

General Specifications - Stage Lifts

Scope: This subcontractor shall furnish all labor, material, equipment and services to furnish and install one Hydraulic Stage Lift.

Shop Drawings: Shop drawings shall be submitted as set forth in General Conditions and Supplementary General Conditions.

General Information: This specification is intended to cover the complete installation of one oil-hydraulic stage lift as approved by the Architect. The lift manufacturer shall be regularly engaged in the manufacture and design of hydraulic lifting devices, submitting proof he has been regularly engaged in this type of business for a period of not less than five (5) years. The General Contractor is to list in his bid the make of lift proposed and the allowance set up for same. All work, including the accessory items listed herein, shall be performed in a first-class workmanlike manner, and is to include all materials and work as shown on the drawings or described hereinafter. All work shall be performed in accordance with the National Electrical Code, National Elevator Code, and such local codes as may be applicable.

Work Not Included: The following work shall be performed under another contract:

- A. Complete and legal hoist-way, pit and machine room of dimensions and specification required.
- B. An Underwriters' approved light outlet and wiring for stage lighting, if required and shown on plans.
- C. Extend the electrical service from the power main through a fused safety switch of ample capacity to the terminals of the power unit controller.
- D. Cutting and/or alteration of walls and painting as required.
- E. Adequate supports for guide rail brackets.
- F. Electrical current during erection and testing of equipment.
- G. Furnish and install nailing strips, sub-floor and finish flooring.

Travel: Travel of the platform shall be _____ feet and _____ inches.

Capacity: The lift platform shall be capable of supporting a uniformly distributed static load of 100 pounds per square foot, with a maximum vertical deflection due to this loading of not to exceed 1/720th of any measured lateral distance. The hydraulic equipment shall be capable of raising the dead load plus a live load of 50 pounds per square foot. The hydraulic cylinders will be so sized and located that maximum operating pressure will not exceed 300 PSI, and static pressure will not exceed 500 PSI.

Speed: The lift platform shall travel at a speed of _____ feet per minute under full contract load.

Power Supply: The power supply for the lift apparatus will be ____ volts, ____ phase, 60 cycles, alternating current. Lighting and control circuits will be 115 volts, 60 cycles, alternating current.

Description: The lift platform shall be _____ wide by _____ long and of a configuration as shown on the drawing. The platform frame of the lift will consist of formed and/or structural steel shapes welded and/or bolted together and supported at the cylinder positions with heavy bolster assemblies. The steel platform frame shall be arranged to receive nailing strips, sub-floor and finish flooring by others, and as selected by the Architect.

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Hydraulic Cylinders: The platform shall be raised with hydraulic cylinders of a size and number required to support the load specified and raise the rated load plus the weight of the platform and appurtenances to the height desired without overload. Each cylinder will consist of the following: A plunger of heavy seamless steel pipe with heavy welded steel head and having a stop ring welded at the bottom to positively prevent it from leaving the casing and with the plunger being accurately turned and polished to an extremely smooth finish over its entire length; an outer casing of seamless steel pipe with welded bottom head, large internal bronze bearings which are spaced at least 2 ½ times the ram diameter for greater stability, welded oil connection with automatic air eliminator (bleeder) mechanism, a heavy-duty gland with multiple "Vee" packing rings which are supported top and bottom with metal adaptors for improved sealing and including a circular packing pressure ring, an adjustable packing gland ring and an effective wiper ring. In addition, each cylinder will be provided with an effective oil reclaimer mechanism that will permit any oil that passes the packing to be returned to the oil reservoir. The cylinder assembly will be factory tested at twice the maximum system pressure, but at not less than 600 PSI. A safety factor of 5-to-1, at maximum system pressure, will be maintained at all times for all components of the cylinder.

