

THE BALDWIN LOCOMOTIVE WORKS

RECORD No. 79

PACIFIC TYPE
LOCOMOTIVES

THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA, PA., U. S. A.

PACIFIC TYPE LOCOMOTIVES

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PACIFIC TYPE LOCOMOTIVE IN SERVICE
BALTIMORE AND OHIO RAILROAD

Pacific Type Locomotives

THERE are two fundamental features of design which are essential to the success of any locomotive; first, sufficient tractive force and weight on driving wheels to start the specified train load; and second, sufficient power developing capacity to maintain the required speed after the train is started. The second qualification depends upon the boiler, which is the source of power; and insufficient capacity here means failure for the entire locomotive, no matter how well designed its cylinders, valve motion and other parts may be.

Passenger locomotives are required to exert a tractive force up to the limit of their adhesion, only when starting heavy trains in difficult places. They must, however, develop large horse-powers in fast service, and this requires high steaming capacity in proportion to the weight on driving wheels.

The Pacific, or 4-6-2 type, is specially fitted for handling heavy, fast passenger traffic, as it combines a

large adhesion weight with high boiler power. This design has a four-wheeled leading truck, which provides excellent guiding qualities; three pairs of coupled driving wheels, placed under the waist of the boiler, and a two-wheeled radial trailing truck under the firebox. The furnace dimensions are in no way cramped by reason of the wheel arrangement, and sufficient grate area and furnace volume can be obtained for burning any kind of fuel that is suitable for locomotive work.

The first locomotives using the 4-6-2 wheel arrangement in combination with a wide firebox placed back of the driving wheels and over the trailing truck, were built in 1901 by The Baldwin Locomotive Works for the New Zealand Government Railways. These locomotives had a gauge of three feet six inches. In 1902, the American Locomotive Company built standard gauge locomotives of the same type for the Missouri Pacific Railway and the Chesapeake and Ohio Railway.

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The type was designated "Pacific" because it was first used in the United States by the Missouri Pacific Railway.

The Pacific type is a logical development of the ten-wheeled, or 4-6-0 type. The latter is extensively used in both freight and passenger service, and is highly efficient for work which is within its capacity; but for heavy, high-speed service, the Pacific type is now usually employed. The ten-wheeled type carries, on an average, about seventy-six per cent. of its total weight on driving wheels, while in the Pacific type the ratio averages sixty-three per cent. In general, the relative steaming capacity of a locomotive bears an inverse ratio to the percentage of the total weight carried on the driving wheels. On this basis, a Pacific type locomotive should develop a maximum horse-power approximately twenty to twenty-five per cent. in excess of a ten-wheeled locomotive carrying the same weight on driving wheels. The result of this is illustrated in the accompanying diagram, which shows the draw-bar pulls exerted on a grade of one-half per cent. at speeds up to seventy miles per hour,

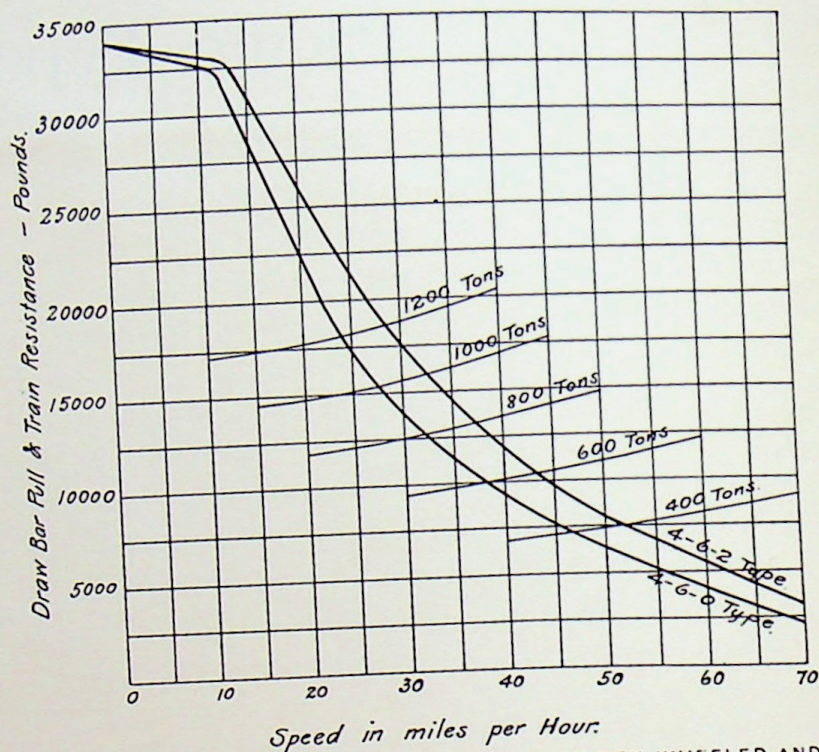


DIAGRAM ILLUSTRATING HAULING CAPACITIES OF TEN-WHEELED AND PACIFIC TYPE LOCOMOTIVES AT VARIOUS SPEEDS

by representative Pacific and ten-wheeled type locomotives, each carrying 160,000 pounds on driving wheels.

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The weight of the Pacific type locomotive, with tender, is assumed to be 200 tons, and of the ten-wheeler 180 tons. The transverse lines on the diagram show the total resistances, on a grade of one-half per cent., for trains of various weights as noted. With a given weight of train, the Pacific type can, under the conditions assumed in this diagram, maintain a speed approximately five miles per hour faster than the ten-wheeler; while at all but the slowest speeds, the hauling capacity of the Pacific type is materially greater than that of the other engine. At starting speeds the tractive force is limited by the adhesion, and here the superiority shown by the Pacific type is practically negligible; but its increased capacity at higher speeds is most apparent.

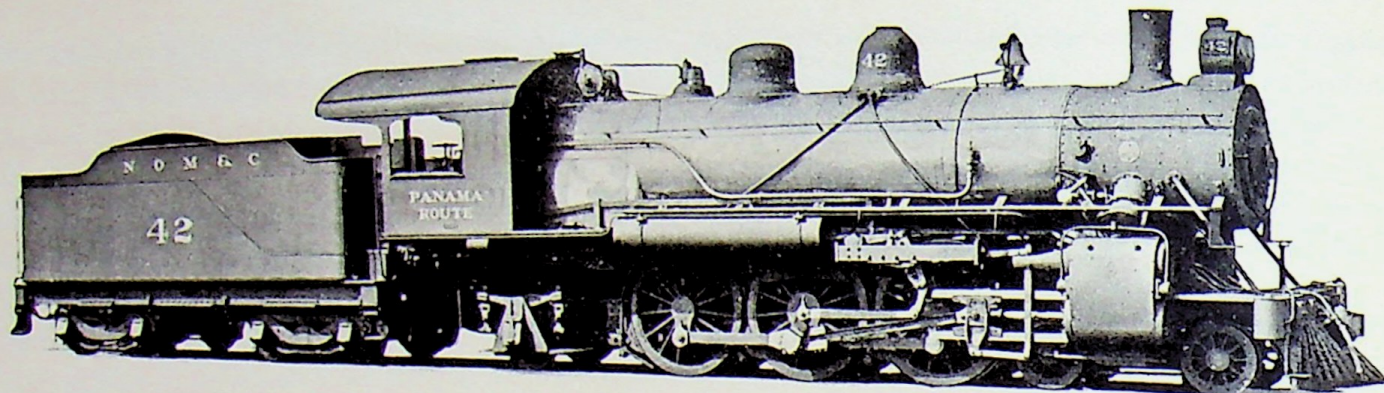
The depth of the firebox, and especially the vertical distance from the grate to the bottom row of tubes, has an important bearing on fuel economy when burning bituminous coal. In ten-wheeled locomotives with wide fireboxes and large driving wheels, the depth of the throat is sometimes so restricted that it is practically impossible to apply a brick-arch. In the Pacific type, however, there is room for a deep furnace throat, as the

grate is placed over a pair of comparatively small trailing wheels; and a satisfactory design of brick-arch can be installed. The arch is an important aid to combustion and smoke prevention when using high volatile coal.

Superheated steam is an important feature in improving locomotive efficiency, and the majority of Pacific type locomotives recently built are equipped with superheaters. In heavy through service, such locomotives are regularly hauling trains weighing from 600 to 800 tons exclusive of engine and tender; while in some cases even greater loads are handled. With restricted weight and clearance limitations, every means must be utilized to improve the efficiency of locomotives employed in such severe duty; and to the superheater is largely due the successful results attained.

Pacific type locomotives are being used to an increasing extent in fast freight service. With a load per pair of driving wheels of 60,000 pounds, which can be safely carried on well-built track, laid with heavy rails, such a locomotive can exert a tractive force in excess of 40,000 pounds, and is well fitted for handling preference freight on comparatively level lines.

THE BALDWIN LOCOMOTIVE WORKS



New Orleans, Mobile and Chicago Railroad Company

The Pacific type wheel arrangement is suitable, not only for large locomotives operating in the heaviest class of service, but also for smaller engines in which high capacity must be combined with a moderate load per axle. The locomotive shown above is one of four which are used on seventy-pound rails, and develop a tractive force of 30,900 pounds. The ratio of adhesion is four. The weight on driving wheels is thus fully utilized, and the steaming capacity is materially greater than that

of a ten-wheeled locomotive with the same axle-loading. The additional weight necessary to secure this increased capacity is carried by the rear truck wheels.

These engines were built simultaneously with eight Mikado type locomotives for the same road, and practically all parts subject to wear, with the exception of the driving tires and a few minor details, are interchangeable in the two classes.

Pacific Type Locomotive

Baldwin Class 12-38-1/4-D, 521

for the

Gauge 4' 8 1/2"

New Orleans, Mobile and Chicago Railroad Company

GENERAL DIMENSIONS

CYLINDERS

Diameter	22"
Stroke	28"
Valves	Piston, 13" diameter

BOILER

Type	Straight
Diameter	66"
Thickness of Sheets	11/16"
Working Pressure	185 lbs.
Fuel	Soft Coal
Staying	Radial

FIREBOX

Material	Steel
Length	102 3/8"
Width	65 7/8"
Depth, front	67 1/2"
" back	56 1/2"
Thickness of Sheets	sides, 5/16"
back, 5/16"; crown, 3/8"; tube, 1/2"	

Water Space,	
front, 4"; sides, 3 1/2"; back, 3 1/2"	

TUBES

Material	Steel
Diameter	5 3/8" and 2"
Thickness	5 3/8", No. 9 W. G. 2", No. 12 W. G.
Number	5 3/8", 24; 2", 175
Length	19' 3"

HEATING SURFACE

Firebox	162 sq. ft.
Tubes	2403 sq. ft.
Total	2565 sq. ft.
Superheating Surface	550 sq. ft.
Grate Area	46.8 sq. ft.

