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THE BALDWIN LOCOMOTIVE WORKS
&
AMERICAN LOCOMOTIVE COMPANY

SPECIFICATION

NO. A-13357

CODE WORD AVITOLO

FOR THE FRENCH SUPPLY MISSION

22" x 28" 282-S-255 Eight Coupled Type Locomotive

THE BALDWIN LOCOMOTIVE WORKS, PHILADELPHIA, PA.

(MAR. 1940) E D 32-B

AMERICAN LOCOMOTIVE COMPANY

30 CHURCH STREET

NEW YORK

SPECIFICATION NO. A-13357

CODE WORD AVITOLO

JULY 27, 1944

OF A n Eight Coupled Type

LOCOMOTIVE, TYPE 282-S-255

FOR THE FRENCH SUPPLY MISSION

GAUGE OF TRACK	CYLINDERS		DRIVING WHEELS DIAMETER	BOILER		FIRE BOX		TUBES		
	DIAMETER	STROKE		DIAMETER	PRESSURE (POUNDS)	LENGTH	WIDTH	NUMBER	DIAMETER	LENGTH
4'-8 $\frac{1}{2}$ "	22"	28"	65"	Max.O.D. 76"	256	102-1/8"	75 $\frac{1}{2}$ "	140 46	2" 5-3/8"	20'-0"
WHEEL BASE				APPROXIMATE WEIGHT IN WORKING ORDER—(POUNDS)						
DRIVING	ENGINE	ENG. & TEND. ABOUT	LEADING	DRIVING	TRAILING	ENGINE	TENDER			
17'-0"	35'-10"	68'-11"	35,000	176,000	44,000	255,000	160,000			
FUEL KIND	EVAPORATING SURFACES—(SQUARE FEET)					SUPER HEAT SURFACE SQ. FT.	GRATE AREA SQ. FT.	MAXIMUM TRACTIVE POWER (POUNDS)	FACTOR OF ADHESION	
	TUBES	FLUES	FIRE BOX	ARCH TUBES	TOTAL					
Coal	1,460	1,290	185	25	2,960	1,115	53.3	45,300	3.86	
LIMITATIONS						79'-0" Turntable				
WEIGHT PER AXLE	WEIGHT ON WHEELS	WEIGHT TOTAL	WIDTH	WHEEL BASE TOTAL	LENGTH OVER ALL	HEIGHT ABOVE RAIL				
44,000	176,000	Berne Clearance Diagram - 3% Max. Grade								

TENDER TYPE 8-wheel CAPACITY, WATER 8,000 U.S. GALLONS. FUEL 12 U.S. Tons

GENERAL DESIGN SHOWN BY Preliminary Design 985-N-42400

Design is new and is based on Conference with the French Supply Mission representatives in New York on July 20, 1944.

