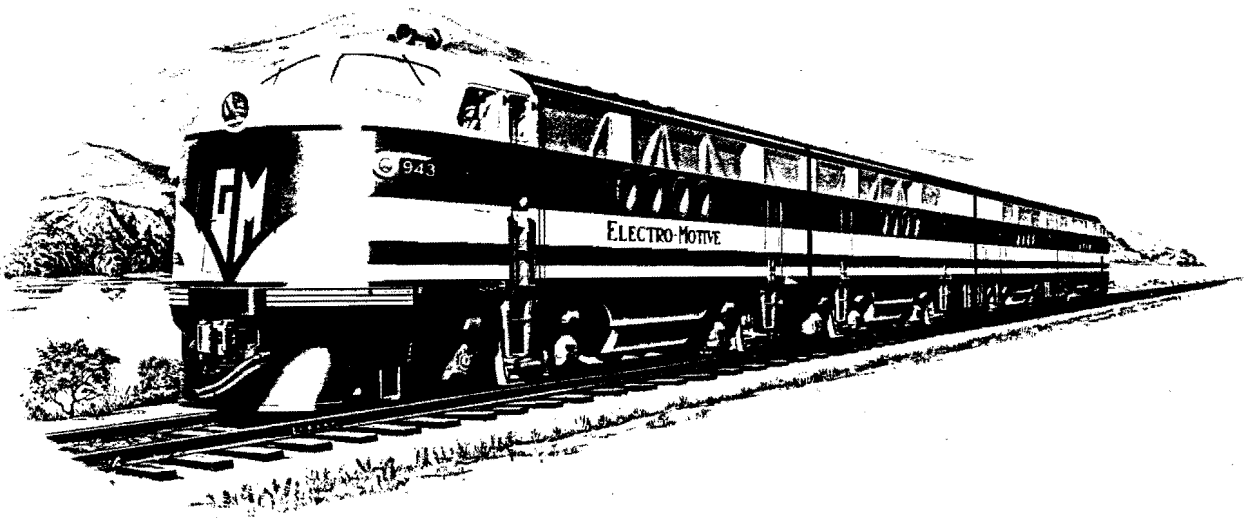
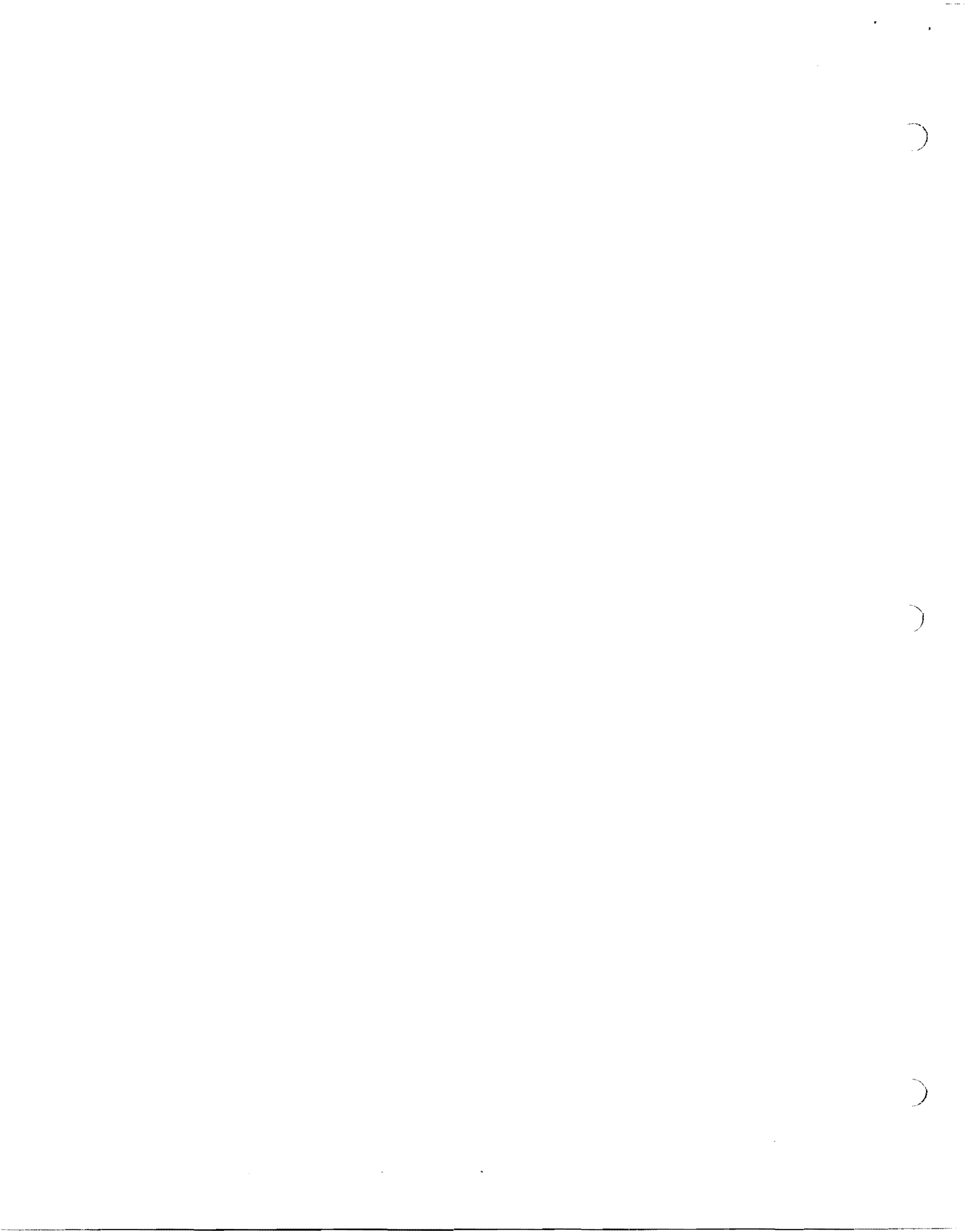


