for reduced headroom requirements.
       4. Capacity: 50 lb Free Standing Tool Solutions Jib Crane - Model TSJ50 as manufactured by Gorbel, Inc.
       5. Capacity: 75 lb Free Standing Tool Solutions Jib Crane - Model TSJ75 as manufactured by Gorbel, Inc.
       6. Capacity: 100 lb Free Standing Tool Solutions Jib Crane (Aluminum) - Model TSJ100A as manufactured by Gorbel, Inc.
       7. Capacity: 150 lb Free Standing Tool Solutions Jib Crane - Model TSJ150 as manufactured by Gorbel, Inc.

\*\* NOTE TO SPECIFIER \*\* Delete span not required.

* + - 1. Span: 4 feet.
      2. Span: 6 feet.
      3. Span: 8 feet.
      4. Span: 10 feet.

\*\* NOTE TO SPECIFIER \*\* Aluminum TSJ100A only.

* + - 1. Span: 12 feet.

\*\* NOTE TO SPECIFIER \*\* Delete height not required.

* + - 1. Height Under Boom: 8 feet (2.4 m).
      2. Height Under Boom: 10 feet (3 m).
      3. Coverage: Circular. 180 degree rotation.

\*\* NOTE TO SPECIFIER \*\* Options and Accessories:

* + - 1. Provide portable base.
      2. Provide adjustable locking.
      3. Provide 75 lb (34 kg) tool trolley.

\*\* NOTE TO SPECIFIER \*\* Designed to be smaller, lighter and more cost effective for applications with suspended tools

* + 1. Tool Solutions Jib Crane - Wall/Column Mounted:
       1. Small bracket centers allow for reduced headroom requirements.
       2. Capacity: 50 lb Wall Mounted Tool Solutions Jib Crane - Model TSJ50 as manufactured by Gorbel, Inc.
       3. Capacity: 75 lb Wall Mounted Tool Solutions Jib Crane - Model TSJ75 as manufactured by Gorbel, Inc.
       4. Capacity: 100 lb Wall Mounted Tool Solutions Jib Crane (Aluminum) - Model TSJ100A as manufactured by Gorbel, Inc.
       5. Capacity: 150 lb Wall Mounted Tool Solutions Jib Crane - Model TSJ150 as manufactured by Gorbel, Inc.

\*\* NOTE TO SPECIFIER \*\* Delete span not required.

* + - 1. Span: 4 feet.
      2. Span: 6 feet.
      3. Span: 8 feet.
      4. Span: 10 feet.

\*\* NOTE TO SPECIFIER \*\* Aluminum TSJ100A only.

* + - 1. Span: 12 feet.
      2. Coverage: Circular. 180 degree rotation.

\*\* NOTE TO SPECIFIER \*\* Options and Accessories:

* + - 1. Provide adjustable locking.
      2. Provide 75 lb (34 kg) tool trolley.
  1. ELECTRIC CHAIN HOISTS
     1. Performance Requirements: Electric chain hoists.

\*\* NOTE TO SPECIFIER \*\* Edit this article to reflect specific project requirements.

* + - 1. Designed, fabricated, and installed to comply with applicable requirements of ASME, FEM/ISO, NFPA 70 and OSHA.
      2. Lift and lower loads in response to operator's use of pendant controller.
      3. Capacity Overload: Hoist must not lift load that exceeds rated capacity.
      4. Hoists are shipped with the clutch set for 10 percent higher than the rated capacity.
      5. Power Loss Protection: Braking system to lock hoist in place in event of power loss.

\*\* NOTE TO SPECIFIER \*\* Gorbel, Inc. provides electric chain hoists to be installed on a variety of material handling cranes and applications. Single or dual speed models. Contact Gorbel, Inc. for assistance in selecting a chain hoist for a specific project and application.

* + 1. Electrically powered, pendant operated chain hoist to be attached to trolleys on cranes and other material handling equipment to lift and move loads;
       1. Model: \_\_\_\_\_\_\_\_. GS Series Hoist as manufactured by Gorbel, Inc.
          1. Speed: Single.
          2. Speed: Dual.
    2. Operational Functions:
       1. Design and fabricate chain hoist to lift specified load and perform functions described in the "Performance Requirements" Paragraph.

\*\* NOTE TO SPECIFIER \*\* Chain hoists lifting capacities range from 1/8 to 5 tons. It is important that hoist capacity does not exceed crane capacity or other equipment on which hoist will be installed.

* + - * 1. Lifing Capacity Options: 1/8, 1/4, 1/2, , 1-1/2, 2, 3, 4, and 5 tons.
      1. Lifting Capacity: \_\_\_\_ tons.

\*\* NOTE TO SPECIFIER \*\* Single fall hoists use one strand of chain falling from the hoist body, terminating at the hook tackle. On double fall hoists, the chain loops through the hook block and terminates at the hoist body. Double fall hoist have double the lift capacity but at half the speed.

* + - 1. Number of Falls: \_\_\_.

\*\* NOTE TO SPECIFIER \*\* Chain Hoists lift speeds range from 4 to 48 fpm (1.2 to 14.6 m per min) and with either single or dual speed versions.

* + - 1. Lift Speed for Single Speed Model: \_\_\_to \_\_\_ ft (\_\_\_ to \_\_\_ m) per minute.
      2. Lift Speed for Dual Speed Model: \_\_\_to \_\_\_ ft (\_\_\_ to \_\_\_ m) per minute.

\*\* NOTE TO SPECIFIER \*\* GS Series Hoists are classified in accordance with ASME HST Hoist Duty Classes H3 and H4. Ratings are determined by volume of handling and how frequently the rated load is lifted. A hoist required to handle a high volume of lifts at or near the rated load should have a H4 rating.

* + - 1. Duty Rating in Accordance with ASME HST: H3.
      2. Duty Rating in Accordance with ASME HST: H4.

\*\* NOTE TO SPECIFIER \*\* Refer to Gorbel product literature for voltage and motor horsepower values for the specific model of chain hoist being specified.

* + - 1. Voltage: \_\_\_\_\_\_\_\_.
      2. Motor Horsepower: \_\_\_\_\_\_\_\_ HP.

\*\* NOTE TO SPECIFIER \*\* Lift is defined as the maximum length of travel required to raise and lower the load. Typical lift dimensions are 10, 15, 20 feet (3.0, 4.5, 6.0 meters). Contact Gorbel for other lift heights.

* + - 1. Lift Dimension: \_\_\_ feet (\_\_\_ meters).

\*\* NOTE TO SPECIFIER \*\* Headroom is defined as the distance between the lower hook saddle and the bottom of the support beam or the trolley wheel flange when the lower hook is in the uppermost position. Hoists are provided with headroom dimensions varying from 14.5 to 29.6 inches (36.83 to 75.18 cm). Refer to product literature for headroom required for specific model of chain hoist being specified.

* + - 1. Headroom dimension: \_\_\_ inches (\_\_\_ cm).
    1. Construction: Chain hoist is housed in an aluminum, compact housing and include these features:
       1. Low voltage, 24 VAC control circuit for operator protection.
       2. Modular DC brake and clutch is easily accessible for routine inspection and/or service.
       3. Totally enclosed, fan cooled motor.
       4. Case hardened gears and other components.
       5. Mainline contactor controlled by Emergency-Stop on the pendant control handle.
    2. Hoist Control: Pendant type control device to functionally operate chain hoist as indicated on reviewed shop drawings.
       1. Type: Pendant type control handle equipped with:
          1. UP, DOWN switch and Emergency Stop to operate hoist.
          2. Pendant cable with wire rope strain relief.
       2. Limit Switches: Equip chain hoist system with modular upper and lower limit switches.
    3. Accessories:
       1. Chain Container: Manufacturer's standard canvas bag type.
       2. Chain Container: Manufacturer's standard plastic bucket type.

\*\* NOTE TO SPECIFIER \*\* There are three means of suspension based on crane connection requirements or use with a GSH trolley. Consult with Gorbel, Inc. for assistance in selecting type of plate for a specific project. Delete suspension options nor required.

* + 1. Suspension: Single hole suspension plate offering lower headroom loss for applications using a clevis pin or bolt connection, such as Workstation Cranes.
    2. Suspension: Double hole suspension plate for use with GSH trolleys on structural beam (jib cranes) or Patented Track cranes.
    3. Suspension: Rigid hook for the more common "universal" means of connection. Useful for moving hoists among various locations or suspending from lifting eyes or closed rings.
  1. TROLLEYS

\*\* NOTE TO SPECIFIER \*\* Electric Chain Hoists can be provided with trolleys for use on fixed beam tracks or on various crane systems. Trolleys may be part of an existing material handling system or are being provided as part of a new crane system. Include and edit this Article if trolleys are to be included with the chain hoists. Delete trolley type options not required. Schedule on drawings if numerous different trolleys are required.

* + 1. Trolley Type: Motor-Driven Single Speed
       1. Model \_\_\_\_\_\_\_\_ as manufactured by Gorbel, Inc.
       2. Flange width: \_\_\_ inches (\_\_\_ mm),
       3. Speed: \_\_\_ fpm (\_\_\_m per min).
       4. Capacity: \_\_\_\_\_ tons.
    2. Trolley Type: Motor-Driven Two Speed
       1. Model \_\_\_\_\_\_\_\_ as manufactured by Gorbel, Inc.
       2. Flange width: \_\_\_ inches (\_\_\_ mm),
       3. Speed: \_\_\_ fpm (\_\_\_m per min).
       4. Capacity: \_\_\_\_\_ tons.
    3. Trolley Type: Manual, Push (Up to 3 tons)
       1. Model \_\_\_\_\_\_\_\_ as manufactured by Gorbel, Inc.
       2. Flange width: \_\_\_ inches (\_\_\_ mm),
       3. Speed: \_\_\_ fpm (\_\_\_m per min).
       4. Capacity: \_\_\_\_\_ tons.
    4. Trolley Type: Manual, Geared (2 tons to 5 tons)
       1. Model \_\_\_\_\_\_\_\_ as manufactured by Gorbel, Inc.
       2. Flange width: \_\_\_ inches (\_\_\_ mm),
       3. Speed: \_\_\_ fpm (\_\_\_m per min).
       4. Capacity: \_\_\_\_\_ tons.
  1. FALL ARREST ANCHOR SYSTEMS

\*\* NOTE TO SPECIFIER \*\* The Gorbel® Tether Track Anchor System provides a rigid, mobile anchor point for fall arrest or fall restraint systems. It attaches to an anchorage structure that has been approved for this application by a qualified person. Standard design loads for the attachment locations are provided and are based on a worst case placement of the 900 lb. arresting force and the weight of the Tether Track Anchor System. This product meets all applicable OSHA and ANSI standards for fall protection. Delete if not required.

* + 1. Fall Arrest Anchor System: Tether Track Rigid Rail Anchor System as manufactured by Gorbel, Inc.