DRIVING WHEELS

Diameter, outside	69"
" center	62"
Journals, main	9" x 12"
" others	8 1/2" x 12"

ENGINE TRUCK WHEELS

Diameter, front	33"
Journals	5 1/2" x 10"
Diameter, back	40"
Journals	7 1/2" x 12"

WHEEL BASE

Driving	12' 0"
Rigid	12' 0"
Total Engine	31' 4"
Total Engine and Tender	62' 11 3/4"

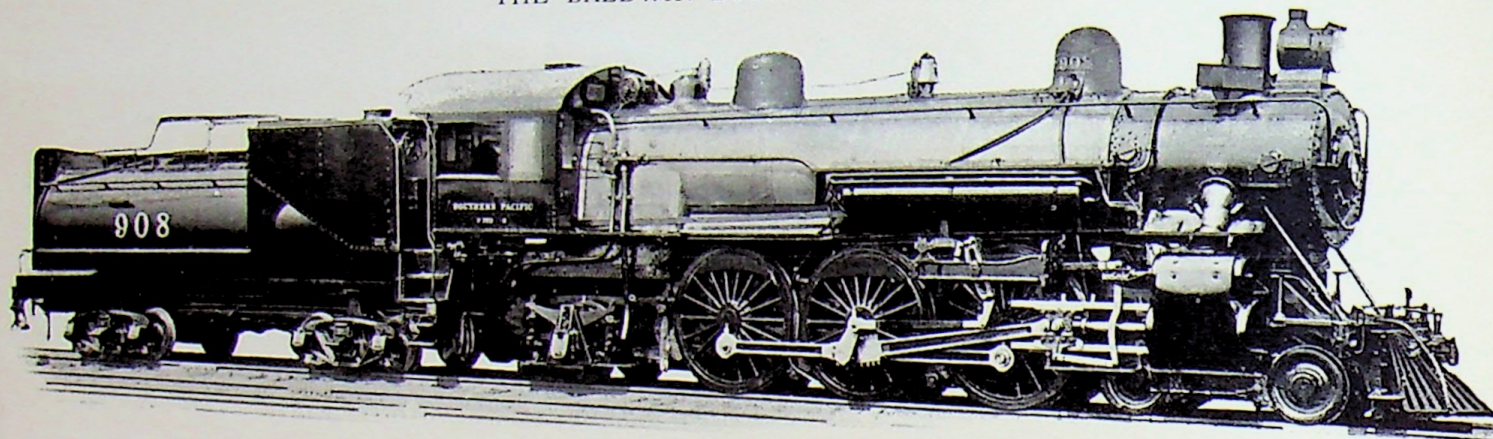
WEIGHT

On Driving Wheels	123,000 lbs.
On Truck, front	39,900 lbs.
" back	34,900 lbs.
Total Engine	197,800 lbs.
Total Engine and Tender,	
about	335,000 lbs.

TENDER

Number of Wheels	8
Diameter of Wheels	33"
Journals	5 1/2" x 10"
Tank Capacity	7000 gals.
Fuel Capacity	14 tons

THE BALDWIN LOCOMOTIVE WORKS



Southern Pacific Company

The Southern Pacific has in service a large number of Pacific type locomotives, built to the same general dimensions as that illustrated above. The design of this locomotive is based on one prepared in 1903. The engines built at that time used saturated steam and were equipped with Stephenson link motion; while the locomotive illustrated has a Schmidt superheater and Walschaerts valve gear. The tractive force exerted is 30,000 pounds, and with driving wheels seventy-seven

inches in diameter, these engines are well fitted for high-speed service. The fuel used is oil, and the railroad company's standard arrangement of oil-burning equipment is applied. The tender is of the Vanderbilt type, with cylindrical water tank and vestibule train connection.

These locomotives have been most successful in heavy passenger service. Their design includes a large number of details which interchange with those of other types of locomotives used on this road.

Railroad Co's Class P-77- $\frac{22}{8}$ -141-S
Baldwin Class 12-38- $\frac{1}{4}$ -D, 490

Pacific Type Locomotive

for the

Gauge 4' 8 $\frac{1}{2}$ "

Southern Pacific Company

GENERAL DIMENSIONS

CYLINDERS

Diameter	22"
Stroke	28"
Valves	Piston, 12" diameter

BOILER

Type	Straight
Diameter	70"
Thickness of Sheets	$\frac{11}{16}$ "
Working Pressure	200 lbs.
Fuel	Oil
Staying	↓ Crown Bars

FIREBOX

Material	Steel
Length	108"
Width	66"
Depth, front	68"
" back	64"
Thickness of Sheets	sides, $\frac{3}{8}$ "
back, $\frac{3}{8}$ "; crown, $\frac{3}{8}$ "; tube, $\frac{1}{2}$ "	

Water Space,	
front, 5"; sides, 5"; back, 5"	

TUBES

Material	Steel
Diameter	$5\frac{3}{8}$ " and 2"
Thickness	$5\frac{3}{8}$ ", No. 9 W. G.
Number	2", 0.125"
Length	$5\frac{3}{8}$ ", 24; 2", 173
	20' 0"

HEATING SURFACE

Firebox	181 sq. ft.
Tubes	2477 sq. ft.
Total	2658 sq. ft.
Superheating Surface	580 sq. ft.
Grate Area	49.5 sq. ft.

DRIVING WHEELS

Diameter, outside	77"
" center	70"
Journals, main	10" x 12"
" others	9" x 12"

ENGINE TRUCK WHEELS

Diameter, front	$33\frac{1}{2}$ "
Journals	6" x 10"
Diameter, back	45"
Journals	8" x 14"

WHEEL BASE

Driving	13' 4"
Rigid	13' 4"
Total Engine	33' 4"
Total Engine and Tender	68' 6 $\frac{1}{4}$ "

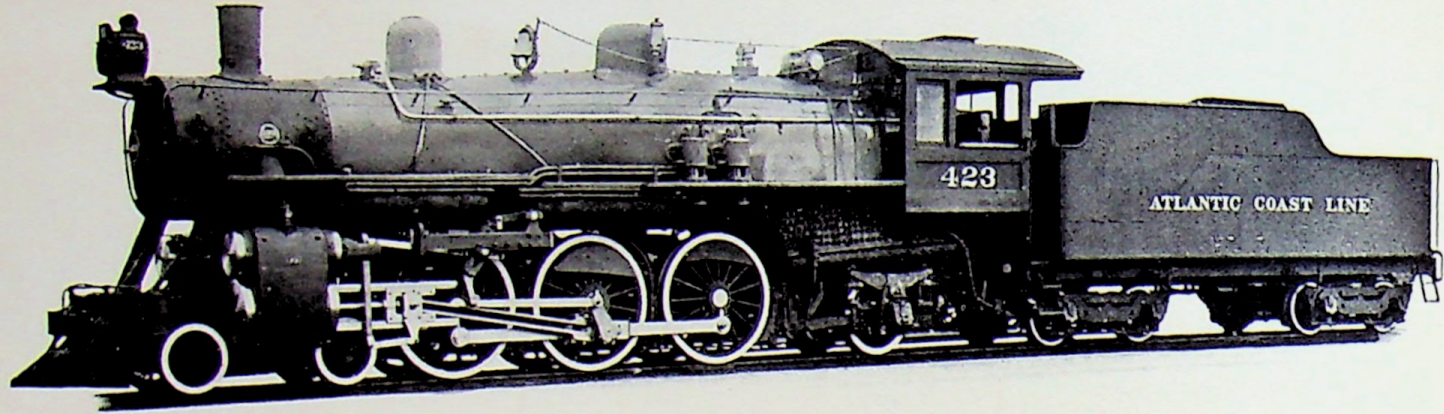
WEIGHT

On Driving Wheels	141,500 lbs.
On Truck, front	37,600 lbs.
" back	42,000 lbs.
Total Engine	221,100 lbs.
Total Engine and Tender,	
about	382,000 lbs.

TENDER

Number of Wheels	8
Diameter of Wheels	33"
Journals	6" x 11"
Tank Capacity, water	9000 gals.
Tank Capacity, oil	2940 gals.

THE BALDWIN LOCOMOTIVE WORKS



Atlantic Coast Line Railroad Company

Twenty-five locomotives, of the design illustrated above, are in service on the Atlantic Coast Line. The wheel-loading of these engines is such that they can be used on rails weighing eighty pounds and over per yard. This statement is based on the well-known rule that each ten pounds weight per yard of rail, properly supported by cross-ties, can safely carry a load of 3,000 pounds. These locomotives have boilers of the extended wagon-top type, and are equipped with superheaters, brick-

arches and combustion chambers. They exert a tractive force of 33,900 pounds, and although primarily intended for passenger service, can also be efficiently used in fast freight service if desired. This design of locomotive, with medium sized driving wheels, is well adapted to a road like the Atlantic Coast Line, where the grades are generally light and a large amount of heavy through passenger business and perishable freight must be handled.

Pacific Type Locomotive

Railroad Co's Class P-3
Baldwin Class 12-38-1/4-D, 565

for the

Gauge 4' 8 1/2"

Atlantic Coast Line Railroad Company

GENERAL DIMENSIONS

CYLINDERS

Diameter	22"
Stroke	28"
Valves	Piston, 14" diameter

BOILER

Type	Wagon Top
Diameter	66"
Thickness of Sheets	11/16" and 3/4"
Working Pressure	200 lbs.
Fuel	Soft Coal
Staying	Radial

FIREBOX

Material	Steel
Length	108 1/8"
Width	72 1/4"
Depth, front	76"
" back	67 1/2"
Thickness of Sheets	sides, 3/8"
back, 3/8"; crown, 3/8"; tube, 1/2"	

Water Space,
front, 5"; sides, 4"; back, 4"

TUBES

Material	Steel
Diameter	5 3/8" and 2"
Thickness	5 3/8", No. 9 W. G. 2", No. 11 W. G.
Number	5 3/8", 24; 2", 183
Length	18' 6"

HEATING SURFACE

Firebox	184 sq. ft.
Combustion Chamber	34 sq. ft.
Tubes	2387 sq. ft.
Firebrick tubes	30 sq. ft.
Total	2635 sq. ft.
Superheating Surface	524 sq. ft.
Grate Area	54.2 sq. ft.

DRIVING WHEELS

Diameter, outside	68"
" center	62"
Journals, main	10" x 12"
" others	9" x 12"

ENGINE TRUCK WHEELS

Diameter, front	31 3/8"
Journals	6" x 10 1/8"
Diameter, back	44"
Journals	8" x 14"

WHEEL BASE

Driving	13' 0"
Rigid	13' 0"
Total Engine	33' 0"
Total Engine and Tender	67' 5 3/4"

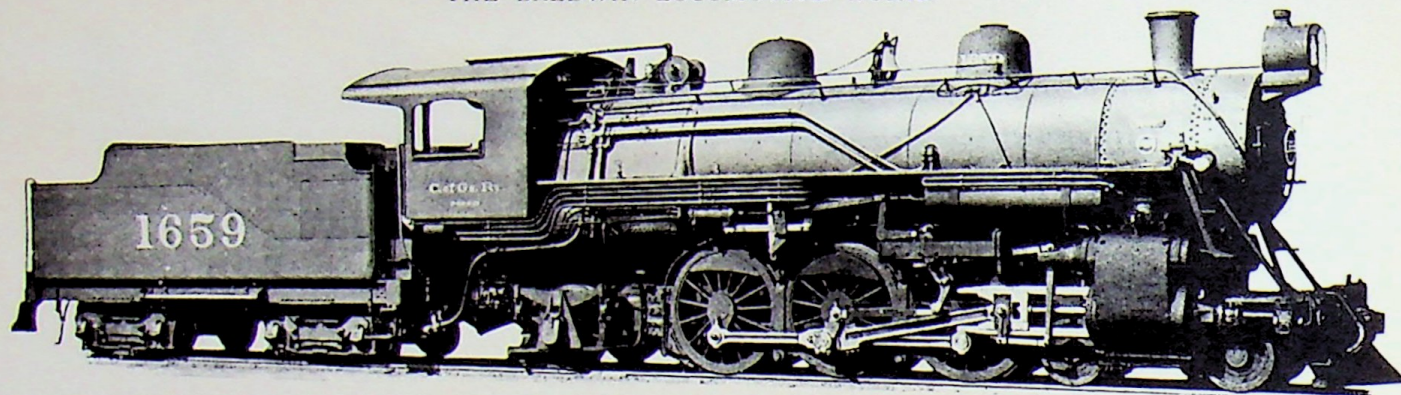
WEIGHT

On Driving Wheels	140,400 lbs.
On Truck, front	44,900 lbs.
" back	41,200 lbs.
Total Engine	226,500 lbs.
Total Engine and Tender, about	380,000 lbs.