ELECTRO-MOTIVE DIVISION
GENERAL MOTORS CORPORATION
LA GRANGE, ILLINOIS, U. S. A.



FREIGHT LOCOMOTIVE



P R E F A C E

This Specification is prepared to cover only the pertinent details of the Electro-Motive 5400 H.P. "Main Line" Diesel Electric Freight Locomotive.

For the convenience of the reader, the Specification has been divided into the following sections:

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SECTION I - GENERAL INFORMATION & IDENTIFICATION

MODEL Model FT 5400 H.P. Main Line Freight Locomotive.

TYPE AAR designation 2(B-B+B-B) Common designation 2(044-440).

ARRANGEMENT The general arrangement of the locomotive is shown on Elevation and Floor Plan Drawing #8064350 included with this Specification.

The locomotive consists of two units coupled together for multiple unit operation in either direction from an operator's cab at either end. Each unit consists of two 1350 H.P. Sections permanently coupled together. Each Section is carried by two 4-wheel power trucks.

MAJOR DIMENSIONS

Distance pulling face of front coupler to center line of #1 truck - - - - -	12'6"
Distance between truck centers:	
Cab Section - - - - -	27'3"
Intermediate Section - - - - -	26'6"
Truck rigid wheel base - - - - -	9'0"
Distance between coupler pulling faces - - - - -	193'0"
Width over body posts - - - - -	9'10"
Height from top of rail to top of carlines - - - - -	14'1/2"
Over all height - - - - -	15'0"

WEIGHT

Total fully loaded weight on rail approximately - - -	900,000#
Supplies - Fuel - - - - - gallons	4800 total
Sand - - - - - cu. ft.	80 "

CLEARANCES

EMD Clearance Diagram #8059244 illustrates clearance conditions for body, trucks, motors, running gear and miscellaneous underneath equipment.

Truck swing design for 23° curve, or 250' radius, with 2-1/4" free lateral motion in the truck bolster and 3/8" in Hyatt journals.

SAFETY APPLIANCES

All steps, grab handles and other modern safety appliances illustrated on this drawing, cover EMD interpretation of Interstate Commerce Commission requirements.

SECTION 2 - CARBODY CONSTRUCTION

CARBODY FRAMING

Carbody framing designed to simulate bridge construction. Side frames in form of modified Howe truss are calculated to carry entire body weight and lading. Side paneling applied to frame members not included in stress calculations.

Power equipment weight is carried principally on underframe cross members extending from side to side. The center sill sections interposed between these cross bearers are in effect continuous, and designed to take "buff" and "drag".

The upper members of the side frames are tied together with a turtle back roof, with roof sheets attached to closely spaced carlines.

MATERIAL & DESIGN

Wherever suitable, construction has taken advantage of rolled steel sections to insure straightness. Material specifications are carefully selected, consideration being given not only to tensile and physical properties, but also fatigue and Charpy impact resistance at varying temperatures.

Where sections intersect, longitudinal members are protected against cross welds with attendant danger of under-cutting by use of diamond shaped gussets placed to connect the different members so that the transfer of forces will be gradual. No abrupt changes are permitted in sections which might result in stress concentrations.