BOILER AND BOILER FITTINGS

Boiler	Boiler type straight of waist at front end 72" , largest course 76" , inside diameter homogeneous boiler steel. Domic well secured to boiler. Shell thoroughly reinforced at opening. Boiler well designed, thoroughly braced and stayed, of best workmanship, and capable of carrying, with a factor of safety of 4½, a working pressure of 256 lbs. per square inch. Boiler tested, with steam to 20% and with hot water to 25% above working pressure. Horizontal seams Butt jointed, Multiple riveted, with welt strips inside and outside. Plates planed at edges and caulked. Sloping backhead and throat. Rivet holes reamed after assembling, to insure uniform holes, and slightly counter sunk under heads of rivets. Fusible plugs in crown sheet
Fire Box	Fire box of homogeneous fire box steel, welded construction Length inside 102-1/8" width inside 75-1/4" Thickness of crown sheet 3/8" , tube sheet 1/2" , sides 3/8" , back 3/8" Water space front 4-1/2" , sides 4" , back 4" xxxxxxxxxxxxxxxxxxxxxxxx
Mud Ring Staybolts	Mud ring accurately fitted and substantially double riveted. of cast steel Staybolts of wrought iron, of ample diameter, screwed and riveted to sheets, suitably spaced from center to center, and pneumatically driven. Tell tale holes drilled in outer ends. Crown sheet supported by radial stays of wrought iron, body of ample diameter with enlarged ends, screwed through the crown and shell and riveted over. Flexible expansion stays at front of firebox. Approx. 48 in number.
Staybolts	Flexible stays - 3-pc. type with welded sleeves Flexible water space staybolts. in breaking zone Approx. 370 in number.
Flexible	Flexible radial staybolts (2 rows each side of fire box) Approx. 104 in number.
Superheater Mud Drum	Fire tube type "A" to give steam temperature of 400°C (420° maximum) Located on under side of first course
Tubes	140 tubes of seamless steel 2" outside diameter #12 B. W. G. thick (min.)
Flues	46 flues of seamless steel 5-3/8" outside diameter # 8 B. W. G. thick (") 20'-0" long, set with copper ferrules at fire box end. tube spaces. 11/16" back Tubes and flues to be welded in back tube sheet
Fire Brick	Fire brick arch supported on four 3" O.D. arch tubes
Cleaning Holes	Hand Holes xxxxxxxx provided at corners of fire box, above fire door and crown sheet, and for washing boiler shell.
Blow-off Cock	Blow-off Cock. two - one on each side of firebox.
Safety Valves	Safety Valves of ample capacity. two - 3" (one muffled and one open)
Water Supply	Furnished by one injector/ of ample capacity. non-lifting - one motion type.
Feed Water Heater	One open type.
Throttle	Balanced throttle valve multiple type, with steel dry pipe and cast steel steam pipes to cylinders. Outside steam pipes.
Stoker	Mechanical stoker to be applied.
Firedoor Grates	To open inward. Cast iron rocking bars suitable for fuel. with drop grate at front end.
Ash Pan	Ash pan of steel plate. with suitable flush pipes.
Smoke Box	Smoke box extended and fitted with netting and deflecting plates. Front and door of pressed steel, carefully fitted.
Smoke Stack	Smoke stack of cast iron, designed to give maximum draft. Variable exhaust nozzle.

FRAMES, CYLINDERS, ETC.

~~Firebox supported by waist sheets - no shoes.~~
~~Frames thoroughly braced~~ and to boiler by suitable ~~expansion~~ expansion members.
 Pedestals protected from wear by **cast steel** shoes and adjustable wedges, and securely fastened together at bottom by caps lugged and bolted to bottom of pedestal. **Automatic wedges - brass faced shoes.**
Cast steel bed frame with integral cylinders and cradle.

Cylinders, diameter **22"**, stroke **28"**, ~~Water relief valves in cylinder heads.~~

~~Ample steam and exhaust passages - cast steel cylinder heads.~~
 Cylinder bushings of **gun iron.**

Cylinder Bushings **"Z" type** **three**
 Pistons of cast steel/~~made~~, made with solid heads, and fitted with/cast iron packing rings.
 Piston rods of hammered steel, of ample diameter, securely fastened to pistons and cross heads.

Valves Steam chest valves: **12" piston type.**

Valve Motion **Walschaert** Valve motion graduated to cut off equally at all points of the stroke.
 Detail parts of soft steel with case hardened wearing surfaces.
 Bushings of bronze or soft steel case hardened.

Reverse Gear Reverse gear. **Power (air) reverse gear, left hand drive.**

Rod Packing Metallic packing on piston rods **and** valve stems

Guides Guides **multiple bearing** type, of steel, securely bolted to cylinder heads and to rigid guide yoke extending across frames.

Crossheads Crossheads **multiple bearing** type, of cast steel with ample bearings.

DRIVING WHEELS, RODS, ETC.

Driving Wheels Driving wheels, number **8**, diameter **65"**, diameter centers **58"**, carefully proportioned and accurately counterbalanced. Main centers of **cast steel**
 Hub liners of **bronze** Other centers of **cast steel**

Tires Tires of open-hearth steel **3-1/2"** thick
 Flanged tires **on all drivers** **5-1/2"** wide
~~on all drivers~~

Axles **Gibson type retaining rings on all wheels.**
 Axles of hammered open-hearth steel finished in best manner.
 Main journals, diameter **10-1/2"**, length **12"**
 Other journals, diameter **9"**, length **12"**

Boxes Main driving boxes of **cast steel**
 Other driving boxes of **cast steel** with deep flanges and large **oil** cellars, and carefully fitted with heavy bronze bearings arranged with suitable grooves. **and Babbitt lined.**

Springs Driving springs of open-hearth steel, tempered in oil, and secured to a system of equalizing beams to insure the engine riding in the best possible manner.