\*\* NOTE TO SPECIFIER \*\* Delete mounting not required:

* + - 1. Mounting: Ceiling Mounted.
      2. Mounting: Free Standing Monorail and Bridge Anchor Systems.
      3. System shall be designed to support multiple workers, each weighing up to 310 lb (141 kg) with tools, as indicated or required.
      4. Anchor system shall provide a rigid, mobile anchor point for fall arrest or fall restraint systems. It shall be designed to attach to an anchorage structure that has been approved for this application by a "qualified person".
         1. Qualified Person: ANSI defines a qualified person as "A person with a recognized degree or professional certificate and with extensive knowledge, training and experience in the fall protection and rescue field who is capable of designing, analyzing, evaluating and specifying fall protection and rescue systems...".
         2. Design loads for attachment locations to be based on a worst case placement of the 900 lb (408 kg) arresting force and the weight of the anchor system.
         3. Lanyards or self-retracting lifelines (SRL) to be used with the Anchor System shall have a maximum arresting force (MAF) of 900 lb (408 kg) or less. Customer chosen lanyards or SRL shall minimize freefall distance. Verify that the mounting height of this Anchor System will provide adequate fall clearance when used with the chosen lanyard or SRL and harness.
         4. Each trolley shall have no more than one person attached.
         5. Bridges and trolleys to be designed to freely move. To prevent a swing fall and the lengthening of the free fall distance. Verify the bridge and trolley maintains the closest possible distance to the user whenever he or she changes position.
         6. The Anchor System is intended only for indoor use.
      5. The product shall meet all applicable OSHA and ANSI standards for fall protection.

\*\* NOTE TO SPECIFIER \*\* Gorbel's Tether Track Swing Arm Fall Arrest Anchor System is designed for normal interior operation. Special fall arrest applications such as outdoor systems can be custom designed and fabricated. Contact Gorbel, Inc. for assistance in designing and specifying unique fall arrest anchor systems. Select and edit the following paragraphs to indicate type of fall arrest anchor system required for Project. Refer to Tables in Gorbel product literature for available models, spans, weights, dimensions, and thrust and pull loads. Delete if not required.

* + 1. Fall Arrest Anchor System: Swing Arm Fall Arrest Anchor System as manufactured by Gorbel, Inc.
       1. Type: Fall arrest anchor system designed to protect workers from falls in an interior, elevated work area that rotates into position when needed and out of the way when not in use; Tether Track Swing Arm Fall Arrest Anchor System, Model No. [\_\_\_\_\_] as manufactured by Gorbel, Inc.
          1. Work Area: Rectangular.
          2. Work Area: Semi-circular.
          3. Mounting: Wall mounted.
          4. Mounting: Free-standing.
          5. Operation: Manually operated.
          6. Operation: Motor operated.
       2. Layout: As indicted and dimensioned on Drawings and reviewed shop drawings.

\*\* NOTE TO SPECIFIER \*\* Tether Track Swing Arm Fall Arrest Anchor systems are designed to support either one or two workers each weighing up to 310 pounds (140 kilograms) with tools. Contact Gorbel, Inc. for assistance if heavier loads are required.

* + - 1. Number of workers each weighing 310 pounds (140 g) with tools to be supported:
         1. Number of Workers: 1.
         2. Number of Workers: 2.
      2. Configuration: Flexible system consisting of a steel swing arm beam (boom) attached to a support with pivoting brackets which allow for swinging beam out of work area when not in use.
         1. Support: Wall supported.
         2. Support: Free-standing steel pipe mast.
         3. Tether Track: Secured to bottom of swing arm is a single tether track with trolley for connection to a single worker.
         4. Tether Track: Secured to bottom of swing arm are two tether tracks and trolleys which enable one worker to pass by another without unsafely disconnecting.

\*\* NOTE TO SPECIFIER \*\* Swing arm spans can range from 8 to 30 feet (2.4 to 9.1 meters). Maximum span depends on number of workers supported and mounting method. Refer to Gorbel, Inc. product literature for allowable spans and other values required for completing the following paragraphs.

* + - * 1. Total span: \_\_\_\_ [feet including 18 inches (457 mm) maximum cantilevered extension of tether track.
        2. Approximate weight: \_\_\_\_\_pounds.
        3. Thrust and pull force: \_\_\_\_\_pounds.
        4. Center-to-center distance for support brackets: \_\_\_\_\_ feet.
      1. Construction: Fabricate fall arrest anchor system from ASTM A36 steel sections with finished ends and surfaces.
      2. Components:
         1. Swing Arm: L-shaped fabrication consisting of wide flange steel horizontal arm welded to a vertical wide flange leg with pivoting brackets for anchorage.
         2. Brackets: Provide swing arm fall arrest anchor system with pair of two-piece, pivoting steel brackets for anchoring swing arm to support. Male part of bracket shall be factory welded to vertical leg of swing arm. Female part of bracket shall be welded to support.

\*\* NOTE TO SPECIFIER \*\* As an option, swing arm brackets can be equipped with rotation stops to limit total rotation of swing arm. Include the following paragraph to specify this option.

* + - * 1. Rotation Stop: Provide upper bracket with slotted steel plate to accept rotation stop bolts and limit extent of swing arm rotation.
      1. Tether Track:
         1. Type: Cold-rolled steel, enclosed track designed to accommodate easy, smooth movement without forcing or jamming of tether trolley and attached connector and to effortlessly follow worker; Plain Tether Track Rail as manufactured by Gorbel, Inc.
         2. Profile: Rectangular, tubular section with continuous bottom slot to allow movement of trolley and connector. Bottom running flanges to have 2 degree taper to keep trolley centered. Flat, non-centering tracks are not acceptable.
         3. End stops: Provide track with end stops to be field installed on track ends after tether trolleys are inserted into track.
      2. Tether trolleys: Wheeled, steel fabrication designed specifically to use with tether track specified for fall arrest systems and provide fluid movement and stability; Tether Trolleys as manufactured by Gorbel, Inc.
         1. Wheels: Equip each trolley with 3 pairs of wheels sized to roll within tether track. Material, DURACOMP4 as provided Gorbel, Inc. Profile, provide wheels with 2 degree taper to match taper of tether track.
         2. Connection device: Equip bottom of trolley with swivel eye for securing shock-absorbing lanyard or self-retracting lifeline and which allows free movement beneath trolley and prevents twisting of the connector.