Substantial arches are provided to take care of lateral forces or uneven jacking conditions. Substantial pads at the ends of each body bolster are provided for jacking or lifting carbody. Additional pads are provided for support of carbody when removing either set of bolster jacks to drop a truck for maintenance purposes.

Underframe portions overhanging center plates at each end are fabricated with top and bottom cover plates extended between side sills and designed to form a rigid box platform. End frame posts, spaced approximately in line with center sills, join the platform and roof structure.

At cab end of unit, collision framing above the platform consists of a combination of posts, plates and braces. Two large front posts are securely fastened to the platform and a deep anti-telescoping plate, the ends of which tie into heavy diagonal braces, anchored in the side framing. The elevated cab floor supports, front bulkhead, and rear partition members are all arranged to provide added strength to the front end structure.

SECTION 2 - CARBODY CONSTRUCTION

ROOF HATCHES

Hatches are provided in the roof for installation and removal of engines, generators, and other equipment. Four lifting eyes are provided on each hatch for proper handling.

OUTSIDE FINISH

Outside finish does not assist in the support of the carbody and therefore is not included in stress calculations.

Material used consists of 3/8" plywood panels completely covered with light gauge steel with edges lapped and soldered to protect against moisture. This type of paneling was selected for light weight and flat surface.

Panels are applied to the side frames against an asphalt-impregnated canvas backing to prevent frictional wear of the metal covering, which might occur due to slight movement of the frame members caused by deflection. Bolt holes are not permitted in paneling. Application is made by use of longitudinal and vertical battens clamping the panels in position. Space provided between panels for batten holding bolts and to permit uneven expansion and contraction of materials, is filled with a plastic asphalt putty for weather protection. Suitable openings in panel arrangement provide for necessary doors and windows.

Roof sheets are 12 gauge steel and end frame sheets are 16 gauge steel. The streamline contours of the front end are covered with 12 gauge steel so formed and attached to the framing that it will also assist as a stress member.

FLOORING

Underframe construction supplemented by welded 1/4" floor plate which acts as foundation for application of anti-skid runways.

BODY CENTER PLATES

Grade "B" steel casting, welded to body bolster assembly. Wear plates applied to bottom and outside surfaces.

CONTROL CABS

Locomotive control cabs are located approximately over front bolster. Cab floors are elevated above locomotive platforms for improved vision. Each cab is accessible through doors on each side, and likewise from the engine compartment by means of a three-step stairway.

Window equipment consists of slanting windshield and drop sash side windows.

CAB SEATS

One swivel type, adjustable, with upholstered seat, back and arm rests, at engineman's position.

SECTION 2 - CARBODY CONSTRUCTION

- CAB SEATS**
(Cont'd.) Also one swivel type, adjustable, with upholstered seat, back and arm rests on left side of cab.
- CAB FLOOR** Wood floor, linoleum covered.
- CAB INSIDE FINISH** Sides 1/16" steel; roof lined with acoustical treatment, fitted and machine screwed in position.
- CAB INSULATION** Sides and roof insulated with 2" insulation. Fire and moisture proof.
- REAR CAB PARTITION** 3/4" plywood panels covered with light gauge steel, fitted and clamped to partition framing.
- CAB SASH**
Windshleld sash - stationary, 9/16" safety plate glass.
Side door sash - retractible, 1/4" safety plate glass.
Cab side sash, 1/4" safety plate glass, retractible into side pocket, mechanically operated by hand crank.
- ENGINE COMPARTMENT SASH** 1/4" safety plate glass.

All sash, as indicated on elevation drawings, are spaced regardless of carbody framing members. Body framing across sash openings painted black. One hinged sash on each side of each section provides clear opening.
- GUTTERS** Gutters are provided above side doors and cab side windows.
- COUPLERS** Couplers at both ends and at center between units are AAR type "E" coupler, with special heavy shank.

Standard equipment includes sections connected with special forged link with ball joint at each end.

Air connections at both ends. Sections permanently connected with metallic hose connections. Units connected with standard separable hose connections.

