a pass an inspection? Yes, one! The inspector found an air safety valve on a traction engine. The owner did not receive an approval certificate for the boil er until he assured the inspector that a steam safety valve had been installed. What does an air safety valve look like? I don't know. The only one I ever saw was in flight as it sailed through the air when the owner heaved it into the woods.

DATA FOR STATE OF GEORGIA BOILER TEST

NORTH GEORGIA LIVE STEAMERS, INC.

Owner _____

Address _____

_____

_____

Maryland Boiler Number [ ]

Boiler Application

☐ Locomotive [ ] Tractor

☐ Stationary [ ] Marine

Operating pressure _____ psig

Fuel _____

1. Definitions

Operating Pressure – Boiler pressure designed for operation and to which the safety valves are set.

Working Pressure – Boiler pressure based on the code calculations which pressure may be significantly greater than the "Operating Pressure."

2. Boiler Materials and Specifications (when available)

Shell ..... _____

Tube Sheet, Throat Sheet ..... _____

Firebox Wrapper ..... _____

Tubes ..... _____

Stays ..... _____

Welding, brazing, or silver solder alloys ..... _____

3.1 Allowable Material Stress

Carbon Steel:

- Ultimate tensile stress ..... 50,000 psi
- Code factor of safety 4
- Allowable working stress ..... 12,500 psi
- No temperature allowance is required for pressures up to 250 psig.

Copper:

- Ultimate tensile stress ..... 30,000 psi
- Code factor of safety 5

3.1 Allowable Material Stress (continued)

Copper (continued):

- Allowable working stress with temperature allowances:

Room temperature	6,000 psi
80 psig @ 324°F	4,400 psi
90 psig @ 332°F	4,300 psi
100 psig @ 338°F	4,200 psi
110 psig @ 344°F	4,100 psi
120 psig @ 350°F	4,000 psi

area of circles

5/16 .076

3/8 .11

7/16 .147

1/2 .196

3.2 Maximum Allowable Working Pressure (MAWP):

a. Boiler Shell

$$P = \frac{s \times t \times c}{r} \text{ (psig)}$$

P = Maximum Allowable Working Pressure – (psig)
s = Allowable material stress – (psig)
r = Outside shell radius – (inches)
t = Wall thickness – (inches)
c = Constant – 1 seamless tube, 0.8 welded tube

$$P = \frac{(\quad) \times (\quad) \times (\quad)}{(\quad)} = \boxed{\quad} \text{ psig}$$

b. Stayed Surfaces:

$$P = \frac{t^2 \times s \times c}{p^2} \text{ (psig)}$$

P = Stay bolt pitch (larger dimension if not square spacing) – (inches)
c = constant

2.1 – For welded or silver soldered stay bolts.
2.8 – For welded or silver soldered stay bolts with heads

$$P = \frac{(\quad)^2 \times (\quad) \times (\quad)}{(\quad)^2} = \boxed{\quad} \text{ psig}$$

c. Stay Bolts:

$$P = \frac{a \times s}{h \times v} \text{ (psig)}$$

a = Cross sectional area (square inches) of stay bolt, root of thread if threaded
h = Stay bolt spacing (inches) horizontal
v = Stay bolt spacing (inches) vertical

$$P = \frac{(\quad) \times (\quad)}{(\quad) \times (\quad)} = \boxed{\quad} \text{ psig}$$

3.3 Calculated Factor of Safety (CFS):

$$CFS = \frac{\text{MAWP (psig)} \times \text{Code Factor of Safety}}{\text{Max. Operating Pressure (psig)}} = \boxed{\quad}$$