\*\* NOTE TO SPECIFIER \*\* Refer to Gorbel product literature for available standard configurations for free standing swing arm fall arrest anchor system and dimensions for steel pipe support mast. Include the following paragraph and select values from Gorbel product literature. Any deviations from Gorbel recommended mast and foundation dimensions must be calculated by qualified structural engineer and calculations should be submitted to Architect as product submittal.

* + - * 1. Free Standing Steel Pipe Mast: Overall height from floor to trolley saddle: \_\_\_\_\_ feet. Mast Diameter: \_\_\_\_\_ inches. Base Plate: Hexagonal steel plate with triangular stiffeners welded to bottom of mast. Equip plate with holes to receive anchor bolts. Provide wafer board bolt hole template for embedding anchor bolts in concrete foundation. Anchor bolts shall have ICC-ES listing demonstrating suitability for specific application. Factory weld brackets for receiving pivoting swing arm to mast.

\*\* NOTE TO SPECIFIER \*\* As an option, swing arm fall arrest anchor system can be provided with a friction brake to lock and hold swing arm in a desired position within the work area. Include the following paragraphs if friction brake is required.

Friction brake: Provide swing arm fall arrest anchor system with friction brake assembly to lock and hold swing arm in desired position within work area; Swing Arm Friction Brake as manufactured by Gorbel, Inc. Field installed braking system consisting of steel plate semi-circular rotor; manually operated caliper brake; cable and pulley connecting brake to welded lever assembly with two pull chains for locking and releasing swing arm.

Operation: Brake rotor is attached to support and is fixed in place. Caliper brake mechanism is attached to top of vertical leg of swing arm with brake pads positioned above and below rotor. Pulling on lever assembly chain causes brake to clamp rotor stopping swing arm rotation in a fixed position. Pulling on opposite lever assembly chain releases swing arm to rotate.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph if folding fall arrest anchor system is to be motorized.

* + - * 1. Motor Operator: Provide electric motor operator and controls for motorized movement of swing arm; Swing Arm Motor Drive System as manufactured by Gorbel, Inc.

Motor: 110-120 VAC, 60 HZ, 3 wire, instantly reversible, lifetime lubricated, and equipped with internal thermal overload protector, electric brake, and accessible limit switches.

Operation: Motor drive unit shall be mounted on supporting [wall] [mast] and shall rotate a lever arm which engages a pivot block on top surface of swing arm. Rotation of lever arm shall move swing arm clockwise or counter clockwise.

Control Enclosure: Provide electrical control enclosure with three button (FORWARD, REVERSE, STOP) pendant.

Limit Switches: Equip motor operator with adjustable limit switches that halt movement of swing arm at edges of work area.

Provide necessary conduit, wiring, junction box, and mounting hardware required for complete, functional installation of motor operator.

* + - 1. Accessories: Provide fall arrest anchor system with end stops, splices, fasteners, anchors, and other hardware and accessories as required for a complete, secure, structurally sound, safe installation as indicated on drawings and reviewed shop drawings.
      2. Shop Finishing: Steam wash steel components with iron phosphate solution and apply thermoset enamel finish. Colors shall be as selected by Architect from manufacturer's full range. Provide spray cans of matching colors, air-drying paint for field touch-up.
      3. Warning Labels: Provide and factory install durable, colored, adhesive applied user warning labels in compliance with ANSI 7359, OSHA 1926, and other applicable regulatory requirements. Install on swing arm or trolley as appropriate.
         1. Maximum number of workers, 1 or 2, that may simultaneously use swing arm fall arrest anchor system.
         2. Maximum worker weight.
         3. Maximum average arresting force.
         4. Maximum arresting force.
         5. Only one worker anchored to trolley.
         6. Warning to inspect before using.

\*\* NOTE TO SPECIFIER \*\* Gorbel's Tether Track Fold Away Fall Arrest Anchor System is designed for normal interior operation. Maximum spans and other dimensions vary depending on type of system being specified. Unique to each system are the following characteristics: Support centers: Distance between the two pivoting, cantilevered support beams ranging from 20 to 35 feet (6.1 to 10.7 meters). Cantilever distance: Length of the support beam cantilevered from wall or free standing post ranging from 6 to 20 feet (1.8 to 6.1 meters). Track length: Length of the truss-type horizontal monorail with the tether track ranging from 23 to 144 feet (7 to 43.9 meters). Number of tracks on monorail: Either single or dual. Trolley saddle height: For free standing systems, the distance from the floor to the tether trolley saddle ranging from 14 to 22 feet (4.3 to 6.7 feet). Bracket centers: Center to center distance between support brackets ranging from 3 to 6 feet ( 0.9 to 1.8 meters). Gorbel, Inc. provides standard, pre-engineered folding systems in these categories: Single person/single track/ wall mounted system. Two person/single track/ wall mounted system. Two person/dual track/ wall mounted system. Single person/single track/ free standing system. Two person/single track/ free standing system. Two person/dual track/ free standing system. Special fall arrest applications such as outdoor systems can be custom designed and fabricated. Contact Gorbel, Inc. for assistance in designing and specifying unique folding fall arrest anchor systems. Select and edit the following paragraphs to indicate type of fall arrest anchor system required for Project. Refer to tables in Gorbel product literature for available models, spans, weights, dimensions, and thrust and pull loads. Delete if not required.