SECTION 2 - CARBODY CONSTRUCTION

CENTERING DEVICE	A centering device arrangement engages the coupler shank between units and the connecting links between sections to restrain the angular movement. These devices prevent excessive offset of the sections when the locomotive is used as a helper locomotive at the rear end of the train.
DRAFT GEAR	National Malleable Type M-380 rubber draft gear at both ends and between units.
YOKE	National Malleable. Design to suit draft gear with 3-1/2" pin.
DRAW BAR CARRIER	Spring supported.
UNCOUPLING DEVICE	Uncoupling device operative from both sides of locomotive.
COUPLER SWING	Coupler swing of 17° provided with coupler having 11" knuckle.
FRONT COUPLER CONNECTIONS	Air brake and signal lines fitted with shut-off valves.
PILOTS	Pilots removable, made of 3/16" steel plate, substantially braced both laterally and longitudinally.
ANTI- CLIMBERS	Anti-climbers are 7" rolled section to suit contour of front platform.
DIAPHRAGMS	Diaphragms between sections attached to body end posts of each section. Diaphragms with standard EMD face plate between units.
VESTIBULE LIGHTS	Vestibule lights provided between units operated on same circuit with engine room lights.
FOOT PLATE	Foot plate provided between units and between sections.
BODY END DOORS	Sliding body end doors, supported on rollers at top and guide at bottom, are provided with 10" square wire glass window light between units.

SECTION 2 - CARBODY CONSTRUCTION

BODY SIDE DOORS

Locomotive side entrance doors located as shown on elevation drawing.

TRIMMINGS

Door locks - Special EMD design, non-tarnishing cast material, 5-1/4" "L" handle, latched when in horizontal position. Outside doors locked by inside latch; right and left hand side doors on engine room provided with a lock; both locks have keys alike.

Hinges - heavy duty, wrought iron.

WEATHER- STRIP

For sash - Rubber channel of special design to provide good cushioning and water-tight installation.

For outside doors - rubberized canvas-covered sponge rubber at sides, top and bottom along inside edges; one rubber strip at bottom on outside.

SIGNAL BRACKETS

Combination flag and oil marker light brackets located as shown on elevation drawing, at rear of unit. Flags and marker lights furnished by Railroad.

Classification light of special design streamlined into front end contour and built integral with illuminated number box. Classification light arranged for red, green and white indication. Classification flag brackets located within arm's reach outside cab side windows.

Blue flag bracket at end of anti-climber in plain view from cab.

SECTION 3 - TRUCKS

TRUCK ASSEMBLIES

Two (2) four (4) wheel truck assemblies are provided per locomotive section; interchangeable. Improved riding qualities and greater stability in negotiating curves are obtained by a new treatment of load suspension, strictly an EMD development.

Weight of complete assembly including traction motors, approximately 39,000 pounds; rigid wheelbase 9'0"; oversize AEREA E-12 axles with 6-1/2" journals for Hyatt roller bearings, 40" wheels and clasp brakes.

Truck frame is supported on each of the four journal boxes by twin group coil springs. Swing bolster is supported at each end by quadruple full-elliptic springs. These springs rest on each end of the spring plank, which in turn is carried by swing hangers pivoted from outside of truck frame.

Each of the two motors on each truck is supported by the driving axle, to which it is geared, and a spring motor nose suspension on the truck transom.

Truck assemblies are equipped with EMD design clasp brakes actuated by four brake cylinders per truck.

SHOCK ABSORBERS

Four shock absorbers are mounted between the truck frame and bolster to eliminate excessive lateral oscillation and to ease the body against truck frame when entering or leaving curves.

AXLES

Oversize AEREA E-12 with special 6-1/2" journals. AAR material specification M-104.

WHEELS

Medium carbon rolled steel, 40" in diameter, 2-1/2" rim. Tread ground smooth and concentric after assembly on axles.

JOURNAL BOXES

Locomotive equipped with Hyatt Roller Bearing 6-1/2" journals of special EMD design, whereby lateral thrust is removed from the journal bearing itself and taken through a cushioning arrangement directly on the box. Journal box pedestal guides provided with manganese steel wear plates.

JOURNAL BEARINGS

Hyatt roller bearings.

TRUCK FRAME & BOLSTER

Steel casting, heat treated, EMD design.

SECTION 3 - TRUCKS

PEDESTALS	Lined with special wear resisting steel plates bolted to the truck frame.
PEDESTAL TIE BARS	Fitted and applied at the lower end of the pedestal legs, held in position by 1" bolt at each end.
TRUCK CENTER PLATES	Truck center plate provided with wear plates, dust guard and lubricating arrangement.
SIDE BEARINGS	Although the truck center plate is so large that there is no need for side bearings, the usual friction type side bearings are provided.
INTERLOCK	In combination with the truck side bearings is a special EMD designed truck and body interlock, which also serves to stop the truck from sluing in case of derailment.
SWING HANGERS	Made from the same material as the axles.
BOLSTER SPRINGS	MS-1095 steel, full elliptic.
TRUCK BRAKES	Clasp brake rigging is provided on each wheel, operated by individual 9" x 8" brake cylinders. Brake lever ratio 5.66 to 1. Two 14-1/4" brake shoes per wheel give an average shoe pressure of 12,250# in emergency application.
BRAKING PERCENTAGE	Based on a weight of 870,000# per locomotive unit, this locomotive has a braking ratio of 65% with 50# brake cylinder pressure, or 90% with 68# cylinder pressure.
BRAKE PINS	All pins and bushings hardened and ground; case hardened to double customary depth and very much oversized to reduce wear. All holes in brake levers bushed.
HAND BRAKES	One hand brake provided per section, connected to one brake cylinder lever only. All trucks provided with special lever for connecting to hand brake.

SECTION 4 - POWER PLANT & EQUIPMENT

GENERAL	The motive power of each locomotive is derived from four entirely independent Diesel-Electric Power Plants of 1350 H.P. each, consisting essentially of the following apparatus.
ENGINE	G.M. Diesel sixteen (16) cylinder, V-type, 2 cycle, bore 8-1/2", stroke 10", unit injection, Roots blower scavenging through cylinder wall intake and multi-valve exhaust. Water cooled cylinder liners and heads. Ten (10) bearing crankshaft, copper-lead alloy bearings, drop-forged connecting rods, double floating lead-bronze piston pin bushings, malleable iron pistons. Isochronous governor speed control with separate overspeed trip lubricating oil and water pumps.
MAIN GENERATOR	EMD, Type D-8, nominally 600 volt, direct current, voltage controlled by load regulator. Single bearing direct connected to engine crankshaft through flexible coupling. Capacity suitable to continuously transmit to traction motors the rated output of the engine under all conditions for which the locomotive is offered.
AUXILIARY GENERATOR	Battery charging unit, adjustable between 74 and 78 volts, capacity 10 K.W., mounted above and driven by "V" belts from main generator.
ENGINE STARTING	By motoring of the main generator through use of special starting fields energized by the locomotive storage battery.
TRACTION MOTORS	Four EMD, type D-7B, direct current, roller bearing motors are used per power plant. Clean air is forced to the motors by engine driven blowers, located in the carbody above each truck, at the rate of 1900 cubic feet per minute per motor, through ducts in the floor of the carbody which connect with flexible rubber ducts held against the motor housing air intake ports.
GEAR RATIO	For high speed trains, 61:16, allowing a maximum safe speed of 70 MPH.
HIGH VOLTAGE CONTROL	Manual transition forward and backward, with four (4) motor connections, - series parallel, series parallel shunt, parallel and parallel shunt. Switch equipment for transmission of single generator output to four traction motors suitably arranged in ventilated cabinet. All high voltage circuits safeguarded by ground protective relay.

SECTION 4 - POWER PLANT & EQUIPMENT

CONTROL CABINETS

Divided into three groups as follows:

- (a) DISTRIBUTION CABINET, one (1) per locomotive unit, comprising main fuse, battery cut-out switch, fuse test blocks, main battery charging ammeter and voltmeter in 64 volt supply circuit, individual switches and fuses for independent control of train control, main control for power plant, main lighting switch for running lights, cab, and engine room lights.
- (b) LOW VOLTAGE CONTROL CABINET, one (1) per locomotive section, housing voltage regulator, battery charging and engine starting equipment.
- (c) HIGH VOLTAGE CONTROL CABINET, one (1) per locomotive section, housing generator and traction motor control equipment.

STORAGE BATTERY

EXIDE IRONCLAD, 32 cell MV25D, in ventilated cabinets, located at rear of first section.

EXHAUST SYSTEM

Two manifolds mounted on each engine, with outlets extending slightly above roof line.

COOLING SYSTEM

Each engine has a separate circulating system consisting of two 200 GPM engine driven water pumps, forced air circulation thru Harrison fin tube radiators. Each engine has a separate water supply tank with a cooling system capacity of 225 gallons. Provision made so steam jet heating of cooling water during lay-over periods can be made from external steam source.

ENGINE TEMPERATURE CONTROL

Forced air circulation through seamless tube type radiator assemblies. Four (4) vertical 34" fans driven from engines through clutches deliver approximately 80,000 CFM of air per engine.

Engine air delivery is completely controllable by means of the fan clutches, and by the manually operated shutters mounted in the intake air ducts.

ENGINE LUBRICATING OIL SYSTEM

Dual circulating system for each engine, comprising single pressure pump for oil delivery from supply tank to the engine lubricating system, separate pressure pump for oil delivery

SECTION 4 - POWER PLANT & EQUIPMENT

ENGINE LUBRICATING OIL SYSTEM (Cont'd.)

from supply tank to piston cooling system, and scavenger pump for oil delivery from engine sump through 4-element oil filter and three Harrison oil coolers, into the supply tank. Pumps protected by strainers in each suction line, with supply tank protected by basket strainer in tank filler.

FUEL SYSTEM

Return flow system, comprising one motor driven dual pump per engine. Filter provided in suction line for pump protection in addition to two filters in pressure line. Sight glasses and relief valves are provided for visual check of fuel flow and for automatic by-pass of fuel back to supply tank in the event of plugged line or dirty filter.

FUEL TANK

Capacity 1200 gallons per section, total 4800 gallons. Filling station on each side of each locomotive arranged for 4" Protectoseal element with 2-1/2" fuel connection. Tanks fitted with bottom sump, cleanout plug and non-removable water drain.

I.C.C. REQUIREMENTS

Each fuel filling station has I.C.C. approved direct reading fuel gauge, indicating fuel level starting 4 1/2" from top of tank. Each tank is also supplied with an Ashcroft hydrostatic level gauge which indicates fuel level down to 1" from bottom.

Each filling station fitted with pull ring for emergency fuel cut-off as required by I.C.C. Similar pull cords located at Operator's control station and in engine room.

Tanks of heavy gauge steel, substantially braced and reinforced by numerous baffles. Two vents 2" in diameter with 4" Protectoseal flame arrestors terminate outside the locomotive at the side sills in accordance with I.C.C. regulations.

CAB RADIATORS

Two (2) hot water units with fan driven air circulating system in each cab. Hot water taken from engine cooling system.

AIR BRAKES

#8EL brake equipment with KS-8-PA brake valve and safety control features and maximum speed governor control.

BRAKE PIPING

Byers Genuine Wrought Iron Pipe with A.A.R. malleable iron fittings or 300# malleable iron fittings. All 3/8"-1/2" and 5/8" O.D. sizes to be steel tubing, soft annealed, with steel S.A.E. fittings.

SECTION 4 - POWER PLANT & EQUIPMENT

BRAKE PIPING (Cont'd.)

All apparatus arranged for unit replacement by use of standard A.A.R. unions.

Brake and signal pipes terminate at cab end of unit in extra heavy wrought iron fittings. Rear end of unit fitted with standard A.A.R. equipment.

MAIN RESERVOIRS

Main air reservoirs are Carbon-Steel with all-welded seams and heads, 24½" x 60", capacity 25,000 cubic inches each.

Two of these reservoirs are located under each cab floor and fitted with syphon drain cocks at end of reservoirs. A third reservoir is located vertically at the rear of the second section and fitted with sump tank and drain cock.

All reservoirs are connected together with equalizing reservoir line, giving a total combined capacity of 150,000 cubic inches.

AIR COMPRESSORS

One Gardner-Denver, two-stage, three cylinder, air-cooled direct coupled compressor per section, having a displacement of 178 cubic feet per minute at 800 RPM, pro rata delivery in proportion to engine speed.

Air compressor governor mechanically adjusted to provide constant main reservoir pressure with 5-10 lbs. range differential.

BRAKE COOL- ING SYSTEM

Two grid unit radiators between compressor and first main reservoir and one unit between first reservoir and second reservoir on first section.

Two grid unit radiators between compressor and main reservoir on second section.

SANDERS

Forward running only, automatic operation, with emergency brake application, otherwise manual from sanding valve, one trap per lead wheel of each truck, one sander relay valve per pair of traps.

SAND CAPACITY

One sand box per trap, 4-1/2 cu. ft. capacity each except sand boxes for front truck which have a capacity of 6-1/2 cu. ft. each.

SECTION 4 - POWER PLANT & EQUIPMENT

ENGINEMAN'S CONTROL STATION

Electro-pneumatic trunk line system comprising:

- (a) Engineer's control station containing locomotive throttle with engine speed control mechanism, motor connection lever, reversing lever with actuating means for control of traction motor reverser position, and which, when removed from station voids all locomotive movements.
- (b) Four (4) valve, eight (8) position, electro-pneumatic engine governor operating mechanism, mounted on engine.
- (c) Power Plant control push-button box with fused switches for master control circuit, generator field, fuel pump and push button for engineer's helper "Call" signal, and defroster blower switch.
- (d) Locomotive light switch box with push button control for:
 1. Dynamotor for headlight (with dimmer).
 2. Classification lights.
 3. Engineer's instrument panel and number lights.
 4. Engine room lights on separate three-way switch.
 5. Cab lights and hood lights on separate double pole, single throw switches.
- (e) Instrument panel, arranged for indirect lighting of air brake gauges, speedometer, and shielded wheel slip indicator.
- (f) Main generator load meter to indicate proper motor connection.

