

AMERICAN LOCOMOTIVE COMPANY
30 Church Street
New York

Specification No. A-13318-A

Code Word AVILTOIR

OF A Consolidation
FOR U. S. WAR DEPARTMENT

May 20, 1942

Locomotive Type 200-3-160

Gauge of Track	CYLINDERS		DRIVING WHEELS DIAMETER	BOILER		FIRE BOX		TUBES		
	Diameter	Stroke		Diameter	Pressure (Pounds)	Length	Width	Number	Diameter	Length
4'-3-1/2"	15"	26"	57"	Max. O.D. 70"	225	11-1/8"	70-1/4"	150 30	2" 5-3/8"	13'-6"

Driving Wheel Base	Eng & Tank-about Engine	APPROXIMATE WEIGHT IN WORKING ORDER - (POUNDS)			
		Leading	Drivers	Trailing Engine	Tender
15'-6"	25'-3"	25'-0"	17,000	143,000	- 160,000 130,000

FUEL	HEATING SURFACES - (SQUARE FEET)				Total	SUPER HEAT GRATES SURFACE AREA		MAXIMUM TRACTIVE POWER (Pounds)	FACTOR OF ADHESION
	Tubes	Flues	Fire Box	Arch Tubes		Sq. Ft.	Sq. Ft.		
Coal	1,055	567	136	15	1773	480	42.0	51,900	4.55

LIMITATIONS
Weight per axle
36,000

TENDER TYPE 8-wheel CAPACITY WATER 6,500 GALLONS

FUEL 10 tons

GENERAL DESIGN GIVEN BY Preliminary Design 905-11-20770

Design in new.
B-007
C-
8-111

FRAMES, CYLINDERS, ETC.

- Frames Frames of cast steel thoroughly annealed, with integral single forward section provided with lugs for holding cylinders. Frames thoroughly braced together and to boiler by suitable cross-ties and expansion members. Pedestals protected from wear by cast iron shoes and adjustable wedges, and securely fastened together at bottom by caps lugged and bolted to bottom of pedestal.
- Cylinders Cylinders, diameter 19", stroke 26", of cast iron. Cast with half saddle attached, secured together and to frames in a substantial manner.
- Pistons Pistons of cast iron, 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: 10" 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.
- Reverse Gear Reverse gear. Hand lever type, but arranged for future application of power reverse gear. Right hand drive.
- Rod Packing Metallic packing on piston rods and valve stems.
- Guides Guides Laird type of steel, securely bolted to cylinder heads and to rigid guide yoke extending across frames.
- Crossheads Crossheads Laird type, of cast steel with ample bearings. Crosshead shoes of cast iron babbitted. Crosshead pins arranged for outside applications.

DRIVING WHEELS, RODS, ETC.

- Driving wheels Driving wheels, number 8, diameter 57", diameter centers 51", carefully proportioned and accurately counterbalanced. Main centers of cast steel
Hub liners of steel plate Other centers of cast steel
- Tires Tires of open-hearth steel 3" thick
Flanged tires 5-3/8" wide
- Axles Axles of hammered open-hearth steel finished in best manner
Main journals, diameter 8", length 11"
Other journals, " 8", " 11"
Main driving axle hollow bored and heat treated.
- Boxes Main driving boxes of cast steel
Other driving boxes of cast steel with deep flanges and large force feed oil collars, and carefully fitted with heavy bronze bearings arranged with suitable grooves.
- 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 adjustable bronze bearings. I-section
Parallel rods of hammered open-hearth steel with bronze bushings. Rectangular section.

BOILER AND BOILER FITTINGS.

Boiler type straight top, largest course 70" outside diameter, material of shell, homogeneous boiler steel. Dome well secured to boiler. Shell thoroughly reinforced at opening. Boiler well designed, thoroughly braced and stayed, of best workmanship, and capable of carrying a working pressure of 225 lbs. per square inch. Boiler tested to A.S.M.E. Boiler Code. Horizontal seams butt jointed, Multiple riveted, with welt strips inside and outside. Plates planed at edges and smoothed. Sloping back head and throat. Rivet holes rounded after assembling, to insure uniform holes, and slightly counter sunk under heads of rivets. Boiler design to A.S.M.E. Boiler Code, Section 3, except to have safety factor of 4.

Fire Box

Fire box of homogeneous fire box steel. Two fusible plugs in crown sheet.

Length inside 84-1/8" width inside 70-1/4"

Thickness of crown sheet 3/8", tube sheet 1/2", sides 3/8", back 3/8". Water space front 4", sides 3-1/2", back 3-1/2" Crown and sides in one piece.

Head Ring Staybolts

Head ring accurately fitted and substantially single riveted. Staybolts of wrought iron, of ample diameter, screwed and riveted in sheets, suitably spaced from center to center, and pneumatically driven. Tall 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. 28 in number.

Staybolts

Flexible water space staybolts Approx. 39, in number.
Flexible radial staybolts (- rows each side of fire box). Approx. - in number.