Equalizers: The lift system shall be equipped with a positive, mechanical equalizer arrangement that will coordinate the hydraulic cylinders and prevent the platform from twisting and tilting. The hydraulic cylinders will be coordinated to maintain alignment within ½" at any position throughout the travel when the platform is loaded to full rated capacity and/or when eccentrically loaded so that the rated capacity is concentrated in one contiguous mass upon any area of the platform making 50% of the total. The equalizers will consist of multiple rack and pinion assemblies, located as required to accomplish the above. Each assembly will consist of a heavy steel housing for rack bar and drive pinion, complete with bronze bearings for both rack bar and pinion shaft - all being closely machined to minimize "back-lash"; a hardened pinion gear and a pinion shaft. The rack bars will be equipped with an adjustable mounting device, the assemblies will be connected together with heavy torsion tubes, each capable of resisting the forces involved with a minimum of deflection. Each torsion tube will be equipped with a universal type drive coupling on either end. Torsion tubes over twenty feet (20') long will be equipped with support bearings. Assemblies attached to the hydraulic cylinders will be securely welded and will be properly aligned at the factory. Any free standing rack and pinion assembly will be equipped with adequate supports and brackets to insure proper transmission of equalizing forces.

Hydraulic Power Unit: The hydraulic power unit shall be compactly and neatly designed and of a capacity to meet the above proper operation requirements. The pumping unit shall be of the screw or geared type especially designed for oil-hydraulic elevator service to provide steady discharge with minimum pulsations for smooth and quiet operation and shall be directly connected through a quiet flexible coupling to a NEMA frame standard motor suited for this purpose and of sufficient size to handle the rated load, without overload. The assembly will consist of a cleanable suction strainer; the motor/pump assembly noted above; a quiet adjustable bypass relief valve set at 10% over the pressure required to raise the rated load; a check valve designed to close quietly and support the lift on a positively locked column of oil; an up-start valve with external adjustment designed to by-pass oil during the initial start of the motor/pump assembly and to close slowly to permit the oil to gradually be diverted into the hydraulic cylinders, assuring a smooth "up-start"; an up-stop valve with external adjustment to permit bypassing the oil and assure smooth "up-stop"; a lowering valve and leveling valve to assure smooth stops; a manual valve to permit lowering the lift in event of electrical power failure; a rectangular oil reservoir of ample capacity to contain the oil necessary to properly operate the system, plus 25% reserve oil. The reservoir will be complete with drain, oil sight gauge, oil filler and breather. All valving and piping will be arranged to permit adjustment end service without dismantling the piping. Pipe connections to the oil reservoir will be sealed against contamination. All sources of vibration will be isolated with vibration absorbing materials where possible.

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Controls: The controller cabinet shall be provided with suitable cover, and shall be mounted near the hydraulic power unit. There shall be one remote control station at stage level, consisting of a keyed selector switch, and a control button for each level served, plus an emergency "STOP" button. Control buttons shall be of the momentary contact type and momentary pressure on the button chosen will cause the lift to travel to the landing selected without interruption, automatically stopping and leveling. The emergency "STOP" button shall stop the lift at any point in its travel regardless of direction. Limit switches shall be of the heavy-duty type and shall be properly arranged to provide for the operation specified.

Controls (Alternate): The controller cabinet shall be provided with a suitable cover and shall be mounted near the hydraulic power unit. There shall be one remote control station located to permit the operator to observe the stage at any position in its travel. The station shall be provided with a key operated ON/OFF selector switch and constant pressure RAISE/LOWER push buttons. Limit switches shall be of the heavy-duty type and shall be properly arranged to provide for the operation specified.

Safety Interlocks: Each door entering the stage lift shall be provided with an electrical end mechanical door interlock which shall prevent the starting of the lift except when all doors are closed and prevent opening any door except when the platform is at the level served by that door.

Guides: The lift shall be provided with vertically mounted guides of the elevator T-rail type fastened to the pit wall. The lift platform shall be provided with guide shoes of the size and type required to provide stability to the platform at any point in its travel.

Jack Shaft Casings: Furnish suitable steel casings of sufficient inside diameter so that the hydraulic cylinders and equalizers will hang perfectly plumb.