Rods Connecting rods of hammered open-hearth steel, fitted with ~~solid~~ **solid** ~~bushings~~ **bushings** I-section.
 Parallel rods of hammered open-hearth steel with bronze bushings. **Rectangular, deep section.**

Crank Pins Crank pins of hammered open-hearth steel with ample bearing surfaces.

Lubrication All bearings on engine provided with suitable means for their proper lubrication, adjustable oil cups on guides and suitable oil ~~boxes~~ cups on rods. (Plunger type) ~~mechanical~~ by lubricator.
Cylinders and valves oiled ~~by lubricator~~ by lubricator.
Mechanical lubricator feed connection to the top of each driving box.

TRUCKS

Leading Truck Type **radial, inside bearing**
Frame of ~~cast steel~~ cast steel
Boxes of cast **steel** with ~~roller bearings~~ roller bearings.
Axles of hammered open-hearth steel. Journals, diameter and length **7" x 12", nominal size.**
Wheels, number **2**, diameter **36"** with cast steel centers and **3½" x 5½"** **steel tires and Gibson retaining rings.**

Trailing Truck Type **radial, outside bearing.**
Frame of ~~cast steel~~ cast steel
Boxes of cast **steel** with ~~roller bearings~~ roller bearings
Axles of hammered open-hearth steel. Journals, diameter and length **7½" x 12" nominal size.**
Wheels, number **2**, diameter **42"** with cast steel centers and **3½" x 5½"** **steel tires and Gibson retaining rings.**

Booster

CAB, PILOT AND FIXTURES

Cab Cab substantially built of **steel plate; roof, wood lined**; thoroughly braced and secured to boiler and running boards, furnished with suitable sliding windows, and with convenient tool boxes, seats, cushions and arm rests for engineer and fireman.

Running Boards Running boards of **steel plate**

Bumper Front bumper of **cast steel (bolted to frames)**
Arranged for future application of M.C.B. couplers.

Pilot ~~Suitable~~ Suitable rail guards applied (front and rear).

Coupler Coupler **Screw link and twin buffer type.**

Sand Box **Two** Sand boxes of ample capacity arranged with suitable valves and pipes.

Sander **Pneumatic, front of No.1 and No.3 and back of No.4 drivers.**

Headlight Headlight **Three lamps front of engine - brackets only rear of tender.**
Electric lighting equipment to be applied.

Fixtures Engine provided with support for headlight, ~~whistle~~ cast iron whistle, steam gauge, gauge cocks, glass water gauge, blower, cab lamps.

Speed Indicator ~~Apply~~ **Apply speed indicator without recording device.**

Tools Engine provided with all necessary wrenches, firing tools, hammer, chisels, packing tools, one jack screw, one scoop shovel, oil cans and torch. **Two traversing jacks.**

Templates Principal parts of engine fitted to gauges and templates, and interchangeable.

Bolts and Nuts All bolt threads U. S. Standard, except where finer threads are necessary. All finished removable nuts case-hardened. Fittings manufactured outside to have makers' standard threads.

Hand Rails Hand rails of iron or steel conveniently arranged and securely fastened.

TENDER

Frame Frame substantially built of **cast steel - water bottom type.**
Arranged for future application of M.C.B. Coupler.

Coupler **Screw link and twin buffer type.**

Draft Gear **arrange for future application.**

Trucks Two **four-** wheel center bearing trucks, with heavy holsters. **cast steel side frames**

Axles Axles of hammered steel. Journals, diameter and length **6" x 11"**

Wheels Wheels, number **8**, diameter **37-3/4" O.D. with cast steel centers and 3-1/2" x 5-1/2" steel tires and Gibson retaining rings.**

Springs Springs of open-hearth steel tempered in oil. **elliptic type.**

Brake Brake on both trucks with suitable brake beams.

Tank Tank type **rectangular** made of steel plates
 strongly riveted together, with angle iron corners, thoroughly braced and stayed, and well secured to tender frame.

Coal gates of **steel plate**

Water capacity **8,000** U. S. Gallons (231 cubic inches)

Coal capacity **12** tons (2000 lbs.)

Tool Boxes Tool boxes of **steel plate**

GENERAL FINISH

General Finish Cylinder casings of sheet steel, with pressed steel **painted** head covers.
 Steam chest body casings of sheet steel with pressed steel covers.

Lagging Boiler lagged with sectional magnesite.
 Cylinders lagged with sectional magnesite.

Jacket Boiler jacket of sheet steel neatly secured by bands and painted. **Boiler Jacketed #18 B.W.G. thick. Supported on lagging.**
 Back head lagged and jacketed.
Smoke Box lagged and jacketed.

Painting Engine and tender well painted and varnished, with marking and numbers, as specified by Purchaser.

Patents All patent fees not covered by this specification excepted.

BRAKES AND SPECIALTIES

Brakes Automatic air brakes on engine and tender, suitable train connections.
 Operating brake schedule. **Automatic and straight air on locomotive with H-7 brake**
 Air pump **one 8 1/2" cross compound located on front deck.** valve.
 Main reservoirs of ample capacity.
 Foundation brake, drivers, style **equalized**
~~equalized~~
 trailing truck, ~~xxx~~ on both wheels
Le Chatelier water brake.
 Automatic air brake train line connections, front and rear.
 All brake applications single shoe type.

Radial Buffer **Between engine and tender.**

Safety Bars **Between engine and tender.**

Boiler Boiler barrel plates to be carbon-silico steel having 70,000 lbs. tensile strength.

Frames If specified cast steel beds are not available in necessary quantity for scheduled deliveries, an alternate design of cast steel bar type frames with one-piece cast steel cylinders may be used.

Tender Frames If specified cast steel tender frames are not available in necessary quantity for scheduled deliveries, an alternate design of rolled steel shapes may be used, making frame open type with water bottom tank.

Roller Bearings If specified roller bearings are not available for scheduled deliveries, suitable plain bronze bearings of the size specified may be used with suitable bronze hub liners on wheels.

Speed Recorder If specified speed recorder is not available for scheduled deliveries, the engines are to be arranged for its future application and the device itself is to be omitted.

Design The locomotive builders' standard practice for -
Design
Construction
Finish & Methods of Manufacture
for U. S. locomotives is to be given these locomotives throughout, following Purchaser's standard for -
Couplers
Train Connections
Clearances

All details to be designed to the English System of Measurements and the drawings will show only English dimensions and will be made to Builders' standard sizes.

All bolt and pipe threads and fittings to have Builders' standard threads as standard in the U. S.

Materials All material and specialties to be of U. S. manufacture and to comply with all U. S. Emergency Requirements in force at the time of scheduling these locomotives for delivery and, except as specified, to be of open make.

Inspection Locomotive Builders' Inspection to govern these locomotives throughout for Design, Material and Workmanship.

SPECIALTYMANUFACTURER

Flexible staybolts	Open
Superheater	The Superheater Company
Firebrick	American Arch Co.
Blow-off Cocks	Builders' Standard
Safety Valves	Open
Injectors	Nathan or Sellers
Feedwater Heater	Worthington
Throttle	American Throttle Co.
Mechanical Stoker (type "BK")	The Standard Stoker Co.
Grates	Hulson
Exhaust Nozzle	Kylchap (Shop Made)
Frames (Bed Frame)	General Steel Castings Corp.
Gun Iron Bushings	Hunt-Spiller Corp.
Power Reverse Gear	Builders' Standard
Rod Packing (Metallic)	Open
Driving Wheel Centers (Boxpok)	General Steel Castings Corp.
Lubricator	Nathan or equivalent
Roller Bearings (engine truck)	Open
" " (trailing ")	"
Sander	"
Electric Lighting Equipment	Pyle-National, or equivalent
Electric Lights (Lamps)	Open
Speed Indicator	"
Traversing Jacks	"
Tender Frame	General Steel Castings Corp.
Brakes	Westinghouse
Automatic Driving Box Wedges	Franklin Railway Supply Co.
Radial Buffer	" " " "