TENDER

Number of Wheels	8
Diameter of Wheels	33"
Journals	5 1/2" x 10"
Tank Capacity	8000 gals.
Fuel Capacity	12 tons

THE BALDWIN LOCOMOTIVE WORKS



Central of Georgia Railway Company

Through passenger traffic on the Central of Georgia Railway is being successfully handled by Pacific type locomotives as illustrated above. These engines use superheated steam, and exert a tractive force of 32,800 pounds. A feature of this design is the firebox, which is of a type developed by F. F. Gaines, Supt. of Motive Power of the Central of Georgia Railway. In shape this firebox approximates the Wootten type. The furnace is divided into two sections by a transverse wall, the front section being utilized as a combustion chamber,

Pre-heated air is discharged in a backward direction at the top of the wall, where it mingles with the gases, thus aiding combustion and preventing smoke. The bottom of the combustion chamber is covered with firebrick, and a hopper is provided through which any cinders that accumulate can be easily removed. In actual service, locomotives equipped with this form of furnace are economical in fuel consumption, and experience practically no trouble with leaky flues.

Railway Co's Class P-69- $\frac{2}{3}$ -34.7
Baldwin Class 12-40- $\frac{1}{4}$ -D, 67

Pacific Type Locomotive

for the

Central of Georgia Railway Company

Gauge 4' 8 $\frac{1}{2}$ "

GENERAL DIMENSIONS

CYLINDERS

Diameter	23"
Stroke	28"
Valves	Piston, 12" diameter

BOILER

Type	Straight
Diameter	70"
Thickness of Sheets	$\frac{5}{8}$ "
Working Pressure	190 lbs.
Fuel	Soft Coal
Staying	Radial

FIREBOX

Material	Steel
Length	132"
Width	84"
Depth, front	53"
" back	49 $\frac{1}{2}$ "
Length of Grate	87"
Thickness of Sheets	sides, $\frac{3}{8}$ "
back, $\frac{3}{8}$ "; crown, $\frac{3}{8}$ "; tube, $\frac{1}{2}$ "	

Water Space,
front, 4 $\frac{1}{2}$ "; sides, 3 $\frac{1}{2}$ "; back, 3 $\frac{1}{2}$ "

TUBES

Material	Iron
Diameter	5 $\frac{3}{8}$ " and 2"
Thickness	5 $\frac{3}{8}$ ", No. 9 W. G. 2", No. 11 W. G.
Number	5 $\frac{3}{8}$ ", 28; 2", 194
Length	18' 0"

HEATING SURFACE

Firebox	163 sq. ft.
Tubes	2526 sq. ft.
Total	2689 sq. ft.
Superheating Surface	605 sq. ft.
Grate Area	50.6 sq. ft.

DRIVING WHEELS

Diameter, outside	69"
" center	62"
Journals	10" x 12"

ENGINE TRUCK WHEELS

Diameter, front	33 $\frac{1}{2}$ "
Journals	6" x 12"
Diameter, back	48"
Journals	8" x 14"

WHEEL BASE

Driving	12' 0"
Rigid	12' 0"
Total Engine	31' 6"
Total Engine and Tender	63' 9 $\frac{1}{2}$ "

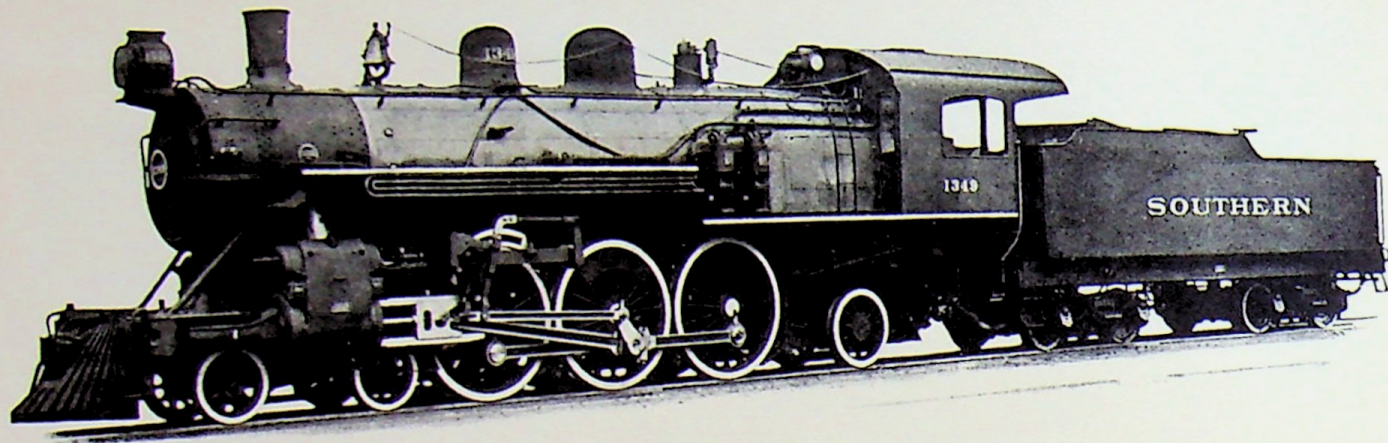
WEIGHT

On Driving Wheels	138,000 lbs.
On Truck, front	43,800 lbs.
" back	46,800 lbs.
Total Engine	228,600 lbs.
Total Engine and Tender, about	365,000 lbs.

TENDER

Number of Wheels	8
Diameter of Wheels	33"
Journals	5 $\frac{1}{2}$ " x 10"
Tank Capacity	7500 gals.
Fuel Capacity	13 tons

THE BALDWIN LOCOMOTIVE WORKS



Southern Railway Company

The Southern Railway was among the first to use Pacific type locomotives, as it has been handling express passenger traffic with engines of this type since 1903. The first locomotives were equipped with slide valves and Stephenson link motion. These engines proved so successful that the Pacific type locomotives subsequently built for this road have been generally similar to them. The locomotive illustrated above has many dimensions in common with the design of 1903, but it is equipped with

the "Southern" radial valve motion, piston valves and a Schmidt superheater; and there has been a thorough revision of the constructive details. These changes have been based directly on experience with the previous designs, and the result is an engine which is specially adapted to meet the requirements of the service.

These locomotives exert a tractive force of 35,000 pounds, and their wheel loading is such that they can be used on rails weighing eighty pounds per yard and over.

Pacific Type Locomotive

for the

Southern Railway Company

Gauge 4' 8½"

Baldwin Class 12-42-¼-D, 120

GENERAL DIMENSIONS

CYLINDERS

Diameter	24"
Stroke	28"
Valves	Piston, 12" diameter

BOILER

Type	Straight
Diameter	70"
Thickness of Sheets	¾" and 13/16"
Working Pressure	185 lbs.
Fuel	Soft Coal
Staying	Radial

FIREBOX

Material	Steel
Length	108½"
Width	72¼"
Depth, front	76¼"
" back	68¾"
Thickness of Sheets	sides, 3/8"
back, 3/8"; crown, 3/8"; tube, 1/2"	

Water Space,
front, 4½"; sides, 3½"; back, 3½"

TUBES

Diameter	5½" and 2¼"
Material	5½", Steel 2¼", Iron
Thickness	5½", No. 9 W. G. 2¼", No. 11 W. G.
Number	5½", 28; 2¼", 176
Length	20' 0"

HEATING SURFACE

Firebox	192 sq. ft.
Tubes	2866 sq. ft.
Total	3058 sq. ft.
Superheating Surface	660 sq. ft.
Grate Area	54 sq. ft.

DRIVING WHEELS

Diameter, outside	72½"
" center	66"
Journals, main	10" x 12"
" others	9" x 12"

ENGINE TRUCK WHEELS

Diameter, front	33"
Journals	5½" x 10"
Diameter, back	42"
Journals	8" x 12"

WHEEL BASE

Driving	12' 6"
Rigid	12' 6"
Total Engine	31' 4½"
Total Engine and Tender	67' 0½"

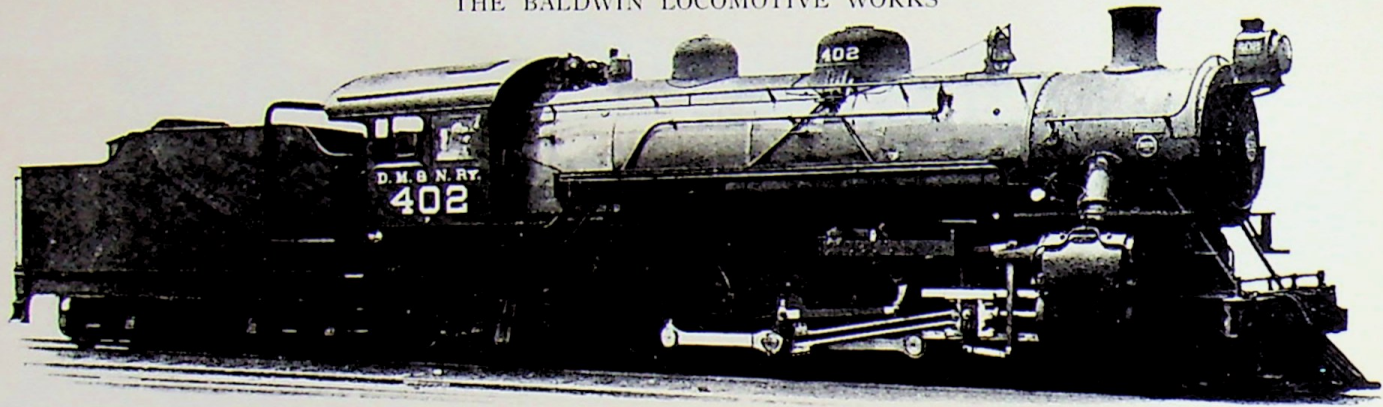
WEIGHT

On Driving Wheels	141,500 lbs.
On Truck, front	48,600 lbs.
" back	42,200 lbs.
Total Engine	232,300 lbs.
Total Engine and Tender, about	375,000 lbs.

TENDER

Number of Wheels	8
Diameter of Wheels	33"
Journals	5½" x 10"
Tank Capacity	7500 gals.
Fuel Capacity	12 tons

THE BALDWIN LOCOMOTIVE WORKS



Duluth, Missabe and Northern Railway Company

The Duluth, Missabe and Northern Railway operates a passenger service between Duluth and Missabe Range points, over a line having maximum grades of three and one-half per cent. Stops are frequent, and the requirements call for locomotives having not only high starting tractive force, but also large steaming capacity. The illustration shows one of three locomotives which have been specially designed for this service. With sixty-nine inch driving wheels these engines exert a tractive force of 39,000 pounds. The design includes a

brick-arch and Schmidt superheater. Brakes are applied to all the wheels under the locomotive and tender; a valuable feature in view of the heavy grade service in which these engines are used.

Locomotives of this general design are also suitable for fast freight traffic on comparatively level roads. With large steaming capacity, high tractive force and medium-sized wheels, they can handle heavy tonnage and also make good time.