Superheater Tubes

Fire tube type "A"
150 tubes of steel 2" outside diameter #13 (Min.) B.W.G. thick.

Flues

30 flues of seamless steel 5-3/8" " " #10 (Min.) B.W.G. thick.

13'-6" long, set with copper ferrules at fire box end 11/16" tube spaces. Tubes and flues welded in firebox tube sheet.

Fire Brick
Cleaning Holes

Fire brick arch supported on 3 - 3" O.D. arch tubes #7 B.W.G. (Min.) Washout plugs provided at corners of fire box, above fire door and crown sheet, and for washing boiler shell.

Fire door
Blow-off Cook
Safety Valves
Water Supply

Of cast iron, hand operated, with renewable cast iron liner. Blow-off Cook, one builder's standard. Safety Valves of ample capacity. 2 - one open and one muffled. Furnished by two injectors of ample capacity. Capable of operating at a feedwater temperature of 135°F.

Throttle

Balanced throttle valve dome type, with steel dry pipe and cast iron steam pipes to cylinders. Outside steam pipes.

Grates

Hooking bars suitable for fuel, removable finger type to operate in two sections (lt. weight type)

Ash Pan
Smoke Box

Ash pan of 3/16" steel plate. Two hopper type. Smoke box extended and fitted with netting and deflecting plates. Front and door of pressed steel, carefully fitted.

Smoke Stack

Smoke stack of steel plate designed to give maximum draft.

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

Lubrication All bearings on engine provided with suitable means for the proper lubrication, adjustable oil cups on guides and suitable oil cups on rods. Cylinders and valves oiled by 2-3 feed mechanical lubricator. Separate mechanical lubricator for air pump.

TRUCKS

Leading Truck Type radial inside bearing. Frame of cast steel. Boxes of cast steel with bronze bearings oil force feed. Axles of hammered open-hearth steel. Journals, diameter and length 6" x 10".

Wheels, number 2 diameter 30" rolled steel AAR contour.

CAB, PILOT AND FIXTURES

Cab Cab substantially built of steel, roof wood lined; thoroughly traced 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.

Bumper Front bumper of steel plate.

Steps Steps front of engine and rear of tender.

Coupler Coupler Central spring draft hook and side buffers set 42" above rail.

Sand box One Sand box of ample capacity arranged with suitable valves and pipes.

Sander Steam type, to apply sand front of No.1 and back of No.3 drivers.

Headlight Apply necessary brackets to suit requirements.

Fixtures Engine provided with cast iron whistle, steam engine, gauge cocks, glass water gauge, blower, cab lamps.

Tools Engine provided with all necessary tools. See list.

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

Bolts and Nuts All bolts heads US standard, except when finer threads are necessary. All finished removable nuts cast hardened. Fittings manufactured outside to have makers' standard threads.

Handrails Illegible

TENDER

Frame	Frame substantially built of steel channels.
Coupler	Coupler suitable spring draft hook and side buffers set 42" above rail.
Trucks	Two four-wheel center bearing trucks, with heavy bolsters.
Axles	Axles of hammered steel. Journals, diameter and length 5" x 9".
Wheels	Wheels, number 33" diameter cast iron chilled tread.
Springs	Springs of open-hearth steel tempered in oil.
Brake	Brake on both trucks with suitable brake beams.
Tank	Tank type rectangular, U-shaped made of 1/4" steel plates. Strongly riveted together, with angle iron corners, thoroughly braced and stayed, and well secured to tender frame. Coal gates of wood. Water capacity 6,500 U.S. Gallons (231 cubic inches) Coal capacity 10 tons (2000 lbs)
Tool Boxes	Tool boxes of steel.

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 magnesia light weight type. Cylinders lagged with sectional magnesia light weight type.
Jacket	Boiler jacket of 1/2 22 B.W.G. sheet steel neatly secured by bands and painted. Back head lagged and jacketed.
Painting	Engine and tender well painted and varnished, with markings and numbers, as specified by Purchaser.
Patents	All patent fees not covered by this specification excepted.

BRAKES AND SPECIALITIES

Brakes	Steam Brake on engine and tender. Operating valve to suit. Foundation brake, Drivers, American Brake Co. Train Brakes - Automatic air brake equipment for train with connections front and rear. 1 - 9" Air pump with main reservoir of ample capacity. Automatic vacuum brake equipment for train with connections front and rear, 1 - Ejector of suitable capacity.
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COPY

Cab shall be of steel, #12 U.S. gauge, open back type.
Roof lined with wood.

Back extension of cab roof to be so designed as to be detachable from cab roof.

Front doors.

Cab provided with clear vision front windows, right.

Cab provided with side windows with sliding sash.

Metal sash for cab windows.

Windows shall be glazed with 3/16" laminated glass.

Side windows equipped with blackout curtains.

Cab door opening shall be provided with canvas curtain, vertical opening.

Steam Turret

Steam turret shall be applied for supply of auxiliary steam with turret valves readily accessible.

