

**NOTE TO SPECIFYING ARCHITECT REGARDING SECTION 11065
STAGE EQUIPMENT
(INCLUDING DRAPERY REPLACEMENT AND HARDWARE RENOVATION)**

This specification includes the following:

1. Renovation of the existing counterweight system.
2. Renovation of the tracks.
3. Replacement of stage drapery.
4. Additional counterweight sets to augment the existing counterweight system are specified as paragraph 2.05. Delete if not required.
5. New winch sets are specified as paragraph 2.06. Delete if not required.
6. Winch set renovation is specified as paragraph 2.07. Delete if not required.
7. Motorized winch machines are specified as paragraph 2.08. Delete if not required.

For clarification or assistance call 1-800-548-8982; no charge, of course.

**SECTION 11065
STAGE EQUIPMENT
(INCLUDING DRAPERY REPLACEMENT AND HARDWARE RENOVATION)**

PART 1. GENERAL

1.01 WORK INCLUDED

A. The work included under this heading embraces all material, scaffolding, equipment and service necessary for and reasonably incidental to the completion to the following: Furnish and install completely, ready for operation, hardware and rigging detailed and hereafter specified. Reconditioning, where specified, refers to the removal, inspections, and restoration of equipment to a like new condition. This shall include the replacement of any part that is worn out, broken, or cannot be reconditioned, as well as servicing, cleaning, painting and reinstallation of all equipment specified. This Contractor shall be responsible for the proper disposal of all materials, rigging and hardware that may pose a health hazard. This disposal shall be done in accordance with the guidelines set forth by the cognizant authorities for environmental protection.

1.02 RELATED WORK IN OTHER SECTIONS OR CONTRACTS

A. Finish Painting

B. Electrical Work

1.03 SHOP DRAWINGS

A. Meet requirements of applicable portions of General Conditions.

B. Indicate methods of securing, anchoring and attaching equipment.

C. Make notations to indicate compliance with requirements of these specifications.

D. Submit samples with full color line for color selections by the architect.

PART 2. MATERIALS

2.01 FABRIC

A. Front stage curtain assembly shall be fabricated using 25 ounce velour manufactured by K.M. Fabrics, J.L. deBall, Frankel Associates, Janson Industries 800 548 8982 or equal as approved by the Architect. Fullness shall be 75 percent (the ratio of the fabric in pleats to the finished horizontal top dimension of the drapery).

B. Concert set curtain assembly shall be fabricated using 20 ounce velour manufactured by K.M. Fabrics, J.L. DeBall, Frankel Associates, Dazians, Valley Forge, or equal as approved by the Architect. Fullness incorporated into the finished drapery shall be 60 percent.

C. Drop curtains shall be fabricated using seamless sharktooth for the scrim drop and seamless muslin for the sky drop. Fabric shall be supplied by Frankel Associates, Dazians, Valley Forge or equal as approved by the architect. No fullness shall be incorporated into the finished drapery.

D. All fabric shall comply with fire resistant standards established by state and local authorities and shall comply with NFPA Bulletin 701 requirements. Certification of flameproofing shall be provided by the fabric suppliers.

E. Tests to determine the quality of material may be conducted as directed by the owner. All costs required to conduct such tests shall be borne by the contractor at no additional cost to the owner.

2.02 DRAPERY

A. All stage drapery shall be replaced with new drapery, manufactured to the same horizontal finished dimensions (measured at the bound top) and the same finished vertical dimensions as the existing stage drapery, unless noted otherwise.

B. Drapery items listed shall contain the added fullness indicated. Fullness shall be pleated at 8 to 12 inch centers to heavy 3 ½ inch jute webbing with number 3 grommets and S hooks, or grommets and tie lines, placed at the pleats as required. Half-strip turnbacks for front curtain shall be provided at both the on-stage edges and off stage edges.

C. Bottom hems of all valances and borders, shall be 3 inches deep. Side hems shall be 2 inches. Bottom hems of the front curtain shall be 6 inches deep and contain no chain weighting. Bottom hems of all other curtains shall be 6 inches deep and contain a #8 jack chain weight encased in a separate canvas pocket. For drop curtains, provide a 2 inch webbing sewn to the back of the bottom hem. Grommets shall be located on 12 inch centers to provide a simple means of securing a weighting batten.

D. Schedule of new stage drapery to be furnished and installed:

ITEM	SECTIONS	FABRIC	FULLNESS
Valance	1	25 oz. velour	75%
Front curtain	2	25 oz. velour	75%
Teaser	1	25 oz. velour	60%
Tormentors	2	25 oz. velour	60%
Olio Curtain	4	21 oz. velour	60%
Borders	4	21 oz. velour	60%
Wing curtains	2	21 oz. velour	60%
Rear curtain 1	4	21 oz velour	60%
Rear curtain 2	4	21 oz velour	60%
Scrim drop	1	seamless sharkstooth	0%
Sky drop	1	seamless muslin	0%

2.03 TRACK HARDWARE REPLACEMENT AND RENOVATIONS

A. Steel pipe battens that are bent or damaged or have inadequate splices shall be replaced with 1 1/2 inch schedule 40 steel pipe using internal sleeves, which shall be not less than 18 inches at all splicing points. Suspension chain hangers shall be replaced if inadequate or unsightly. Aluminum pipe battens replaced or provided in lieu of steel pipe shall have an outside diameter approximately 2 inches and shall have internal splices as indicated above. Chain hangers shall be 2/0 tested welded chain, manufactured from 3/16 inch diameter wire, and shall be painted or plated to inhibit rust.

B. All track channels shall be cleaned and all damaged curtain carriers shall be replaced with new hardware. Dysfunctional end pulleys and floor pulleys shall be replaced with new hardware of appropriate size. All handlines on all tracks shall be replaced with braided 3/8 inch diameter black multi-fiber sash cord with non-stretch core. Remove all carriers from the tracks reused; clean, lubricate, and reinstall, replacing damaged carriers with new carriers. Track housings that are bent or otherwise damaged shall be replaced.

C. New stage curtain track may be used in lieu of renovated track providing that carrier bodies are metal (not plastic) and that each wheel of each carrier is furnished with a race of precision ball bearings and that nylon or neoprene tires are provided and that handlines are 3/8 inch braided reinforced cotton or multi-fiber cord. All tracks that have significant wear shall be replaced.

2.04 COUNTERWEIGHT SETS REPLACEMENT AND RENOVATIONS

A. Counterweight reconditioning shall include inspection and testing of bolted connections for all head blocks, loft blocks and floor blocks, and the replacement of any unsafe equipment.

B. All running lines shall be replaced with new 1/4-inch 6 x 19 aircraft cable, galvanized and preformed. Carriage ends of cable lines shall be secured with two new thimbles and new 1/4-inch painted or galvanized cable clips. Batten ends shall be provided with 36-inch trim chains, thimbles and copper ferrules properly installed. Trim chains shall be 1/4-inch galvanized proof coil chain, grade 50.

C. All hardware and drapery items that are counterweighted shall be left balanced. Furnish additional balance weight as required.

D. All 3/4-inch purchase lines on existing counterweight sets shall be replaced with 3/4-inch composite braided rope with black polyester cover (multi-line II or approved equal) over synthetic, non-stretch braided center.

E. Furnish and install new rope locks for all counterweight sets. Rope locks shall have 9-inch steel handles with vinyl coating and with flanges that allow padlocking of individual sets.

F. Replace all guide cables with new wire rope of same specification as for the running lines terminated in the same way as specified for the carriage ends. Furnish and install 2 turnbuckles (3/8-inch by 6-inch galvanized and forged) for all sets. Tighten all guide cables uniformly to the correct tension.

2.05 COUNTERWEIGHT RIGGING (NEW ADDITIONAL SETS)

A. Furnish a total of ___ sets of multi-line counterweight rigging (cable guide system) firmly and securely attached to structure in the best and most workmanlike manner, fitted and arranged to clear all existing building construction, properly installed/counterbalanced, adjusted, tensioned, and

otherwise ready for operation in accordance with the requirements of the specifications and commonly accepted good practice for stage rigging. Each set shall contain the items listed below, which are catalog numbers of J.R. Clancy Company and The Janson Industries, H and H Specialties, or approved equal. All hardware shall be shop painted.

ITEM	CATALOG NUMBER (or size)
Head block precision tapered roller bearings	#1255
Loft blocks, ball bearing	#819
Cable clips and copper ferrules	1/4-inch
Lead cables (galvanized preformed aircraft)	1/4-inch 7 by 19
Pipe battens	1-1/2" ID steel pipe
Carriage (cable guide)	#85 x 5
Floor block, ball bearing	#855
Rope lock (9-inch steel, lockable)	#533
Counterweights	600 lb. per set
Hand line (multi-line II)	3/4-inch

B. Head blocks shall be of unit parallel type construction with heavy steel side plates extending above sheaves to accommodate three cross bolts and spacers to positively prevent cables escaping from grooves. All sheaves shall run on precision roller bearings of self-contained type operating in a ground cone independent of shaft and hub. Shaft shall be not less than one inch in diameter and shall be fitted with jam nut. Required: Class 30 gray iron (ASTM A-48); machined grooves; 1 inch steel shaft, keyed to side plate. Nylon sheaves are approved at contractor's option.

C. Loft blocks shall be of full steel side construction with cross spacers to prevent cables escaping from grooves. Supply hook and clamp to fasten to beams without drilling. Loftblocks shall incorporate ball bearings. Required: Class 30 gray iron (ASTM A-48); machined grooves; 5/8 inch steel shaft, keyed to side plate. Nylon sheaves are approved at contractor's option.

Loft Block idler assemblies shall be provided to carry the weight of the cables and prevent rubbing against adjacent block side plates. Idler assemblies shall consist of one or more 2-1/2 inch diameter, plastic idler pulleys mounted on the side of the loft block in a steel housing. The housing shall consist of a 12 gauge side plate and two 1/4 inch bolts and pipe spacers to mount the housing and captivate the cables in the grooves. The sheaves shall have ball bearings, and 1/4 inch cable grooves. All nuts shall be of the nylon insert self locking type. Furnish idler sheaves for all cables passing the corresponding loft block.

- D. Counterweight carriages shall have $\frac{3}{4}$ -inch diameter carriage side members. Carriages shall have steel top and bottom members. Provide double nuts at top and bottom of rod.
- E. Floor blocks shall be manufactured from gray iron as a one piece casting fitted with an 8-inch diameter sheave, lathe turned, for $\frac{3}{4}$ -inch hand line, operating on ball bearings. Required: Class 30 gray iron (ASTM A-48); $\frac{5}{8}$ -inch steel shaft, keyed to side plate. Nylon sheaves are approved at contractor's option.
- F. Rope locks shall be manufactured from steel with vinyl-coated hand lines. Furnish cast iron jaws for clamping hand line. The jaws shall be mounted on smooth pins or pivots. Handles shall be at least 9-inches in length and shall consist of one-piece steel fabrication. Each rope lock shall have a cadmium-plated thumbscrew for adjustment of jaw openings. Each lock shall be equipped with a steel oval retaining ring and flanges that permit padlocking individual sets.
- G. Lead line cable shall be of aircraft construction 7 by 19 (galvanized, preformed) with breaking strength not less than 6000 pounds for $\frac{1}{4}$ inch cable.
- H. Hand lines shall be of good quality composite rope, not less than $\frac{3}{4}$ inches in diameter, free from slivers and foreign matter. Cover shall be braided black polyester with non-stretch core (multi-line II).
- I. Counterweight pipe battens shall be 1-1/2-inch (inside diameter) standard schedule 40 pipe. All joints shall be sleeve spliced internally using not less than 18 inch splice pieces. Bolts or rivets shall connect each end of the internal splice pieces to the pipe batten (4 bolts per splice, grade 5, $\frac{3}{8}$ inch diameter).
- J. Counterweights shall be cut from steel plate free from rough edges or foreign matter, with slots at each end to accommodate the vertical rods of the counterweight carriages. All equipment shall be balanced and the surplus weight shall be neatly stacked. All counterweights shall be shop painted on all exposed surfaces in a smooth finish cost of black.
- K. Muling blocks, as required, shall be provided. Sets shall be installed in direct lines where practical but if required, due to physical location of stairs, doorways or obstructions, all muling blocks, extra head block and floor blocks necessary, together with supporting brackets, miscellaneous steel and additional cable and rope shall be furnished and installed to achieve a properly functioning system for each set.

L. Locking rails shall be number 518/1015, or approved equal, fabricated in a continuous battery or individually for locating sets as required. Heavy steel upright frames shall be furnished for each set and shall be provided with holes for use in anchoring to the floor. Furnish anchor bolts with required nuts, washers and plates. Alternatively, where conditions permit, the floor blocks may be installed in the existing locking rail.

M. The stage equipment contractor and the electrical contractor shall have the joint responsibility of assuring that feed cables are not visible from any seat in the audience. The electrical contractor shall furnish and install the bar stock that connects the counterweight pipe (by stage equipment contractor) to the fixture pipe. The plug-in strip, the lighting instruments and the electrical cable shall be provided and installed by the electrical contractor. The stage equipment contractor shall furnish and install all loft blocks and steel cables required. The stage equipment contractor shall also furnish completely assembled fixture pipe battens for each counterweight set used for performance lighting plug-in strips and instruments. The installation of the fixture pipe batten and all electrical equipment shall be made by the electrical contractor.

2.06 WINCH RIGGING (NEW ADDITIONAL SETS)

A. Furnish a total of ___ sets of multi-line rigging (cable guide system) firmly and securely attached to structure in the best and most workmanlike manner, fitted and arranged to clear all existing building construction, properly installed/counterbalanced, adjusted, tensioned, and otherwise ready for operation in accordance with the requirements of the specifications and commonly accepted good practice for stage rigging. Each set shall contain the items listed below, which are catalog numbers of J.R. Clancy Company and The Janson Industries, H and H Specialties, or approved equal. All hardware shall be shop painted.

ITEM	CATALOG NUMBER (or size)
Head block precision tapered roller bearings	#1255
Loft blocks, ball bearing	#819
Clew (cable guide)	#7x1
Cable clips and copper ferrules	1/4 inch
Lead cables (galvanized preformed aircraft)	1/4 inch 7 by 19
Winch drive line	3/8 inch or (2) 1/4 inch
Pipe battens	1-1/2" ID steel pipe
Winch worm gear type	1800 lb capacity

B. Head blocks shall be of unit parallel type construction with heavy steel side plates extending above sheaves to accommodate three cross bolts and spacers to positively prevent cables escaping from grooves. All sheaves shall run on precision roller bearings of self-contained type operating in a ground cone independent of shaft and hub. Shaft shall be not less than one inch in diameter and shall be fitted with jam nut. Required: Class 30 gray iron (ASTM A-48); machined grooves; 1 inch steel shaft, keyed to side plate. Nylon sheaves are approved for use at the contractor's option.

C. Loft blocks shall be of full steel side construction with cross spacers to prevent cables escaping from grooves. Supply hook and clamp to fasten to beams without drilling. Loftblocks shall incorporate ball bearings. Required: Class 30 gray iron (ASTM A-48); machined grooves; 5/8 inch steel shaft, keyed to side plate. Nylon sheaves are approved for use at contractor's option.

Loft Block idler assemblies shall be provided to carry the weight of the cables and prevent rubbing against adjacent block side plates. Idler assemblies shall consist of one or more 2-1/2 inch diameter, plastic idler pulleys mounted on the side of the loft block in a steel housing. The housing shall consist of a 12 gauge side plate and two 1/4 inch bolts and pipe spacers to mount the housing and captivate the cables in the grooves. The sheaves shall have ball bearings, and 1/4 inch cable grooves. All nuts shall be of the nylon insert self locking type. Furnish idler sheaves for all cables passing the corresponding loft block.

D. Clew shall be manufactured from 1/4 inch steel plate. Provide guides for each side of the clew with guide cables and turnbuckles. Provide double nuts at top and bottom of rods.

E. Lead line cable shall be of aircraft construction 7 by 19 (galvanized, preformed) with breaking strength not less than 6000 pounds for 1/4 inch cable.

F. Handlines shall be of good quality composite rope, not less than 3/4 inches in diameter, free from slivers and foreign matter. Cover shall be braided black polyester with composite, non-stretch core (multi-line II).

G. Counterweight pipe battens shall be 1-1/2 inch (inside diameter) standard schedule 40 pipe. All joints shall be sleeve spliced internally using not less than 18 inch splice pieces. Bolts or rivets shall connect each end of the internal splice pieces to the pipe batten (4 bolts per splice, grade 5, 3/8 inch diameter).

H. Muling blocks, as required, shall be provided. Sets shall be installed in direct lines where practical but if required, due to physical location of stairs, doorways or obstructions, all muling blocks, extra head block and floor blocks necessary, together with supporting brackets, miscellaneous steel and additional cable and rope shall be furnished and installed to achieve a properly functioning system for each set.

I. Worm gear hand winch shall consist of a cast iron drum with integral, machined worm gear that rides on a stationary steel shaft. The worm gear shall be turned by a steel worm pinion gear with an adjustable crank handle. Integral to the pinion is a thrust brake and ratchet that is always engaged and automatically increases the retarding torque as the load is increased. All gears shall be fully enclosed for safety. A hole and cable holder shall permit attachment of the lifting cable(s). Minimum drum diameter shall vary with the cable diameter for which the winch is sized, but shall not be less than 16 times the cable diameter. Winch shall be JR Clancy or Thern designed for operating capacity of 1800 pounds minimum.

2.07 WINCH SETS REPLACEMENT AND RENOVATIONS

A. Winch set reconditioning shall include inspection and testing of bolted connections for all headblocks, clews and winches, and floor blocks, and the replacement of any unsafe equipment.

B. All running lines shall be replaced with new 1/4 inch 6 x 19 aircraft cable, galvanized and preformed. Each end of cable lines shall be secured with two 1/4 inch painted or galvanized cable clips which shall be replaced.

C. All hardware and other items that are presently installed on winch sets shall be reinstalled after the renovation has been completed.

D. Steel pipe battens that have been damaged shall be replaced with 1 1/2 inch schedule 40 steel pipe using internal sleeves. Splices shall be 18 inches in length at all splicing points. Suspension hangers shall be replaced if inadequate or unsightly.

E. Furnish and install new winches with the same load capability for any winches that cannot be renovated.

2.08 WINCH SPECIFICATIONS

Motorized winch machines shall comply with the following specifications:
Furnish a total of _____ heavy duty lifting electric winches.

- A. Heavy duty lifting electric winch
 - 1. 2000 lb. continuous line pull
 - 2. 24 ft. per minute
 - 3. 50 ft. of 5/16 inch cable
 - 4. Helically grooved drum
 - 5. 460/3 phase/60 cycle service or other voltage required
 - 6. 2 Horsepower motor
 - 7. 4-contact rotary switch
 - 8. Gear reducer utilizing high efficiency helical worm

- B. Braking System
 - 1. Electromagnetic brake, disc type, activated automatically in the event of power interruptions. The brake shall stop the winch and hold the load securely. The worm gear ratio shall be so high that the effect is a secondary braking system in accordance with OSHA requirements.

PART 3 EXECUTION

3.01 FINISH REQUIREMENTS

- A. All items furnished under this section shall have the manufacturer's standard finish and color, except as noted.

- B. All turnbuckles, clips, shackles, chains, and other items of incidental hardware shall be plated or painted.

- C. All drapery shall be trimmed, leveled, and left ready for use.

END OF SECTION

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