Pacific Type Locomotive

Railway Co's Class P
Baldwin Class 12-44- $\frac{1}{4}$ -D, 105

for the

Gauge 4' 8 $\frac{1}{2}$ "

Duluth, Missabe and Northern Railway Company

GENERAL DIMENSIONS

CYLINDERS

Diameter	25"
Stroke	28"
Valves	Piston, 15" diameter

BOILER

Type	Wagon Top
Diameter	74"
Thickness of Sheets	$\frac{3}{4}$ " and $1\frac{3}{16}$ "
Working Pressure	190 lbs.
Fuel	Soft Coal
Staying	Radial

FIREBOX

Material	Steel
Length	111"
Width	76"
Depth, front	78 $\frac{3}{4}$ "
" back	75 $\frac{1}{4}$ "
Thickness of Sheets	sides, $\frac{7}{16}$ "
back, $\frac{7}{16}$ "; crown, $\frac{7}{16}$ "; tube, $\frac{1}{2}$ "	

Water Space,
front, 4 $\frac{1}{2}$ "; sides, 4 $\frac{1}{2}$ "; back, 4 $\frac{1}{2}$ "

TUBES

Material	Steel
Diameter	5 $\frac{1}{2}$ " and 2 $\frac{1}{4}$ "
Thickness	5 $\frac{1}{2}$ ", No. 9 W. G. 2 $\frac{1}{4}$ ", No. 10 W. G.
Number	5 $\frac{1}{2}$ ", 30; 2 $\frac{1}{4}$ ", 177
Length	20' 0"

HEATING SURFACE

Firebox	206 sq. ft.
Tubes	2936 sq. ft.
Firebrick Tubes	30 sq. ft.
Total	3172 sq. ft.
Superheating Surface	721 sq. ft.
Grate Area	58.6 sq. ft.

DRIVING WHEELS

Diameter, outside	69"
" center	62"
Journals, main	10 $\frac{1}{2}$ " x 12"
" others	10" x 12"

ENGINE TRUCK WHEELS

Diameter, front	33"
Journals	6" x 10"
Diameter, back	42"
Journals	8" x 14"

WHEEL BASE

Driving	12' 6"
Rigid	12' 6"
Total Engine	33' 0"
Total Engine and Tender	65' 8 $\frac{1}{4}$ "

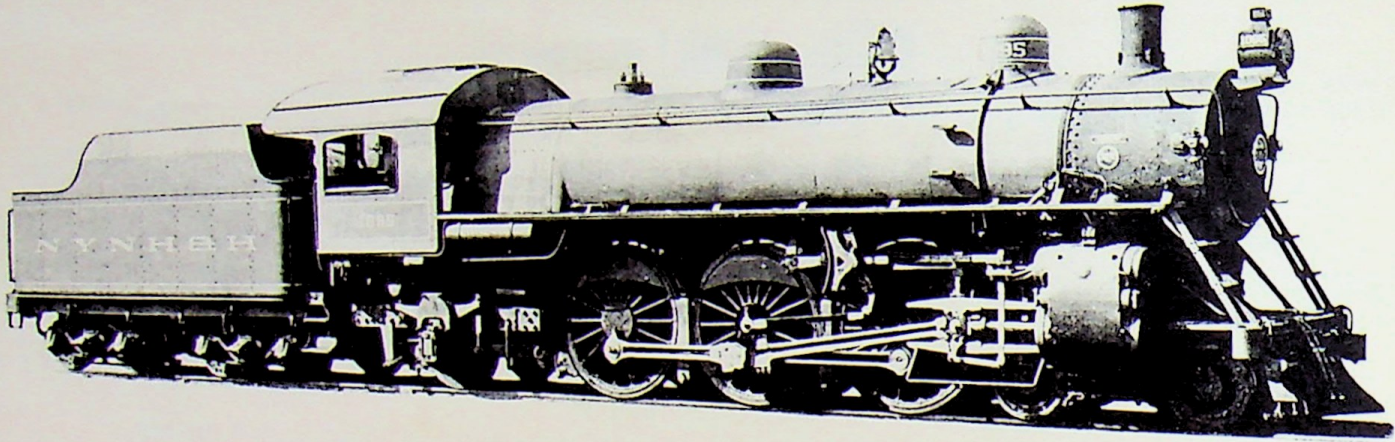
WEIGHT

On Driving Wheels	155,100 lbs.
On Truck, front	44,600 lbs.
" back	46,000 lbs.
Total Engine	245,700 lbs.
Total Engine and Tender, about	400,000 lbs.

TENDER

Number of Wheels	8
Diameter of Wheels	33"
Journals	5 $\frac{1}{2}$ " x 10"
Tank Capacity	8000 gals.
Fuel Capacity	14 tons

THE BALDWIN LOCOMOTIVE WORKS



New York, New Haven and Hartford Railroad Company

The first Pacific type locomotives built for the New York, New Haven and Hartford Railroad by The Baldwin Locomotive Works were completed in 1907. They were designed for handling the heaviest class of passenger service between New York and Boston, and in this work they proved most successful. These engines used saturated steam, and were equipped with slide valves. The locomotive illustrated is a direct develop-

ment of this earlier design, although it is built throughout to larger dimensions, and is equipped with piston valves and a superheater. The firebox contains a brick-arch. The tractive force exerted is 34,700 pounds, and the ratio of adhesion is 4.41. With driving wheels seventy-nine inches in diameter the new locomotives are specially fitted for service in which high speeds are maintained for sustained periods of time.

Pacific Type Locomotive

for the

Gauge 4' 8½"

Railroad Co's Class I-3

Baldwin Class 12-42-1¼-D, 70

New York, New Haven and Hartford Railroad Company

GENERAL DIMENSIONS

CYLINDERS

Diameter	24"
Stroke	28"
Valves	Piston, 12" diameter

BOILER

Type	Straight
Diameter	72"
Thickness of Sheets	11/16" and 3/4"
Working Pressure	200 lbs.
Fuel	Soft Coal
Staying	Radial

FIREBOX

Material	Steel
Length	108½"
Width	71¼"
Depth, front	76"
" back	68"
Thickness of Sheets	sides, 3/8"
back, 3/8"; crown, 3/8"; tube, 1/2"	

Water Space,	
front, 5"; sides, 4"; back, 4"	

TUBES

Material	Iron
Diameter	5½" and 2¼"
Thickness	5½", No. 9 W. G. 2¼", 0.125"
Number	5½", 28; 2¼", 180
Length	21' 6"

HEATING SURFACE

Firebox	194 sq. ft.
Tubes	3132 sq. ft.
Firebrick Tubes	29 sq. ft.
Total	3355 sq. ft.
Superheating Surface	730 sq. ft.
Grate Area	53.5 sq. ft.

DRIVING WHEELS

Diameter, outside	79"
" center	72"
Journals	10" x 12"

ENGINE TRUCK WHEELS

Diameter, front	36¼"
Journals	6" x 12"
Diameter, back	51"
Journals	8" x 14"

WHEEL BASE

Driving	14' 1"
Rigid	14' 1"
Total Engine	35' 3½"
Total Engine and Tender	63' 4½"

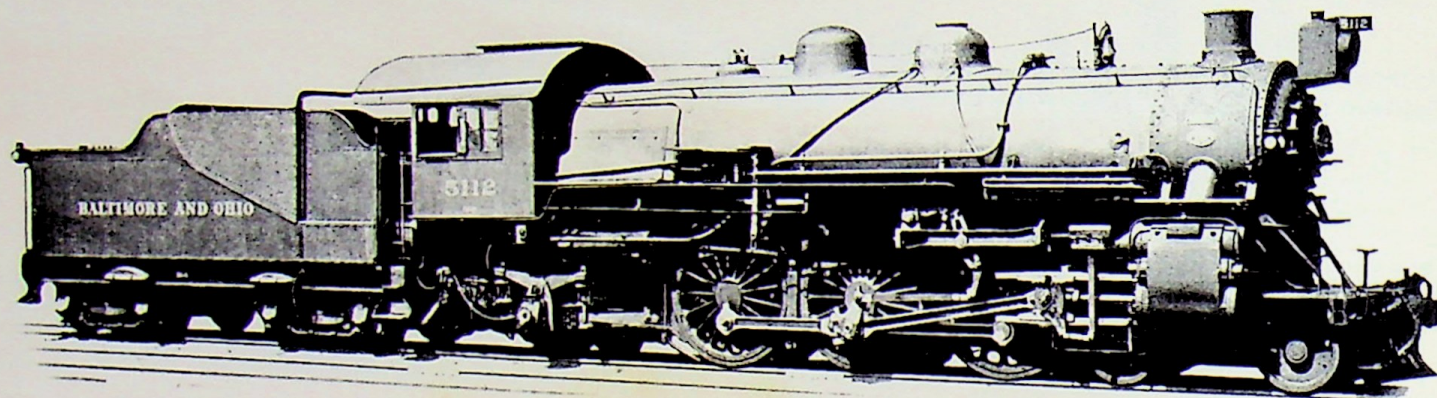
WEIGHT

On Driving Wheels	153,100 lbs.
On Truck, front	49,100 lbs.
" back	44,000 lbs.
Total Engine	246,200 lbs.
Total Engine and Tender, about	365,000 lbs.

TENDER

Number of Wheels	8
Diameter of Wheels	36¼"
Journals	5½" x 10"
Tank Capacity	6000 gals.
Fuel Capacity	13 tons

THE BALDWIN LOCOMOTIVE WORKS



Baltimore and Ohio Railroad Company

The Philadelphia Division of the Baltimore and Ohio Railroad is a high speed line, the fastest schedule allowing 113 minutes for the 94.3 miles between Philadelphia and Baltimore. The profile is undulating, and there is a maximum speed limit of sixty miles per hour. Baldwin locomotives of the American, ten-wheeled and Atlantic types have been successively used on this division; and now the Pacific type has been introduced to cope with increasing train loads and more difficult

schedules. These locomotives are equipped with superheaters and brick-arches, and the labor saving devices include a power reverse gear, air-operated fire-door, and a coal pusher on the tender. The trailing truck is of the improved Hodges type, with frame and boxes composed entirely of steel castings.

These locomotives are proving fully capable of meeting the service requirements, and are maintaining the excellent reputation of their predecessors.

Pacific Type Locomotive

for the

Baltimore and Ohio Railroad Company

Gauge 4' 8½"

Railroad Co's Class P-3
Baldwin Class 12-42-1¼-D, 88

GENERAL DIMENSIONS

CYLINDERS

Diameter	24"
Stroke	28"
Valves	Piston, 14" diameter

BOILER

Type	Straight
Diameter	72"
Thickness of Sheets,	1¼", 2¾" and ¾"
Working Pressure	190 lbs.
Fuel	Soft Coal
Staying	Radial

FIREBOX

Material	Steel
Length	108½"
Width	75¼"
Depth, front	74"
" back	59½"
Thickness of Sheets	sides, ¾"
back, ¾"; crown, ¾"; tube, ½"	

Water Space,	
front, 4½"; sides, 4½"; back, 4½"	

TUBES

Material	Steel
Diameter	5½" and 2¼"
Thickness	No. 9 W. G.
Number	2¼", 125
Length	5½", 25; 2¼", 140
	20' 0"

HEATING SURFACE

Firebox	185 sq. ft.
Tubes	2359 sq. ft.
Firebrick Tubes	23 sq. ft.
Total	2567 sq. ft.
Superheating Surface	587 sq. ft.
Grate Area	56.5 sq. ft.