Turret dry pipe shall extend into dome.

All valves and fittings shall be A.A.R. type.

Water Gauge

Three gauge cocks and reflex type water gauge shall be located on right side of the back head with quick-closing shut-off valves.

Crown Stays

Crown stays shall be taper head 1-1/2" in 12", the front two rows being provided with spherical nuts.

Firebox

Firebox to be of welded construction.

All firebox sheets welded to mud ring.

All locomotives, either coal or oil, to have arch tubes.

Safety Valves

Valve springs, valves and related parts shall be interchangeable between the two valves.

Lubrication

Crank pins shall be lubricated by oil.

Valve motion pins shall be lubricated by oil.

Engines and tender trucks, oil lubrication.

Fire Door

Suitable provision shall be made to screen fire glare.

Couplers

Locomotive and tender to be designed for future application of A.A.R. type couplers with suitable draft gear for tender.

Cylinder Head Casings

Flat disc type of steel plate (not flanged).

Tool Boxes

Suitable tool boxes shall be applied and secured in cab and on tender to contain all tools except firing tools.

Name Plate

Each locomotive shall be provided with cast iron name plate permanently attached.

The proper designation for the nameplate will be furnished with the contract or purchase order.

Connections
Between Engine
and Tender

Single drawbar.
Plain engine and tender chafing irons.
Safety chains to suit design.

Trucks

Tender trucks must interchange with car truck design
to be submitted by the War Department.

Piping

All piping, wherever possible, to be of steel or
iron except copper pipe in cab.

Tools

The following tools to be furnished:

- 1 - bar, pinch, 1" x 36"
- 2 - blocks, crank pin
- 1 - broom, corn
- 1 - bucket, G.I.
- 1 - " , sponge
- 1 - can, oil - 1-gal.
- 1 - " , " - 5-pint.
- 1 - chisel, cape, 3/4" octagon
- 1 - " , cold, 3/4" "
- 1 - crow bar
- 1 - filler, lamp, pint
- 2 - flags, railway signal, green
- 2 - " , " , red
- 2 - clamps, crosshead
- 1 - hook, packing
- 1 - iron, "
- 1 - oiler, pump
- 1 - push pole
- 1 - pair rerailers
- 1 - screw driver, heavy duty handle
- 2 - torches, engineer
- 1 - pound, cotton, waste
- 1 - set wrenches, for all removable nuts on
the loco.
- 1 - wrench, monkey, 12" steel handle
- 1 - " , " , 21" or 24" steel handle
- 1 - " , pipe, adjustable, 1 1/2"
- 1 - " , " , " , 1 1/2"
- 1 - bar, shaker, grate
- 1 - " , slice
- 1 - pick, coal
- 1 - poker
- 1 - scoop, shovel

Clearances

U.S. War Department Drawing C-43090, except -
8'-6" wide up to 42" above rail.
9'-0" " 42" and over " "

Roof Contour - 12'-11" max. height

All figures are drawing dimensions.

Locomotive to be so designed that it can be lowered fully erected through a 35'-0" ship hatch.

General

Locomotive to be designed and built to English dimensions throughout.

Design to be as simple as possible and should avoid the use of castings where rolled shapes or plates can be used.

Builder's standard methods of design and construction to apply except as herein noted.

Interchangeability

Where consistent, design details should interchange with U.S. War Department (4'-8-1/2" gauge) 2-6-2 type locomotives, order S-1872.

Fuel

Engine and tender designed so as to be converted from coal to oil burning with the minimum number of changes. Tap all holes in boiler, etc., to take either equipment. Hollow bolts back of brick for all engines.

Engine and tender connections to take either equipment.

Material

Material to be to the following material specifications where applicable:

- A.S.T.M.
- A.S.M.E.
- A.A.R.
- National Emergency.

Grades and Curves

Locomotive and tender to be designed for:

Grade2%

Curves20°

OIL BURNING LOCOMOTIVES

The following modifications will apply to the foregoing specification for the locomotives which will be designed to burn oil fuel instead of coal:

Boiler

Provision shall be made for the application of fire brick lining for oil burning, with installation of hollow staybolts behind brick work.

Smokebox

The smokebox shall be arranged for oil burning.

Oil Burner

Suitable oil burning equipment to be provided.

Oil Pans

Oil pan shall be 5/16" steel plate.

Fire Door

Fire door of cast iron with renewable fire tile liner and swinging cover.

Oil Tank

Suitable oil tank of 1800-gallon capacity shall be provided to fit into coal space of tender. Tank shall be provided with measuring rod, coil and open heaters, oil tank valve, with strainers and safety cut-out arrangement.

Sand Box

Suitable sand box shall be provided on tender deck in front of oil tank.

Tools

The following tools used on the coal burning locomotives will not be required:

Bar, shaker grate
Bar, slice
Pick, coal
1 - poker
1 - shovel, scoop

The following additional tools will be required for oil burning engines:

1 - scoop, sand
1 - funnel, sand