LOCAL CON- TROL STATION

One per engine, consisting of the following apparatus grouped on side wall of engine room:

- (a) Engine start and stop buttons.
- (b) Isolation switch.
- (c) Master air valve to electro-pneumatic governor control.
- (d) Relay operated from low oil pressure switch on engine which automatically reduces engine speed to idle position and energizes alarm system.
- (e) Lubricating oil pressure gauges.

SECTION 4 - POWER PLANT & EQUIPMENT

LOCAL CONTROL STATION (Cont'd.)

- (f) Two signal lights, indicating Low Oil pressure and Hot Engine.
- (g) Fuel pump contactor in front station.

SIGNAL ALARM SYSTEM

Audible alarm (8" gong) and two (2) illuminated enunciators per locomotive section, each with two (2) colored lenses to indicate low lubricating oil pressure and hot engine water temperature.

System wired to show indicating light on all eight enunciators simultaneously. Audible alarm also sounds with operation of either of the two indicator lights.

Locomotive driver "Wheel Slip" indicator built into Engineer's instrument panel, provides illuminated signal only, for any wheel slip on complete locomotive.

Hot journal alarm with indicating light actuated by relay in series with normally closed elements on each journal box.

WINDSHIELD EQUIPMENT

Wipers - Hayes "Jumbo" type, one for each of the two windshield sections.

Defroster - Pressure blower, one per windshield section, draws air through cab heater.

Sun Visors - Adjustable metal, EMD design; four per cab.

FIRE EXTINGUISHER

One 1-quart carbon tetrachloride in operating cab.
One 1-gallon carbon tetrachloride in each engine room.

WARNING SIGNALS

Two Leslie "Tyfon" signal horn A-200L-RR.
One EMD 12" locomotive bell with internal ringer.

Signal horns individually operated by air valves, by means of pull cords in cab. Bell operated by throttle valve.

RUNNING LIGHTS

One headlight, EMD design, 14" diameter with multiple reflectors having seven (7) pre-focused bulbs. Headlight barrel recessed into carbody curves. Headlight bulbs can be removed and replaced from inside of carbody. Headlight operated from 64V, 2/3 K.W. dynamotor delivering 12 volts to headlight.

Two classification lights, EMD construction, streamlined with carbody, fitted with sliding roundel for RED, WHITE and GREEN indication.

SECTION 4 - POWER PLANT & EQUIPMENT

RUNNING LIGHTS
(Cont'd.)

Two number lights, EMD construction.

Two marker and flag brackets arranged for oil marker lights furnished by Railroad.

One convenience outlet (32 volt) at No. 2 end for portable backup light furnished by Railroad.

ELECTRICAL COUPLERS

21-point receptacles are provided at rear end of units with jumper cables and plugs carrying control and signal circuits for multiple operation.

TOILET

Duner toilet, type 1-A double pan hopper, foot operated, with seat but without lid, arranged with 25-gallon water supply tank, as per General Arrangement Drawing #8064350.

SECTION 5 - PAINTING

GENERAL

Only the best quality materials available are used, with special attention given to both the selection of materials and methods of application to insure a maximum of protection and durability.

CAB

Inside finished in Suede Grey Dulux, trimmed in black.

ENGINE ROOM

Inside finished in Suede Grey Dulux, trimmed in black.

OUTSIDE FINISH

To customer's requirements, consists of:

- (a) Special primer
- (b) Surfacer
- (c) Knife glaze
- (d) Wet-sand entire surface
- (e) Gun-glaze entire surface
- (f) Dry-sand and thoroughly clean
- (g) Duco finish (7 to 10 coats)

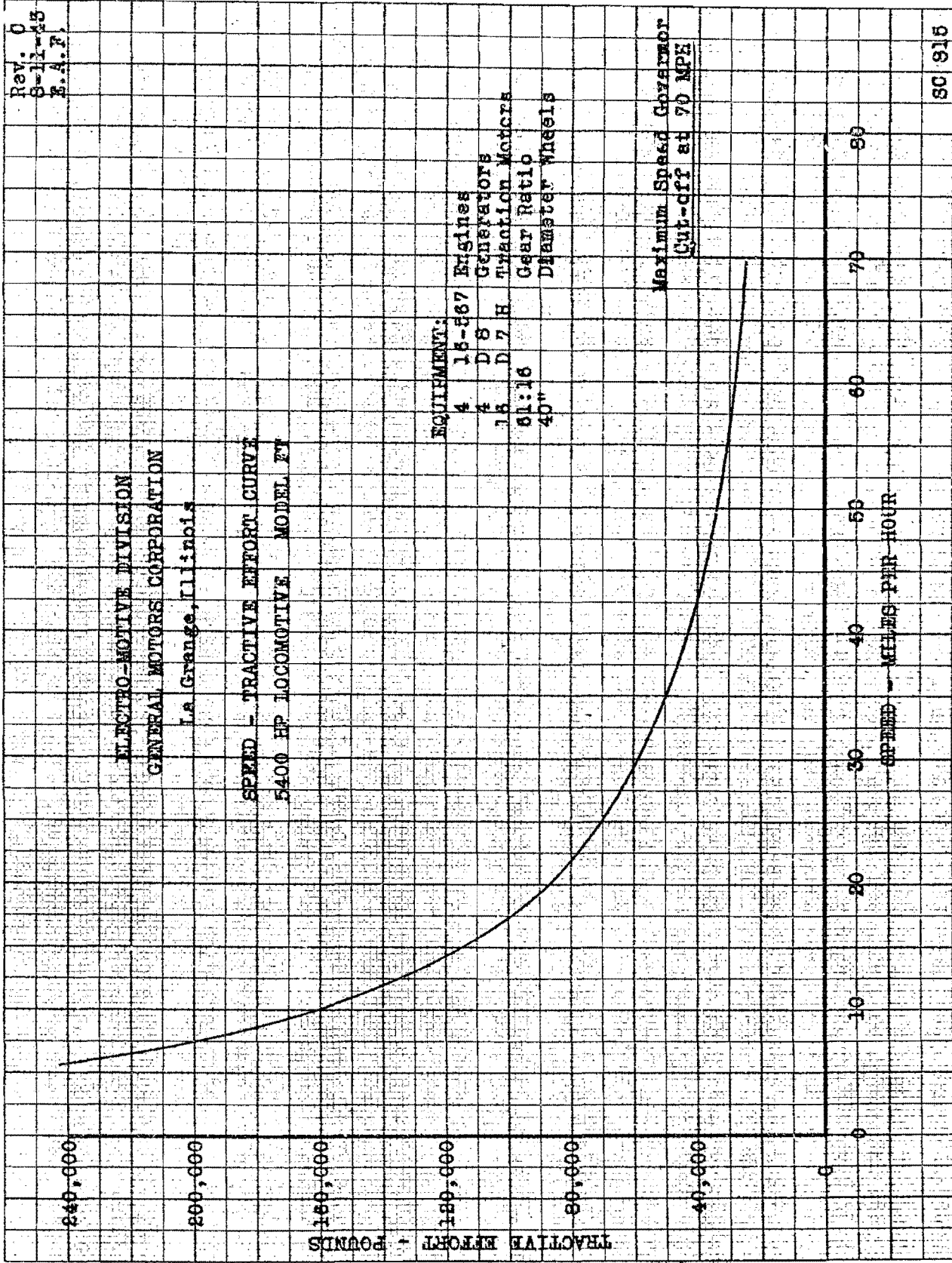
UNDER CARRIAGE

Black, unless otherwise specified.

TRUCKS

Black, unless otherwise specified.

SECTION 6 - PERFORMANCE



SECTION 7 - WARRANTY

THIS IS TO CERTIFY that we, ELECTRO-MOTIVE DIVISION, GENERAL MOTORS CORPORATION, LaGrange, Illinois, warrant all new equipment manufactured by us to be free from defects in material and workmanship under normal use and service; our obligation under this Warranty being limited to making good at our factory any part or parts thereof, which shall within one (1) year after delivery of such equipment to the original purchaser, or before such equipment has been 100,000 miles in scheduled service, whichever event shall first occur, be returned to us with transportation charges prepaid, and which our examination shall disclose to our satisfaction to have been thus defective.

This Warranty being expressly in lieu of all other Warranties expressed or implied and of all other obligations or liabilities on our part, and we neither assume nor authorize any person to assume for us any other liability in connection with the sale of our equipment.

This Warranty shall not apply to any equipment which shall have been repaired or altered unless repaired or altered by us or by our authorized service representatives, if, in our judgment, such repairs or alterations affect the stability or reliability of the equipment, or if the equipment has been subject to misuse, negligence or accident.

We reserve the right to make changes in design or add any improvements on equipment at any time without incurring any obligation to install same on equipment previously purchased.