DRIVING WHEELS

Diameter, outside	76"
" center	68"
Journals, main	10½" x 13"
" others	9½" x 13"

ENGINE TRUCK WHEELS

Diameter, front	37"
Journals	6½" x 12"
Diameter, back	52"
Journals	8" x 14"

WHEEL BASE

Driving	13' 2"
Rigid	13' 2"
Total Engine	34' 3½"
Total Engine and Tender	60' 8¾"

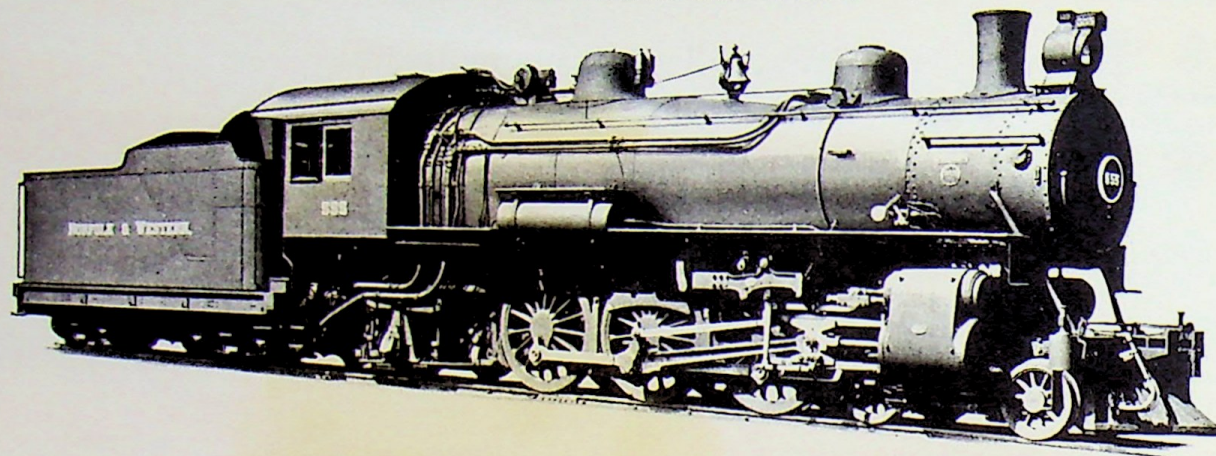
WEIGHT

On Driving Wheels	159,200 lbs.
On Truck, front	49,300 lbs.
" back	40,100 lbs.
Total Engine	248,600 lbs.
Total Engine and Tender	413,000 lbs.

TENDER

Number of Wheels	8
Diameter of Wheels	36"
Journals	6" x 11"
Tank Capacity	7000 gals.
Fuel Capacity	16 tons

THE BALDWIN LOCOMOTIVE WORKS



Norfolk and Western Railway Company

The first Pacific type locomotives built by The Baldwin Locomotive Works for the Norfolk and Western Railway were completed in 1907. They had twenty by twenty-eight inch cylinders, and with sixty-eight-inch driving wheels and a steam pressure of 200 pounds, developed a tractive force of 28,000 pounds. Previous to their introduction, ten-wheeled locomotives having the same tractive force but with less steaming capacity, had been used in heavy passenger service. The locomotive illustrated above is a development of the design of

1907. It uses superheated steam, and exerts a tractive force of 34,400 pounds. The Baker valve-gear is applied. A feature of the boiler design is the wide water spaces, the mud-ring having a width of seven inches all around. These locomotives are well adapted to working heavy passenger traffic over the mountain grades on this road; while at the same time, with seventy-inch driving wheels, they can maintain high speeds on the more level sections of the line.

Railway Co's Class E-2-A
Baldwin Class 12-38- $\frac{1}{4}$ -D, 478

Pacific Type Locomotive

for the

Norfolk and Western Railway Company

Gauge 4' 8 $\frac{1}{2}$ "

GENERAL DIMENSIONS

CYLINDERS

Diameter 22 $\frac{1}{2}$ "
Stroke 28"
Valves Piston, 12" diameter

BOILER

Type Wagon Top
Diameter 74"
Thickness of Sheets $\frac{3}{4}$ " and $\frac{13}{16}$ "
Working Pressure 200 lbs.
Fuel Soft Coal
Staying Radial

FIREBOX

Material Steel
Length 100 $\frac{1}{8}$ "
Width 64 $\frac{1}{4}$ "
Depth, front 78 $\frac{1}{8}$ "
" back 74 $\frac{1}{2}$ "
Thickness of Sheets sides, $\frac{3}{8}$ "
back, $\frac{3}{8}$ "; crown, $\frac{3}{8}$ "; tube, $\frac{1}{2}$ "

Water Space,
front, 7"; sides, 7"; back, 7"

TUBES

Material Steel
Diameter 5 $\frac{3}{8}$ " and 2"
Thickness 5 $\frac{3}{8}$ " 0.150"
2", 0.110"
Number 5 $\frac{3}{8}$ ", 30; 2", 222
Length 20' 1"

HEATING SURFACE

Firebox 192 sq. ft.
Tubes 3167 sq. ft.
Total 3359 sq. ft.
Superheating Surface 729 sq. ft.
Grate Area 44.7 sq. ft.

DRIVING WHEELS

Diameter, outside 70"
" center 62"
Journals 10 $\frac{1}{2}$ " x 12"

ENGINE TRUCK WHEELS

Diameter, front 33"
Journals 5 $\frac{1}{2}$ " x 10"
Diameter, back 42"
Journals 8" x 14"

WHEEL BASE

Driving 12' 6"
Rigid 12' 6"
Total Engine 32' 10 $\frac{1}{2}$ "
Total Engine and Tender 64' 9 $\frac{1}{2}$ "

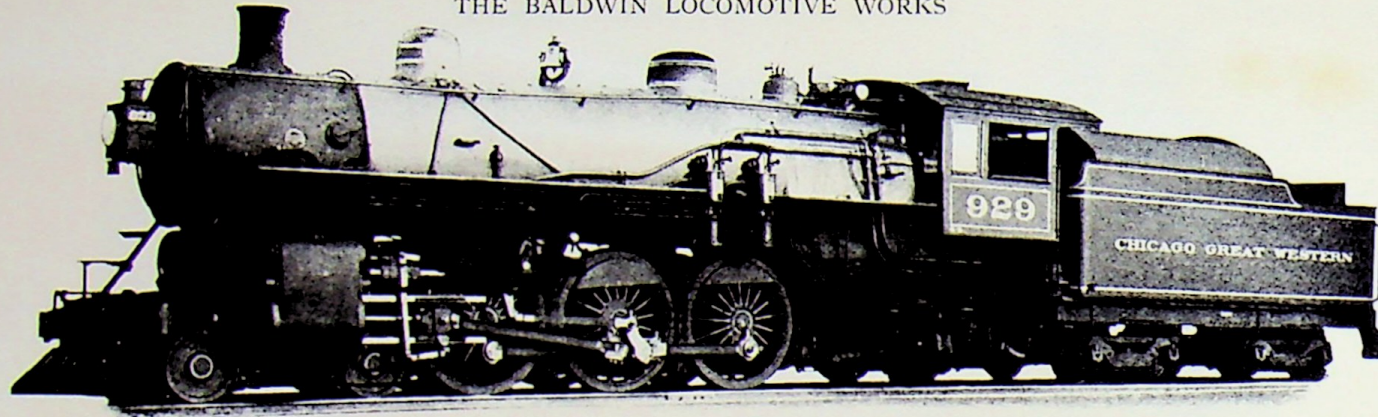
WEIGHT

On Driving Wheels 163,850 lbs.
On Truck, front 39,200 lbs.
" back 46,200 lbs.
Total Engine 249,250 lbs.
Total Engine and Tender,
about 420,000 lbs.

TENDER

Number of Wheels 8
Diameter of Wheels 33"
Journals 5 $\frac{1}{2}$ " x 10"
Tank Capacity 9000 gals.
Fuel Capacity 14 tons

THE BALDWIN LOCOMOTIVE WORKS



Chicago Great Western Railroad Company

Five locomotives as illustrated above, are in service on the Chicago Great Western Railroad, and five of similar design have been built for the Pere Marquette Railroad. These engines, although of limited weight, exert a tractive force of 38,700 pounds; and the steaming capacity is ample for heavy service. The boiler is fitted with a superheater, and with the Gaines locomotive furnace. In many respects, the firebox arrangement is similar to that used on the Central of Georgia locomotive illustrated on page 12. In the Chicago

Great Western and Pere Marquette locomotives, however, a brick-arch, supported on water tubes, extends in a rearward direction from the top of the bridge wall. The supply of heated air is delivered immediately under the foot of the arch; and a long flameway is provided, with liberal space for combustion. The details of these engines are, where practicable, made interchangeable with corresponding parts of locomotives previously built for the Chicago Great Western Railroad.

Pacific Type Locomotive

Railroad Co's Class K-5
Baldwin Class 12-44-1/4-D, 135

for the

Gauge 4' 8 1/2"

Chicago Great Western Railroad Company

GENERAL DIMENSIONS

CYLINDERS

Diameter	25"
Stroke	28"
Valves	Piston, 15" diameter

BOILER

Type	Wagon Top
Diameter	72"
Thickness of Sheets	11/16" and 3/4"
Working Pressure	190 lbs.
Fuel	Soft Coal
Staying	Radial

FIREBOX

Material	Steel
Length	126 1/16"
Width	84 1/8"
Depth, front	76"
" back	64"
Length of Grate	96"
Thickness of Sheets	sides, 5/16"
back, 5/16"; crown, 3/8"; tube, 5/8"	

Water Space,
front, 4 1/2"; sides, 4 1/2"; back, 4 1/2"

TUBES

Material	Steel
Diameter	5 3/8" and 2"
Thickness	5 3/8", No. 9 W. G. 2", No. 11 W. G.
Number	5 3/8", 32; 2", 239
Length	20' 6"

HEATING SURFACE

Firebox	225 sq. ft.
Tubes	3474 sq. ft.
Firebrick Tubes	33 sq. ft.
Total	3732 sq. ft.
Superheating Surface	794 sq. ft.
Grate Area	56 sq. ft.

DRIVING WHEELS

Diameter, outside	73"
" center	66"
Journals, main	11" x 12"
" others	9" x 12"

ENGINE TRUCK WHEELS

Diameter, front	33"
Journals	6" x 10"
Diameter, back	52"
Journals	8" x 14"

WHEEL BASE

Driving	13' 0"
Rigid	13' 0"
Total Engine	35' 4"
Total Engine and Tender	66' 0"

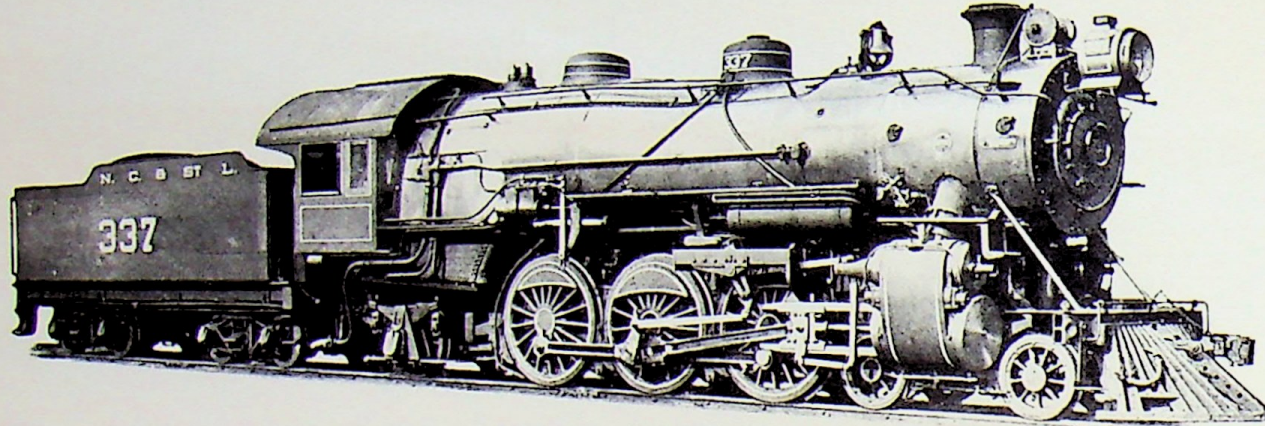
WEIGHT

On Driving Wheels	152,400 lbs.
On Truck, front	52,200 lbs.
" back	52,400 lbs.
Total Engine	257,000 lbs.
Total Engine and Tender, about	410,090 lbs.

TENDER

Number of Wheels	8
Diameter of Wheels	36"
Journals	5 1/2" x 10"
Tank Capacity	8000 gals.
Fuel Capacity	11 tons

THE BALDWIN LOCOMOTIVE WORKS



Nashville, Chattanooga and St. Louis Railway Company

Five locomotives of the design shown above, are in through passenger service on the Nashville, Chattanooga and St. Louis Railway. These engines are generally similar to three, which were built early in 1912 and were designed to use saturated steam at 200 pounds pressure. The new locomotives use superheated steam at 180 pounds pressure, and have cylinders twenty-five inches in diameter, as compared with twenty-three-

inch cylinders in the earlier locomotives. The service requirements are severe, as train-loads are heavy and the profile of the line is difficult. The superheater locomotives exert a tractive force of 37,200 pounds, with a ratio of adhesion of 4.45. They are thus able to start heavy trains without difficulty, and the boiler power is ample for severe duty. The equipment includes a brick-arch and power reverse gear.

Pacific Type Locomotive

Baldwin Class 12-44-1/4-D, 110

for the

Gauge 4' 8 1/2"

Nashville, Chattanooga and St. Louis Railway Company

GENERAL DIMENSIONS

CYLINDERS

Diameter	25"
Stroke	28"
Valves	Piston, 15" diameter

BOILER

Type	Wagon Top
Diameter	76"
Thickness of Sheets	1 1/16", 2 3/32" and 3/4"
Working Pressure	180 lbs.
Fuel	Soft Coal
Staying	Radial

FIREBOX

Material	Steel
Length	114 1/8"
Width	84 1/4"
Depth, front	85 1/4"
" back	76 1/2"
Thickness of Sheets	sides, 3/8"
back, 3/8"; crown, 3/8"; tube, 1/2"	

Water Space,	
front, 5"; sides, 5"; back, 5"	

TUBES

Diameter	5 3/8" and 2"
Material	5 1/8", Steel 2", Iron
Thickness	5 3/8", No. 9 W. G. 2", No. 11 W. G.
Number	5 3/8", 34; 2", 241
Length	20' 6"

HEATING SURFACE

Firebox	241 sq. ft.
Tubes	3553 sq. ft.
Firebrick Tubes	29 sq. ft.
Total	3823 sq. ft.
Superheating Surface	842 sq. ft.
Grate Area	66.7 sq. ft.

DRIVING WHEELS

Diameter, outside	72"
" center	64"
Journals, main	10" x 12"
" others	9 1/2" x 12"

ENGINE TRUCK WHEELS

Diameter, front	37"
Journals	6" x 12"
Diameter, back	44"
Journals	8" x 14"

WHEEL BASE

Driving	13' 0"
Rigid	13' 0"
Total Engine	34' 1"
Total Engine and Tender	68' 3 1/2"

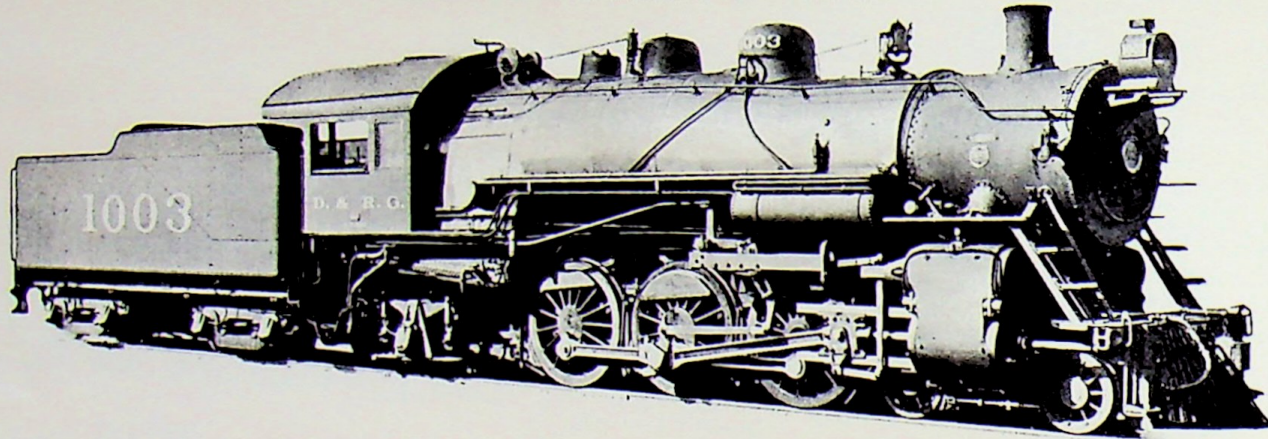
WEIGHT

On Driving Wheels	165,500 lbs.
On Truck, front	49,600 lbs.
" back	44,700 lbs.
Total Engine	259,800 lbs.
Total Engine and Tender,	
about	415,000 lbs.

TENDER

Number of Wheels	8
Diameter of Wheels	36"
Journals	5 1/2" x 10"
Tank Capacity	8500 gals.
Fuel Capacity	14 tons

THE BALDWIN LOCOMOTIVE WORKS



Denver and Rio Grande Railroad Company

There are few railroads in the country on which through traffic must be moved over grades and curves more severe than those found on the Denver and Rio Grande. The locomotive illustrated is one of six, which were built to operate on grades of four per cent. and curves of sixteen degrees. These locomotives carry approximately 54,000 pounds on each pair of driving wheels. They use superheated steam, and exert a tractive force of 41,300 pounds. The adhesion weight is fully utilized, as the ratio of adhesion is less than five

at all speeds below twenty miles per hour. In addition to air brakes on the driving, leading truck and tender wheels, these locomotives are fitted with the LeChatelier cylinder water brake, which aids in controlling the train when descending grades, while it relieves the brake rigging of excessive strain and wear.

This design of locomotive, while specially intended for heavy passenger service, is also suitable for fast freight service on lines having moderate grades.

Pacific Type Locomotive

Railroad Co's Class F-3-262
Baldwin Class 12-46-1/4-D, 125

for the

Gauge 4' 8 1/2"

Denver and Rio Grande Railroad Company

GENERAL DIMENSIONS

CYLINDERS

Diameter	26"
Stroke	26"
Valves	Piston, 16" diameter

BOILER

Type	Wagon Top
Diameter	76"
Thickness of Sheets	3/4" and 13/16"
Working Pressure	185 lbs.
Fuel	Soft Coal
Staying	Radial

FIREBOX

Material	Steel
Length	108"
Width	84"
Depth, front	80 3/4"
" back	68"
Thickness of Sheets	sides, 3/8"
back, 3/8"; crown, 3/8"; tube, 1/2"	
Water Space,	
front, 5"; sides, 4 1/2"; back, 4 1/2"	

TUBES

Material	Steel
Diameter	5 1/2" and 2 1/4"
Thickness	5 1/2", No. 9 W. G.
	2 1/4", No. 11 W. G.
Number	5 1/2", 32; 2 1/4", 200
Length	20' 0"

HEATING SURFACE

Firebox	234 sq. ft.
Tubes	3263 sq. ft.
Total	3497 sq. ft.
Superheating Surface	778 sq. ft.
Grate Area	63 sq. ft.

DRIVING WHEELS

Diameter, outside	67"
" center	60"
Journals, main	11" x 12"
" others	10 1/2" x 12"

ENGINE TRUCK WHEELS

Diameter, front	34"
Journals	6 1/2" x 12"
Diameter, back	42"
Journals	8 1/2" x 14"

WHEEL BASE

Driving	12' 6"
Rigid	12' 6"
Total Engine	33' 8"
Total Engine and Tender	65' 6"

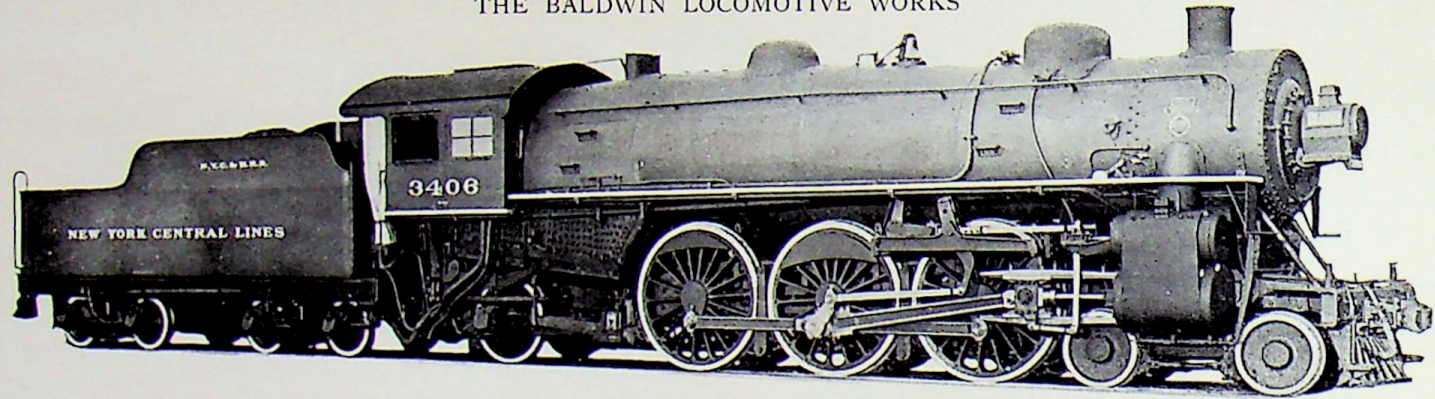
WEIGHT

On Driving Wheels	160,640 lbs.
On Truck, front	50,800 lbs.
" back	49,640 lbs.
Total Engine	261,080 lbs.
Total Engine and Tender,	
about	430,000 lbs.

TENDER

Number of Wheels	8
Diameter of Wheels	34"
Journals	6" x 11"
Tank Capacity	9000 gals.
Fuel Capacity	14 tons

THE BALDWIN LOCOMOTIVE WORKS



New York Central and Hudson River Railroad Company

The New York Central Lines operate a large number of heavy, high speed trains, over roads having light grades. High starting tractive force is not as essential in work of this character, as ample steaming capacity; while large driving wheels are desirable for sustained running at high speeds. The locomotive illustrated is specially fitted for meeting these conditions. The boiler contains a brick-arch and superheater, and is of liberal dimensions throughout; while the driving wheels are seventy-nine inches in diameter. The maxi-

mum tractive force exerted is 30,900 pounds. With ample weight on driving wheels and a high ratio of adhesion, this can be exerted without slipping unless track conditions are most unfavorable.

These locomotives are in a service which was formerly operated by high speed Atlantic type locomotives. They combine the running qualities of the latter with the increased hauling and steaming capacity necessitated by the use of heavy all-steel trains.

Pacific Type Locomotive

Railroad Co's Class K-3-C
Baldwin Class 12-40-1/4-D, 23

for the

Gauge 4' 8 1/2"

New York Central and Hudson River Railroad Company

GENERAL DIMENSIONS

CYLINDERS

Diameter 23 1/2"
Stroke 26"
Valves Piston, 14" diameter

BOILER

Type Wagon Top
Diameter 72"
Thickness of Sheets . . . 11 1/16" and 13 1/16"
Working Pressure 200 lbs.
Fuel Soft Coal
Staying Radial

FIREBOX

Material Steel
Length 108 1/8"
Width 75 1/4"
Depth, front 82"
" back 65"
Thickness of Sheets . . . sides, 3/8"
back, 3/8"; crown, 3/8"; tube, 1/2"

Water Space,
front, 4 1/2"; sides, 4 1/2"; back, 4 1/2"

TUBES

Diameter 5 1/2" and 2 1/4"
Material 5 1/2", Steel
2 1/4", Iron
Thickness 5 1/2", No. 9 W. G.
2 1/4", No. 12 W. G.
Number 5 1/2", 32; 2 1/4", 175
Length 21' 6"

HEATING SURFACE

Firebox 204 sq. ft.
Tubes 3193 sq. ft.
Firebrick Tubes 30 sq. ft.
Total 3427 sq. ft.
Superheating Surface . . 803 sq. ft.
Grate Area 56.5 sq. ft.

DRIVING WHEELS

Diameter, outside 79"
" center 72"
Journals, main 10 1/2" x 14"
" others 10 1/2" x 12"

ENGINE TRUCK WHEELS

Diameter, front 36"
Journals 6 1/2" x 12"
Diameter, back 50 1/4"
Journals 8" x 14"

WHEEL BASE

Driving 14' 0"
Rigid 14' 0"
Total Engine 36' 6"
Total Engine and Tender . 67' 10"

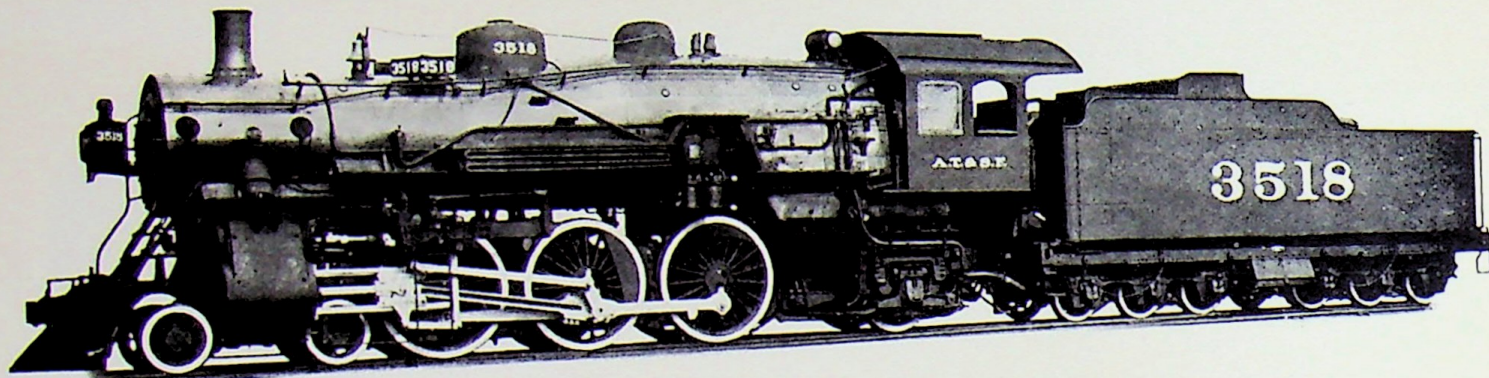
WEIGHT

On Driving Wheels . . . 171,300 lbs.
On Truck, front 50,150 lbs.
" back 47,900 lbs.
Total Engine 269,350 lbs.
Total Engine and Tender,
about 418,000 lbs.

TENDER

Number of Wheels 8
Diameter of Wheels . . . 36"
Journals 5 1/2" x 10"
Tank Capacity 7500 gals.
Fuel Capacity 12 tons

THE BALDWIN LOCOMOTIVE WORKS



Atchison, Topeka and Santa Fe Railway Company

The Atchison, Topeka and Santa Fe Railway first introduced Baldwin balanced compound locomotives in 1903. The illustration shows the latest development of this class of power—a Pacific type locomotive with high-pressure (inside) cylinders inclined, so that the inside main rods pass above the first driving axle, and all the pistons are connected to the second pair of coupled wheels. One hundred and fifteen Pacific type locomotives with this arrangement of cylinders and driving gear, are now in service on the Santa Fe System. All these

engines exert a tractive force of 33,400 pounds working compound.

The locomotive illustrated is equipped with a superheater, brick-arch, Baker valve motion, power reverse gear, and pneumatically operated fire-door and grate-shaker. The tender is carried on six-wheeled trucks, and is provided with a coal pusher. The design is the result of careful co-operation on the part of the railway company and the builders, and the locomotives are proving successful in the heaviest class of passenger service.

Pacific Type Locomotive

(Balanced Compound)

Baldwin Class 12- $\frac{29}{32}$ - $\frac{1}{4}$ -D, 99

for the

Atchison, Topeka and Santa Fe Railway Company

Gauge 4' 8 $\frac{1}{2}$ "

GENERAL DIMENSIONS

CYLINDERS

Diameter (High Pressure)	17 $\frac{1}{2}$ "
Diameter (Low Pressure)	29"
Stroke	28"
Valves	Piston, 15" diameter

BOILER

Type	Wagon Top
Diameter	70"
Thickness of Sheets,	23 $\frac{3}{32}$ ", 13 $\frac{1}{16}$ " and 7 $\frac{1}{8}$ "
Working Pressure	210 lbs.
Fuel	Soft Coal
Staying	Radial

FIREBOX

Material	Steel
Length	109 $\frac{5}{8}$ "
Width	76 $\frac{1}{4}$ "
Depth, front	76 $\frac{1}{4}$ "
" back	73 $\frac{1}{4}$ "
Thickness of Sheets	sides, 3 $\frac{1}{8}$ "
back, 3 $\frac{1}{8}$ "; crown, 3 $\frac{1}{8}$ "; tube, 9 $\frac{1}{16}$ "	

Water Space,	
front, 5"; sides, 5"; back, 4 $\frac{1}{2}$ "	

TUBES

Material	Iron
Diameter	5 $\frac{1}{2}$ " and 2 $\frac{1}{4}$ "
Thickness	5 $\frac{1}{2}$ ", No. 9 W. G. 2 $\frac{1}{4}$ ", No. 11 W. G.
Number	5 $\frac{1}{2}$ ", 26; 2 $\frac{1}{4}$ ", 199
Length	21' 0"

HEATING SURFACE

Firebox	211 sq. ft.
Tubes	3235 sq. ft.
Firebrick Tubes	29 sq. ft.
Total	3475 sq. ft.
Superheating Surface	619 sq. ft.
Grate Area	58 sq. ft.

DRIVING WHEELS

Diameter, outside	73"
" center	66"
Journals, main	11" x 10"
" others	10" x 12"

ENGINE TRUCK WHEELS

Diameter, front	34 $\frac{1}{4}$ "
Journals	7" x 12"
Diameter, back	50"
Journals	8" x 14"

WHEEL BASE

Driving	13' 8"
Rigid	13' 8"
Total Engine	35' 1"
Total Engine and Tender	70' 6 $\frac{1}{4}$ "

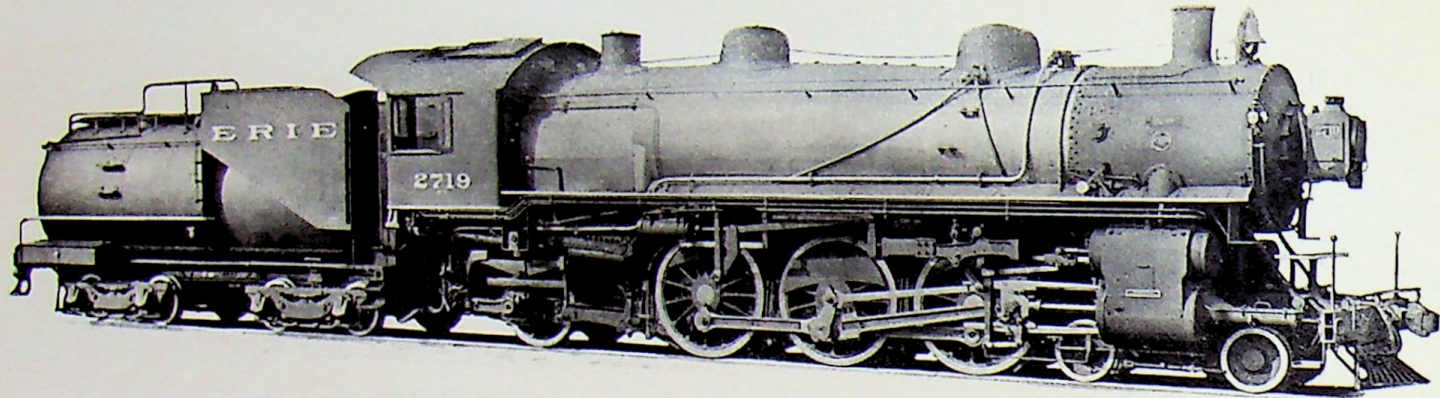
WEIGHT

On Driving Wheels	165,100 lbs.
On Truck, front	57,500 lbs.
" back	55,100 lbs.
Total Engine	277,700 lbs.
Total Engine and Tender,	
about	480,000 lbs.

TENDER

Number of Wheels	12
Diameter of Wheels	34 $\frac{1}{4}$ "
Journals	5 $\frac{1}{2}$ " x 10"
Tank Capacity	10,000 gals.
Fuel Capacity	12 tons

THE BALDWIN LOCOMOTIVE WORKS



Erie Railroad Company

Twenty locomotives, as illustrated above, have been built by The Baldwin Locomotive Works for the Erie Railroad. This is a design that can be used interchangeably in either fast freight or heavy passenger service. With a maximum tractive force of 43,200 pounds, and a ratio of adhesion of 4.27, these engines can start heavy trains without slipping; while high boiler power, in combination with sixty-nine inch driving wheels, gives sufficient speed capacity for all

but the fastest kind of passenger traffic. The equipment includes a superheater, brick-arch, Baker valve motion and Ragonnet power reverse mechanism. A locomotive of this kind, because of its all-around usefulness, is highly efficient on a line where traffic is heavy, and where on account of sudden changes in the volume of business handled, it may at times be necessary to transfer the power from one kind of work to another.

Railroad Co's Class K-4
Baldwin Class 12-44-1/4-D, 120

Pacific Type Locomotive

for the

Erie Railroad Company

Gauge 4' 8 1/2"

GENERAL DIMENSIONS

CYLINDERS

Diameter 25"
Stroke 28"
Valves Piston, 14" diameter

BOILER

Type Wagon Top
Diameter 78"
Thickness of Sheets 27 3/32", 29 3/32" and 15 1/16"
Working Pressure 200 lbs.
Fuel Soft Coal
Staying Radial

FIREBOX

Material Steel
Length 111 1/16"
Width 75 1/4"
Depth, front 82 1/2"
" back 67 1/2"
Thickness of Sheets sides 3/8"
back, 3/8"; crown, 3/8"; tube, 9/16"

Water Space,
front, 6"; sides, 5"; back, 5"

TUBES

Material Steel
Diameter 5 3/8" and 2"
Thickness 5 3/8", No. 9 W. G.
2", No. 11 W. G.
Number 5 3/8", 36; 2", 261
Length 20' 0"

HEATING SURFACE

Firebox 203 sq. ft.
Tubes 3731 sq. ft.
Firebrick Tubes 32 sq. ft.
Total 3966 sq. ft.
Superheating Surface 879 sq. ft.
Grate Area 58 sq. ft.

DRIVING WHEELS

Diameter, outside 69"
" center 62"
Journals, main 11" x 22"
" others 10 1/2" x 13"

ENGINE TRUCK WHEELS

Diameter, front 30"
Journals 6 1/2" x 12"
Diameter, back 50"
Journals 9" x 14"

WHEEL BASE

Driving 13' 0"
Rigid 13' 0"
Total Engine 33' 10"
Total Engine and Tender 66' 4 1/2"

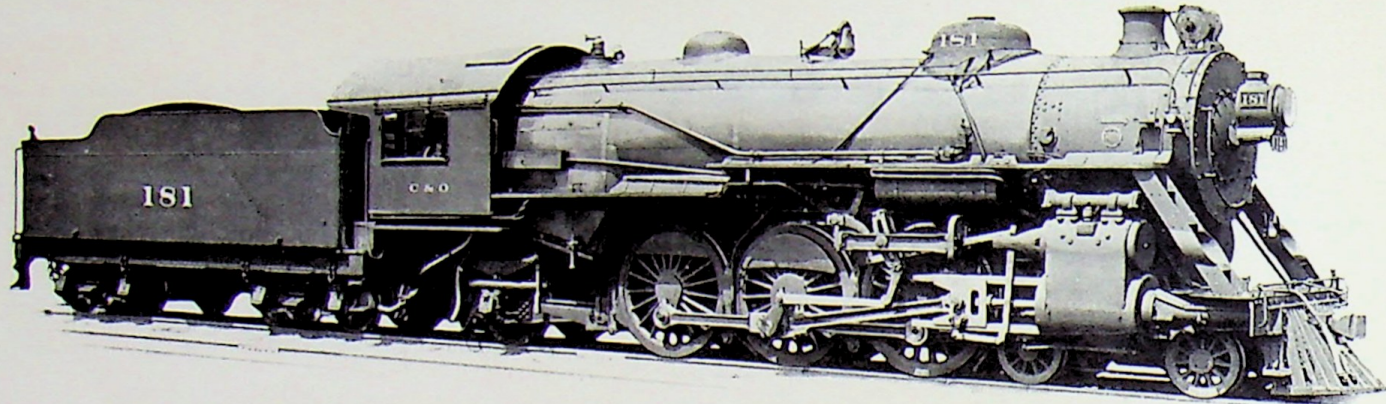
WEIGHT

On Driving Wheels 184,300 lbs.
On Truck, front 48,200 lbs.
" back 49,100 lbs.
Total Engine 281,600 lbs.
Total Engine and Tender,
about 450,000 lbs.

TENDER

Number of Wheels 8
Diameter of Wheels 33"
Journals 6" x 11"
Tank Capacity 9000 gals.
Fuel Capacity 14 tons

THE BALDWIN LOCOMOTIVE WORKS



Chesapeake and Ohio Railway Company

Eight Pacific type locomotives as illustrated above, are in service on the mountain divisions of the Chesapeake and Ohio Railway. These locomotives were designed to haul trains of ten cars, weighing 692 tons, up a grade of sixty feet per mile, thirteen and one-half miles long, at an average speed of twenty-four miles per hour; and they are proving fully capable of meeting these difficult requirements. High starting power is essential in this class of work, and the new locomotives

exert a tractive force of 44,000 pounds, with a ratio of adhesion of 4.08. The equipment includes a superheater, brick-arch and screw reverse mechanism.

This design, with approximately 60,000 pounds on each pair of driving wheels, combines the speed and steaming capacity essential in fast passenger service, with a hauling capacity as great as that developed by many locomotives used in through freight service.

Pacific Type Locomotive

Railway Co's Class F-16
Baldwin Class 12-48-1/4-D, 8

for the

Gauge 4' 8 1/2"

Chesapeake and Ohio Railway Company

GENERAL DIMENSIONS

CYLINDERS

Diameter	27"
Stroke	28"
Valves	Piston, 16" diameter

BOILER

Type	Wagon Top
Diameter	78"
Thickness of Sheets	3/4" and 7/8"
Working Pressure	185 lbs.
Fuel	Soft Coal
Staying	Radial

FIREBOX

Material	Steel
Length	114"
Width	75 1/4"
Depth, front	83 1/2"
" back	69"
Thickness of Sheets	sides, 3/8"
back, 3/8"; crown, 3/8"; tube, 1/2"	

Water Space,	
front, 5"; sides, 4 1/2"; back, 4 1/2"	

TUBES

Material	Steel
Diameter	5 1/2" and 2 1/4"
Thickness	5 1/2", 0.150"
	2 1/4", 0.125"
Number	5 1/2", 36; 2 1/4", 206
Length	20' 6"

HEATING SURFACE

Firebox	220 sq. ft.
Tubes	3535 sq. ft.
Firebrick Tubes	31 sq. ft.
Total	3786 sq. ft.
Superheating Surface	879 sq. ft.
Grate Area	59.6 sq. ft.

DRIVING WHEELS

Diameter, outside	73"
" center	66"
Journals, main	11 1/2" x 22"
" others	10 1/2" x 14"

ENGINE TRUCK WHEELS

Diameter, front	33"
Journals	6" x 12"
Diameter, back	49"
Journals	8" x 14"

WHEEL BASE

Driving	13' 0"
Rigid	13' 0"
Total Engine	34' 1"
Total Engine and Tender	67' 11 1/2"

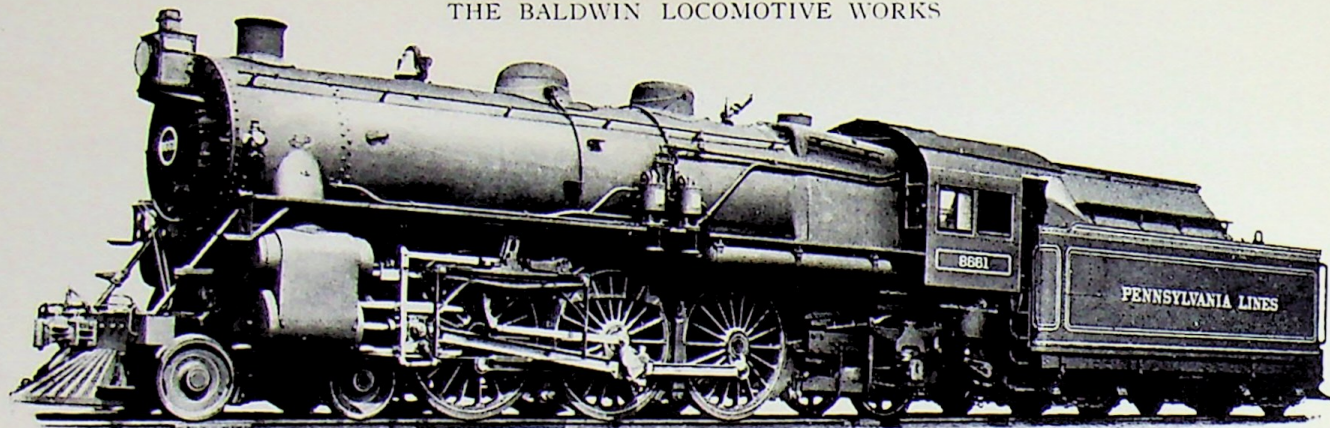
WEIGHT

On Driving Wheels	179,900 lbs.
On Truck, front	51,300 lbs.
" back	50,800 lbs.
Total Engine	282,000 lbs.
Total Engine and Tender	443,000 lbs.

TENDER

Number of Wheels	8
Diameter of Wheels	36"
Journals	6" x 11"
Tank Capacity	8000 gals.
Fuel Capacity	14 tons

THE BALDWIN LOCOMOTIVE WORKS



Pennsylvania Lines

The above illustration represents a fast passenger locomotive used on the Pennsylvania Lines West of Pittsburgh. This engine develops a tractive force of 38,400 pounds, and is equipped with a superheater, brick-arch and mechanical stoker. The wheel diameter is unusually large for a six-coupled locomotive, and these engines are successfully working a class of traffic which was formerly handled by high speed Atlantic type locomotives. Increasing train weights, especially since the advent of steel cars, have necessitated the use of heavier

motive power; hence the development of this type of locomotive.

Thirty of these engines have been built by The Baldwin Locomotive Works, to drawings and specifications furnished by the Railroad Company. The stoker is of the Crawford underfeed type as developed on the Lines West of Pittsburgh.

The engine illustrated above is of peculiar interest, as it is the forty-thousandth locomotive built by The Baldwin Locomotive Works.

Railway Co's Class K-3-S
Baldwin Class 12-46-1/4-D, 156

Pacific Type Locomotive

for the

Gauge 4' 8 1/2"

Pennsylvania Lines

GENERAL DIMENSIONS

CYLINDERS

Diameter	26"
Stroke	26"
Valves	Piston, 16" diameter

BOILER

Type	Belpaire, Straight
Diameter	79 3/4"
Thickness of Sheets	7/8"
Working Pressure	205 lbs.
Fuel	Soft Coal
Staying	Vertical

FIREBOX

Material	Steel
Length	110 3/4"
Width	72"
Depth, front	82 1/8"
" back	62 1/8"
Thickness of Sheets	sides, 3/8"
back, 3/8"; crown, 3/8"; tube, 9/16"	

Water Space,	
front, 4 1/2"; sides, 4 1/2"; back, 4 1/2"	

TUBES

Material	Steel
Diameter	5 1/2" and 2 1/4"
Thickness	5 1/2", 0.148"
	2 1/4", 0.120"
Number	5 1/2", 32; 2 1/4", 202
Length	21' 0"

HEATING SURFACE

Firebox	204 sq. ft.
Tubes	3453 sq. ft.
Firebrick Tubes	23 sq. ft.
Total	3680 sq. ft.
Superheating Surface	845 sq. ft.
Grate Area	55.4 sq. ft.

DRIVING WHEELS

Diameter, outside	80"
" center	72"
Journals	10 1/2" x 15"

ENGINE TRUCK WHEELS

Diameter, front	36"
Journals	6 1/2" x 12"
Diameter, back	56"
Journals	8" x 14"

WHEEL BASE

Driving	13' 10"
Rigid	13' 10"
Total Engine	35' 2 1/2"
Total Engine and Tender	60' 2 1/4"

WEIGHT (Estimated)

On Driving Wheels	189,500 lbs.
On Truck, front	46,100 lbs.
" back	57,600 lbs.
Total Engine	293,200 lbs.
Total Engine and Tender	475,000 lbs.

TENDER

Number of Wheels	8
Diameter of Wheels	36"
Journals	6" x 11"
Tank Capacity	8000 gals.
Fuel Capacity	34,600 lbs.

The Baldwin Locomotive Works

Philadelphia, Pa., U. S. A.

Builders of

Passenger Locomotives

Freight Locomotives

Switching Locomotives

Logging Locomotives

Plantation Locomotives

Locomotives for Rack Railroads

Geared Truck Locomotives

Heavy Locomotives for Special Service

Locomotives for Mills or Furnaces

Electrical Locomotives

Electric Railway Trucks

Mine Locomotives

Oil-Burning Locomotives

Gasoline Locomotives

Compressed-Air Locomotives

Specifications, proposals and full particulars furnished upon application