* + 1. Fall Arrest Anchor System: Folding Fall Arrest Anchor System as manufactured by Gorbel, Inc.
       1. Type: Fall arrest anchor system designed to protect workers from falls in an interior, elevated work area that rotates into position when needed and out of the way when not in use; Tether Track Fold Away Fall Arrest Anchor System, Model No. [\_\_\_\_\_] as manufactured by Gorbel, Inc.
          1. Work Area: Rectangular.
          2. Mounting: Wall mounted.
          3. Mounting: Free-standing.
          4. Operation: Manually operated.
          5. Operation: Motor operated.
       2. Layout: As indicted and dimensioned on Drawings and reviewed shop drawings.

\*\* NOTE TO SPECIFIER \*\* Tether Track Swing Arm Fall Arrest Anchor systems are designed to support either one or two workers each weighing up to 310 pounds (140 kilograms) with tools. Contact Gorbel, Inc. for assistance if heavier loads are required.

* + - 1. Number of workers each weighing 310 pounds (140 g) with tools to be supported:
         1. Number of Workers: 1.
         2. Number of Workers: 2.
      2. Configuration: Flexible system consisting of steel pivoting, cantilevered support beams attached a support with pivoting brackets which allow for swinging beam out of work area when not in use.
         1. Support: Wall supported.
         2. Support: Free-standing steel pipe mast.
         3. Truss type horizontal monorail is secured to cantilevered, support beams with pivoting hanger assemblies.
         4. Bottom cord of horizontal truss [is single tether track with trolley for connection to worker.
         5. Bottom cord of horizontal truss are two tether tracks and trolleys which enable one worker to pass by another without unsafely disconnecting.

\*\* NOTE TO SPECIFIER \*\* Sizes and other dimensions for system components depend on number of workers supported, spacing of supports, and mounting method. Refer to Gorbel, Inc. product literature for allowable spans and other values required for completing the following paragraphs.

* + - * 1. Distance between system supports: \_\_\_\_\_ feet.
        2. to center vertical distance between support brackets: \_\_\_\_\_ feet.
        3. Support beam span: \_\_\_\_\_ feet.
        4. Support beam size: \_\_\_\_\_.
        5. Monorail and track length: \_\_\_\_\_ feet.
        6. Number of tracks on monorail: 1.
        7. Number of tracks on monorail: 2.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph for free standing, floor supported system.

* + - * 1. Distance from floor to tether trolley saddle: \_\_\_\_\_ feet.
        2. Approximate weight: \_\_\_\_\_ pounds.
        3. Thrust and pull force: \_\_\_\_\_ pounds.
      1. Construction: Fabricate fall arrest anchor system from ASTM A36 steel sections with finished ends and surfaces.
      2. Components:
         1. Cantilevered support beam assembly: L-shaped fabrication consisting of wide flange steel horizontal beam welded to a vertical wide flange steel leg with pivoting brackets for anchorage to support.
         2. Brackets: Provide folding fall arrest anchor system with pair of two-piece, pivoting steel brackets for anchoring support beam. Male part of bracket shall be factory welded to vertical leg of support beam. Female part of bracket shall be field anchored to supporting wall or factory welded to steel supporting post as applicable.

\*\* NOTE TO SPECIFIER \*\* As an option, brackets for one folding support beam can be equipped with a rotation stop to limit total rotation of folding fall arrest system. Include the following paragraph to specify this option.

* + - * 1. Rotation stop: Equip one support beam with rotation stop to limit total movement of folding fall arrest system. Provide upper bracket with slotted steel plate to accept rotation stop bolts and limit extent of support beam rotation. Attach steel stop angle to vertical leg of support beam. Position stop angle to hit stop bolts in slotted steel plate.
        2. Horizontal monorail: Truss-type rail fabricated from tubular steel sections with [one] [two] tether track[s] used as bottom cord; [Single] [Dual] Trussed Tether Track as manufactured by Gorbel, Inc.

Tether track: Cold-rolled steel, enclosed track designed to accommodate free, smooth movement without forcing or jamming of tether trolley with attached connector and to effortlessly follow worker. Profile, rectangular, tubular section with continuous bottom slot to allow movement of trolley and connector. Bottom running flanges to have 2 degree taper to keep trolley centered. Flat, non-centering tracks are not acceptable. End stops, provide track with end stops to be field installed on track ends after tether trolleys are inserted into track.

Attachment hardware: Provide pivoting hanger assemblies for field anchoring horizontal monorail to pivoting cantilevered support beams. Pivoting hardware shall allow fall arrest system to fold into a semi-flat configuration out of work area.

* + - * 1. Tether trolleys: Wheeled, steel fabrication designed specifically to use with tether track specified in Paragraph 2.3.D.1 and to provide fluid movement and stability; Tether Trolleys as manufactured by Gorbel, Inc.

Wheels: Equip each trolley with 3 pairs of wheels sized to roll within tether track. Material: DURACOMP4 as provided Gorbel, Inc. Profile: Provide wheels with 2 degree taper to match taper of tether track.

Connection device: Equip bottom of trolley with swivel eye for securing shock-absorbing lanyard or self-retracting lifeline and which allows free movement beneath trolley and prevents twisting of the connector.

\*\* NOTE TO SPECIFIER \*\* Refer to Gorbel product literature for available standard configurations for free standing folding fall arrest anchor system and dimensions for steel pipe supports. Include the following paragraph and select values from Gorbel product literature. Any deviations from Gorbel recommended posts and foundation dimensions must be calculated by qualified structural engineer and calculations should be reviewed by manufacturer.

Free standing steel pipe posts: Overall height from floor to trolley saddle: [\_\_\_\_\_ feet. Post diameter: \_\_\_\_\_ inches. Base plate, hexagonal steel plate with triangular stiffeners welded to bottom of post. Equip plate with holes to receive anchor bolts. Provide wafer board bolt hole template for embedding anchor bolts in concrete foundation. Anchor bolts shall have ICC-ES listing demonstrating suitability for specific application.

Factory weld brackets for receiving pivoting support beam to post.

\*\* NOTE TO SPECIFIER \*\* As an option, folding fall arrest anchor system can be provided with a friction brake to lock and hold support beams in a desired position within the work area. Include the following paragraphs if friction brake is required.

Friction brake: Provide folding fall arrest anchor system with friction brake assembly to lock and hold support beams in desired position within work area; Fold Away Friction Brake as manufactured by Gorbel, Inc. Type: Field installed braking system consisting of: Steel plate semi-circular rotor; manually operated caliper brake; cable and pulley connecting brake to welded lever assembly with two pull chains for locking and releasing support beam. Operation: Brake rotor is attached to supporting [wall] [post] and is fixed in place; caliper brake mechanism is attached to top of vertical leg of support beam with brake pads positioned above and below rotor; pulling on lever assembly chain causes brake to clamp rotor stopping cantilever support beam rotation in a fixed position. Pulling on opposite lever assembly chain releases cantilever support beam to rotate.

\*\* NOTE TO SPECIFIER \*\* Include the following paragraph if folding fall arrest anchor system is to be motorized.

Motor operator: Provide electric motor operator and controls for motorized movement of folding fall arrest system; Fold Away Motor Drive System as manufactured by Gorbel, Inc. Motor drive units shall be installed on one support beam assembly as indicated on Drawings and reviewed shop drawings. Motor: 110-120 VAC, 60 HZ, 3 wire, instantly reversible, lifetime lubricated, and equipped with internal thermal overload protector, electric brake, and accessible limit switches. Operation: Motor drive unit shall be mounted on supporting and shall rotate a lever arm which engages a pivot block on top surface of support beam. Rotation of lever arm shall move beam clockwise or counter clockwise. Control enclosure: Provide electrical control enclosure with three button (FORWARD, REVERSE, STOP) pendant. Limit switches: Equip motor operator with adjustable limit switches that halt movement of support beam at both folded and open positions. Provide necessary conduit, wiring, junction box, and mounting hardware required for complete, functional installation of motor operator

* + - 1. Accessories: Provide fall arrest anchor system with end stops, monorail splices, fasteners, anchors, and other hardware and accessories as required for a complete, secure, structurally sound, safe installation as indicated on Drawings and reviewed shop drawings.
      2. Shop Finishing: Steam wash steel components with iron phosphate solution and apply thermoset enamel finish. Colors shall be as selected by Architect from manufacturer's full range. Provide spray cans of matching colors, air-drying paint for field touch-up.
      3. Warning Labels: Provide and factory install durable, colored, adhesive applied user warning labels in compliance with ANSI 7359, OSHA 1926, and other applicable regulatory requirements. Install on swing arm or trolley as appropriate.
         1. Maximum number of workers, 1 or 2, that may simultaneously use swing arm fall arrest anchor system.
         2. Maximum worker weight.
         3. Maximum average arresting force.
         4. Maximum arresting force.
         5. Only one worker anchored to trolley.
         6. Warning to inspect before using.

\*\* NOTE TO SPECIFIER \*\* Gorbel's Free Standing Bridge Tether Track Fall Arrest Anchor System is designed for normal interior operation. Special fall arrest applications such as exterior or motorized systems can be custom designed and fabricated. Contact Gorbel, Inc. for assistance in designing and specifying unique fall arrest anchor systems. Select and edit the following paragraphs to indicate type of fall arrest anchor system required for Project. Refer to Gorbel product literature for available models, spans, weights, dimensions, and transferred loads. Delete if not required.

* + 1. Fall Arrest Anchor System: Free Standing Bridge Fall Arrest Anchor System as manufactured by Gorbel, Inc.
       1. Type: Free-standing, floor supported, manually operated, fall arrest anchor system designed to protect workers from falls in an interior, rectangular, elevated work area. Bridge with anchoring assembly travels along runway beams to desired location where elevated work will be performed and can be retracted out of the way when not in use; Free Standing Bridge Tether Track Fall Arrest Anchor System as manufactured by Gorbel, Inc.
       2. Layout: As indicted and dimensioned on Drawings and reviewed shop drawings.

\*\* NOTE TO SPECIFIER \*\* Free Standing Bridge Tether Track Fall Arrest Anchor System is designed to support one worker weighing up to 310 pounds (140 kilograms) with tools. Contact Gorbel, Inc. for assistance if heavier loads are required.

* + - 1. Load: System shall be designed to support one worker weighing 310 pounds (140 kilograms) with tools.
      2. Configuration: Customizable system consisting of a series of frames constructed of floor anchored columns connected with a header beam; two parallel runway beams supported by the frames; and a bridge suspended from the runway beams with a track and trolleys for anchoring workers.

\*\* NOTE TO SPECIFIER \*\* Bridge beam spans can range from 4 to 18 feet (1.2 to 5.5 meters). Length of bridge beam will determine spacing of columns, length of header beams, and distance between runway beams. Refer to Gorbel product literature for allowable bridge beam spans and other values required for completing the following paragraphs.

* + - * 1. Total bridge beam span: \_\_\_\_\_ feet.
        2. Center-to-center distance between runway beams: \_\_\_\_\_ feet.
        3. Header beam length: \_\_\_\_ feet.
        4. Center-to-center distance between columns supporting header beam: \_\_\_\_\_\_ feet.
        5. Center-to-center spacing of support frames: \_\_\_\_\_ feet.

\*\* NOTE TO SPECIFIER \*\* Bridge beam spans can range from 4 to 18 feet (1.2 to 5.5 meters). Length of bridge beam will determine spacing of columns, length of header beams, and distance between runway beams. Refer to Gorbel product literature for allowable bridge beam spans and other values required for completing the following paragraphs.

