

# Specification Card for Locomotive No. 18

Owned by Lake Superior and Ishpeming Railroad Company.  
 Operated by Lake Superior and Ishpeming Railroad Company.

Builder American Locomotive Company  
 Builder's No. of Boiler 46941  
 When built 1910  
 Where built Pittsburgh Works  
 Type of boiler Radial stayed  
 Material of boiler shell sheets Steel  
 Material of rivets Steel  
 Dome, where located Second course  
 Grate area in sq. ft. 49.9  
 Height of lowest reading of gauge glass above crown sheet 4 1/2"  
 Height of lowest gauge cock above crown sheet 4"  
 Water-bar tubes, O. diam. None thickness ---  
 Arch tubes, O. diam. 3" OD thickness 7 BWG  
 Fire tubes, number 152 - 2"; 24 - 5-3/8"  
 " " O. diam. --- length 14'7"

**Safety valves:**

No.	Size.	Make.	Style.
<u>2</u>	<u>3 1/2"</u>	<u>Coale</u>	<u>Muffled</u>

Firebox stay bolts, O. diam. 1" spaced 4.25 4.137  
 Combustion chamber stay bolts, O. diam. None  
 " " " " spaced --- x ---  
 Crown stays, O. diam., top 1" & bottom 1" & 1 1/4"  
 " " spaced 4.86 x 4.135  
 Crown-bar rivets, O. diam., top None bottom None  
 " " " spaced --- x ---  
 Water space at firebox ring, sides 4"  
 back 4" front 4"  
 Width of water space at sides of firebox measured at center line of boiler, front 5 1/2" back 6"

Shell sheets:  
 Front tube 1/2" thick.  
 1st course 3/4" " 68 1/2" I. diam.  
 2d " 3/4" " 70" "  
 3d " None " None "

Mem.: When courses are not cylindrical give inside diameter at each end.

**Firebox:**

Thickness of sheets—  
 Tube 1/2" Crown and Side 3/8"  
 Door 3/8" Combustion chamber None  
 Inside throat (if tube sheet is in two pieces) ---

**External firebox:**

Thickness of sheets—throat 3/4" back head 9/16"  
 Roof --- sides 5/8"  
 31"

Dome inside diam. ---  
 Thickness of sheet 1/2" base 1 1/2" liner 3/4"

Were you furnished with authentic records of the tests of materials used in boiler? Yes

Records on file in the office of the Engr. of tests of the American Locomotive Company show that the lowest tensile strength of the sheets in the shell of this boiler is:

Course	Tensile Strength (pounds per sq. in.)
1st course	<u>55,000</u>
2d " "	<u>55,000</u>
3d " "	<u>None</u>

Is boiler shell circular at all points? Yes

If shell is flattened, state location and amount ---

Are all parts thoroughly stayed? Yes

Are dome and other openings sufficiently reinforced? ---

Is boiler equipped with fusible plugs? None

Make working sketch here or attach drawing of longitudinal and circumferential seams used in shell of boiler, indicating on which courses used, and give calculated efficiency of weakest longitudinal seam.

Firebox fitted with Nicholson Thermic Syphons. The crown stay spacing given applies to the area outside the syphon openings. The syphons are constructed of 3/8" plate and stayed with 1" diameter hollow staybolts and applied to firebox with welded butt joints. Radial stays with 1-1/16" bodies and 1-1/4" ends are applied thru syphon flanges to roof sheet.

Crown stay bodies 13/16" and 1-1/16".

SEE COPY FOR SEAMS ON FILE ENG 24

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The maximum stresses at the allowed/working pressure were found by calculation to be as follows:

Stay bolts at root of thread	6045	lbs. per sq. in.	Round and rectangular braces	6885	lbs. per sq. in.
Stay bolts at reduced section		" " " "	Gusset braces	None	" " " "
Crown stays <del>at root of thread</del>	5355	lbs. per sq. in.	Shearing stress on rivets	5600	" " " "
Crown stays <del>at root of thread</del>		" " " "	Tension on net section of plate in longitudinal seam of		
smallest section, bottom	6475	lbs. per sq. in.	lowest efficiency, pounds per sq. in.	11000	

Dimensions and data taken from locomotive were furnished by American Locomotive Company  
 Data upon which above calculations were made were obtained from drawing No. 137-S-91892, 134-S-40200  
 dated October 20, 1909 furnished by American Locomotive Company, 138-S-40200  
 dated September 7, 1929

There were no changes made in shell of boiler.

Mechanical Engineer.

STATE OF Michigan }  
 COUNTY OF Marquette } ss:

S. A. Chamberlin being duly sworn says that he is the officer who signed the foregoing specification, that he has satisfied himself of the correctness of the drawings and data used, has verified all of the calculations, and has examined the record of present condition of boiler dated October 25th, 1930 and sworn to by inspector [Signature] and believes that the design, construction, and condition of boiler No. 46944 renders it safe for a working pressure of 200 pounds per square inch.

(Name of affiant.)

Subscribed and sworn to before me  
 this 25th day of October, 1930

Notary Public.

Approved: