

— 3 BOILERS THUS —

— WORKING PRESSURE 160 LBS PER SQ INCH —

— SCALE = 1 FOOT —

Bolts 12-09		Calculations		Welded to W Gary way Ship Ht 509	
PLATE	$\frac{P-d}{P} = \frac{6.25-.9375}{6.25} = 85.9\%$	BACK GOTT	$\frac{C \times t^2}{P^2} = \frac{135 \times 16^2}{13 \times 625^2} = 186$		
RIVETS	$\frac{a \times N \times 1.75 \times 85}{P \times t} = \frac{.69 \times 5 \times 1.75 \times 85}{6.25 \times .9375} = 84.5\%$	GIRDERS	$\frac{C \times d^2 \times t}{(L-P) L \times \text{diam of}} = \frac{6600 \times 9.5^2 \times 1.25}{(22.5-.825) 22.5 \times 8} = 181$		
SHELL	$\frac{C \times (t-2) \times \frac{t}{4}}{D} = \frac{20 \times (15-2) \times 85}{135} = 163.7\%$	FURNACES	$\frac{C \times (t-2)}{D} = \frac{1160 \times (7-2)}{36} = 144.4$		
F & B TOPS	$\frac{C \times T^2}{P^2} = \frac{175 \times 17^2}{17.625^2} = 162.9\%$	MAIN STAYS	$\frac{C \times a}{\text{Surf Sup.}} = \frac{9000 \times 5.053}{17.625 \times 16} = 161.2$		
TUBE PLATE	$\frac{F}{T} = \frac{150 \times 19^2}{14.25^2} = 213.4\%$	SCREEN STAYS	$\frac{F}{T} = \frac{9000 \times 2.096}{13.625 \times 8.625} = 160.5$		
BACK TUBE PLATE	$\frac{140 \times 10^2}{9^2} = 172.8\%$	" "	$\frac{8000 \times 1.5}{8.625^2} = 161.3$		
DO TO COMP RULE	$\frac{C \times (D-d) \times t}{W \times D} = \frac{1600 (4.5-2.92) \times 10}{29.25 \times 4.5} = 186.9\%$	STAY TUBES	$\frac{1500 \times 2.24}{9 \times 9} = 204$		
COMB CHAM	$\frac{C \times T^2}{P^2} = \frac{135 \times 9.5^2}{8.625^2} = 163.4\%$	Heating Pipes in 3 Bolts	$3442 \text{ Sq. Ft.}$		

CENTRAL MARINE  
DRAWING OFFICE  
28 SEP 1905  
No. 12250  
ENGINE WORKS, WEST HARTLEY



Mann Boilers

N. Gray & Co

No 509 Vessel

G. M. & N. 509.

160 lbs. N.P.

S. S. Bertholey  
W. H. P. Report No 9854

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