* + - * 1. Installed height to bottom of tether track on bridge beam: feet.
        2. Column length: \_\_\_\_\_ feet.
      1. Construction: Fabricate bridge from ASTM B221 extruded aluminum and remainder of fall arrest anchor system from ASTM A36 steel sections with finished ends and surfaces. Bolts shall comply with ASTM A325 and ASTM A490.
      2. Components:
         1. Columns: Fabricated by welding steel sections to form rectangular columns with steel plate top cap pre-drilled to receive header beam and bottom plate pre-drilled for anchoring column to concrete slab.
         2. Header beams: Fabricated by welding steel sections to form rectangular beams with steel plate end caps. Steel members shall be spaced to provided top and bottom continuous gap for bolting header to column cap and for suspending runway beams from header.
         3. Runway beams: Welded steel truss fabricated from tubular steel sections. Bottom chord of truss shall be single tether track for holding bridge beam end trucks.
         4. Bridge beam: Extruded aluminum beam with enclosed tether track profile as specified in Paragraph 2.3.G.2 for bottom flange.
         5. End trucks: Wheeled, steel fabrication designed specifically to use with tether track specified in Paragraph 2.3.G for suspending bridge beam and providing fluid bridge movement and stability; End Trucks as manufactured by Gorbel, Inc.

Wheels: Equip each end truck with 2 pairs of vertical wheels and front and back horizontal guidance wheels sized to roll within tether track. Material: DURACOMP4 as provided Gorbel, Inc.

Profile: Provide vertical wheels with 2 degree taper to match taper of tether track. Equip end truck with pre-drilled holes for attachment to bridge beam.

* + - * 1. Tether trolleys: Wheeled, steel fabrication designed specifically to use with tether track specified in Paragraph 2.3.G for fall arrest systems and provide fluid movement and stability; Tether Trolleys as manufactured by Gorbel, Inc.

Wheels: Equip each trolley with 2 pairs of wheels sized to roll within tether track. Material: DURACOMP4 as provided Gorbel, Inc.

Profile: Provide wheels with 2 degree taper to match taper of tether track.

Connection device: Equip bottom of trolley with swivel eye for securing shock-absorbing lanyard or self-retracting lifeline and which allows free movement beneath trolley and prevents twisting of the connector.

* + - * 1. Tether track:

Type: Cold-rolled steel, enclosed track designed to accommodate easy, smooth movement without forcing or jamming of tether trolley and end trucks; Plain Tether Track Rail as manufactured by Gorbel, Inc.

Profile: Rectangular, tubular section with continuous bottom slot to allow movement of trolley with connector and end truck with bridge beam. Bottom running flanges to have 2 degree taper to keep trolley centered. Flat, non-centering tracks are not acceptable.

End stops: Provide track with end stops to be field installed on track ends after tether trolleys and end trucks are inserted into track.

* + - 1. Accessories: Provide fall arrest anchor system with end stops, splices, fasteners, anchors, and other hardware as required for a complete, secure, structurally sound, safe installation as indicated on Drawings and reviewed shop drawings.
      2. Shop Finishing: Steam wash steel components with iron phosphate solution and apply thermoset enamel finish. Colors shall be as selected by Architect from manufacturer's full range. Provide spray cans of matching colors, air-drying paint for field touch-up.
      3. Warning Labels: Provide and factory install durable, colored, adhesive applied user warning labels in compliance with ANSI 7359, OSHA 1926, and other applicable regulatory requirements. Install on swing arm or trolley as appropriate.
         1. Maximum number of workers, 1 or 2, that may simultaneously use swing arm fall arrest anchor system.
         2. Maximum worker weight.
         3. Maximum average arresting force.
         4. Maximum arresting force.
         5. Only one worker anchored to trolley.
         6. Warning to inspect before using.

\*\* NOTE TO SPECIFIER \*\* Gorbel's Free Standing Monorail Tether Track Fall Arrest Anchor System is designed for normal interior operation. Special fall arrest applications such as exterior or motorized systems can be custom designed and fabricated. Contact Gorbel, Inc. for assistance in designing and specifying unique fall arrest anchor systems. Select and edit the following paragraphs to indicate type of fall arrest anchor system required for Project. Refer to Gorbel product literature for available models, spans, weights, dimensions, and transferred loads. Delete if not required.

* + 1. Fall Arrest Anchor System: Free Standing Monorail Fall Arrest Anchor System as manufactured by Gorbel, Inc.
       1. Type: Free-standing, floor supported, manually operated, fall arrest anchor system designed to protect workers from falls in an interior, elevated work area. Trolley for anchoring connector travels along monorail beam to desired location where elevated work will be performed and can be retracted out of the way when not in use; Free Standing Monorail Tether Track Fall Arrest Anchor System as manufactured by Gorbel, Inc.
       2. Layout: As indicted and dimensioned on Drawings and reviewed shop drawings.

\*\* NOTE TO SPECIFIER \*\* Free Standing Monorail Tether Track Fall Arrest Anchor System is designed to support one or more workers weighing up to 310 pounds (140 kilograms) each with tools. Contact Gorbel, Inc. for assistance if heavier loads are required.

* + - 1. Load: System shall be designed to support one or more workers weighing 310 pounds (140 kilograms) each with tools.
      2. Configuration: Customizable system consisting of a series of frames constructed of floor anchored columns connected with a header beam, monorail beam perpendicular to and supported by the frames, a track on the bottom of the monorail, and a trolley inserted in track for anchoring worker.

\*\* NOTE TO SPECIFIER \*\* Monorail span will determine spacing of support frames, length of header beams, and spacing of columns. Refer to Gorbel product literature for allowable monorail spans and other values required for completing the following paragraphs.

* + - * 1. Total monorail length: \_\_\_\_\_ feet.
        2. Maximum allowable span of monorail beam: \_\_\_\_\_ feet.
        3. Center-to-center spacing of frames supporting monorail: \_\_\_\_\_ feet.
        4. Header beam length: \_\_\_\_\_ feet.
        5. Center-to-center distance between columns supporting header beam: \_\_\_\_\_ feet.

\*\* NOTE TO SPECIFIER \*\* System can be designed for a maximum height of 26 feet (7.9 meters) from floor to tether track on monorail.

* + - * 1. Installed height to bottom of tether track on monorail beam: \_\_\_\_\_ feet.
        2. Column length: \_\_\_\_\_ feet.
      1. Construction: Fabricate fall arrest anchor system from ASTM A36 steel sections with finished ends and surfaces. Bolts: Comply with ASTM A325 and ASTM A490.
      2. Components:
         1. Columns: Fabricated by welding steel sections to form rectangular columns with steel plate top cap pre-drilled to receive header beam and bottom plate pre-drilled for anchoring column to concrete slab.
         2. Header beams: Fabricated by welding steel sections to form rectangular beams with steel plate end caps. Steel members shall be spaced to provided top and bottom continuous gap for bolting header to column cap and for suspending monorail from header.
         3. Monorail: Welded steel truss fabricated from tubular steel sections. Bottom chord of truss shall be single tether track or dual trussed track for holding tether trolley; Series F500 or F1000 as manufactured by Gorbel, Inc.
         4. Tether trolley: Wheeled, steel fabrication designed specifically to use with tether track for fall arrest systems and provide fluid movement and stability; Tether Trolleys as manufactured by Gorbel, Inc.

Wheels: Equip each trolley with 3 pairs of wheels sized to roll within tether track. Material: DURACOMP4 as provided Gorbel, Inc. Profile: Provide wheels with 2 degree taper to match taper of tether track.

Connection device: Equip bottom of trolley with swivel eye for securing shock-absorbing lanyard or self-retracting lifeline and which allows free movement beneath trolley and prevents twisting of the connector.

* + - * 1. Tether Track:

Type: Cold-rolled steel, enclosed track designed to accommodate easy, smooth movement without forcing or jamming of tether trolley and end trucks; Plain Tether Track Rail as manufactured by Gorbel, Inc.

Profile: Rectangular, tubular section with continuous bottom slot to allow movement of trolley with connector. Bottom running flanges to have 2 degree taper to keep trolley centered. Flat, non-centering tracks are not acceptable.

End stops: Provide track with end stops to be field installed on track ends after tether trolley and is inserted into track.

* + - 1. Accessories: Provide fall arrest anchor system with end stops, splices, fasteners, anchors, and other hardware as required for a complete, secure, structurally sound, safe installation as indicated on Drawings and reviewed shop drawings.
      2. Shop Finishing: Steam wash steel components with iron phosphate solution and apply thermoset enamel finish. Colors shall be as selected by Architect from manufacturer's full range. Provide spray cans of matching colors, air-drying paint for field touch-up.
      3. Warning Labels: Provide and factory install durable, colored, adhesive applied user warning labels in compliance with ANSI 7359, OSHA 1926, and other applicable regulatory requirements. Install on swing arm or trolley as appropriate.
         1. Maximum number of workers, 1 or 2, that may simultaneously use swing arm fall arrest anchor system.
         2. Maximum worker weight.
         3. Maximum average arresting force.
         4. Maximum arresting force.
         5. Only one worker anchored to trolley.
         6. Warning to inspect before using.
  1. SHOP FINISHING
     1. Steel: Steam wash steel crane components with iron phosphate solution and apply blue or yellow baked enamel finish.
     2. Aluminum: Mill finish.
     3. Provide spray can of matching color, air-drying paint for field touch-up.

1. EXECUTION
   1. EXAMINATION
      1. Do not begin installation until support structures have been properly prepared.
      2. Design and construction of reinforced concrete footings and slabs as detailed on Drawings and specified in other sections. Verify that accurate crane applied forces and anchor bolt patterns are provided for foundation design.
   2. INSTALLATION
      1. Install units and accessories in accordance with manufacturer's instructions and approved shop drawings. Do not modify crane components in any manner without advance written approval by crane manufacturer.
      2. Clearances for Moving Crane Components:
         1. 3 inches (76 mm) minimum vertical clearance from any overhead obstruction.
         2. 2 inches (51 mm) minimum horizontal clearance from any lateral obstruction.

\*\* NOTE TO SPECIFIER \*\* Bridge and monorail cranes only. Delete if not required.

* + - 1. Prior to applying proper torque to the bolts, ensure runways are:
         1. Level to within plus or minus 1/8 inch in 20 feet (3 mm in 6.1 m).
         2. Parallel with opposite runway to within plus or minus (3 mm in 6.1 m).
  1. FIELD QUALITY CONTROL
     1. Perform field quality control testing as recommended by manufacturer. Move bridge and hoist trolley through entire travel to ensure crane is clear of obstructions and moves freely and smoothly. Inspect installed crane. Verify all bolts are tight and lock washers fully compressed.
     2. Field test crane and accessories for operating functions. Ensure crane movement is smooth and proper. Adjust as required and correct deficiencies.
     3. Clean surfaces. If necessary, touch-up paint damage, scratches, and blemishes with manufacturer provided matching paint. Protect crane from other construction operations.
  2. DEMONSTRATING AND TRAINING
     1. Provide demonstration and training session for Owner's representative covering operation and maintenance.
  3. PROTECTION
     1. Protect installed products until completion of project.
     2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION