Inspection.

12. The inspection representing the purchaser shall have all reasonable facilities afforded to him by the manufacturer to satisfy him that the finished material is furnished in accordance with these specifications. All tests and inspections shall be made at the place of manufacture, prior to shipment.

STANDARD SPECIFICATIONS FOR STEEL CASTINGS.

Process of Manufacture.

1. Steel for castings may be made by the open-hearth, crucible or Bessemer process. Castings to be annealed or unannealed as specified.

CHEMICAL PROPERTIES.

Ordinary Castings.

2. Ordinary castings, those in which no physical requirements are specified, shall not contain over 0.40 per cent. of carbon, nor over 0.08 per cent. of phosphorus.

Tested Castings.

3. Castings which are subjected to physical test shall not contain over 0.05 per cent. of phosphorus, nor over 0.05 per cent. of sulphur.

PHYSICAL PROPERTIES.

Tensile Tests.

4. Tested castings shall be of three classes:—"hard," "medium," and "soft." The minimum physical qualities required in each class shall be as follows:—

	Hard castings.	Medium castings.	Soft castings.
Tensile strength, pounds per square inch	85,000	70,000	60.000
Yield point, pounds per sq. in.	38,250	31,500	27,000
Elongation, per cent. in two inches	15	18	22
Contraction of area, per cent.	20	25	30
Tensile strength, pounds per sq. inch	85,000	70,000	

Drop Test.

5. A test to destruction may be substituted for the tensile test, in the case of small or unimportant castings, by selecting three castings from a lot. This test shall show the material to be ductile and free from injurious defects, and suitable for the purpose intended. A lot shall consist of all castings from the same melt or blow, annealed in the same furnace charge.

Percussive Test.

6. Large castings are to be suspended and hammered all over. No cracks, flaws, defects, nor weakness shall appear after such treatment.

Bending Test.

7. A specimen one inch by one-half inch (1 inch x ½ inch) shall bend cold around a diameter of one inch (1 inch) without fracture on outside of bent portion, through an angle of 120 degrees for "soft" castings, and 90 degrees for "medium" castings.

TEST PIECES AND METHODS OF TESTING.

Test Specimen for Tensile Test.

8. The standard turned test specimen, one-half inch (½ inch) diameter and two-inch (2 inch) gauged length, shall be used to determine the physical properties specified in paragraph No. 4. It is shown in the following sketch:—

Number and Location of Tensile Specimens.

9. The number of standard test specimens shall depend upon the character and importance of the castings. A test piece shall be cut cold from a coupon to be moulded and cast on some portion of one or more castings from each melt or blow, or from the sink-heads (in case of sufficient size are used). The coupon or sink-head must receive the same treatment as the casting or castings, before the specimen is cut out, and before the coupon or sink-head is removed from the casting.

Test Specimen for Bending.

10. One specimen for bending test one inch by one-half inch (1 inch x ½ inch) shall be cut cold from the coupon or sinkhead of the casting or castings as specified in paragraph No. 9. The bending test may be made by pressure or by blows.

Yield Point.

11. The yield point specified in paragraph No. 4 shall be determined by the careful observation of the drop of the beam or halt in the gauge of the testing machine.

Sample for Chemical Analysis.

12. Turnings from the tensile specimen, drillings from the bending specimen, or drillings from the small test ingot, if preferred by the inspector, shall be used to determine whether or not the steel is within the limits in phosphorus and sulphur specified in paragraphs Nos. 2 and 3.

Finish.

13. Castings shall be true to pattern, free from blemishes, flaws, or shrinkage cracks. Bearing surfaces shall be solid, and no porosity shall be allowed in positions where the resistance and value of the casting for the purpose intended, will be seriously affected thereby.

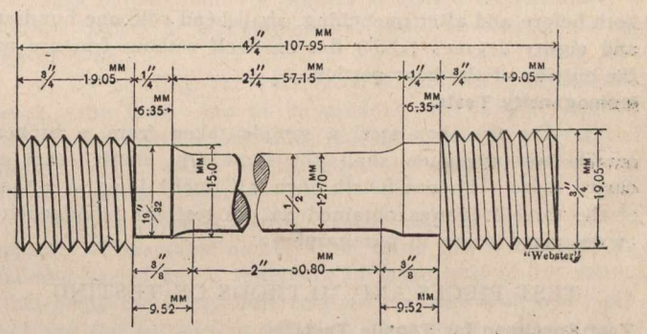
Inspection.

14. The inspector representing the purchaser shall have all reasonable facilities afforded to him by the manufacturer to satisfy him that the finished material is furnished in accordance with these specifications. All tests and inspections shall be made at the place of manufacture prior to shipment.

STANDARD SPECIFICATIONS FOR OPEN-HEARTH BOILER PLATE.

Process of Manufacture.

1. Steel shall be made by the open-hearth process.



Chemical Properties.

2. There shall be three classes of open-hearth boiler plate and rivet steel, namely:—"Flange or boiler steel, fire box steel and extra soft steel," which shall conform to the following limits in chemical composition:—

	Flange or boiler steel, per cent.	Fire box steel, per cent.	Extra soft steel, per cent.
Phosphorus shall not exceed	Acid 0.06 Basic 0.04	Acid 0.04 Basic 0.03	0.04
Sulphur shall not exceed.	0.05	0.04	0.04
Manganese	0.30 to 0.60	0.30 to 0.50	0.30 to 0.50

Boiler Rivet Steel.

3. Steel for boiler rivets shall be of the extra soft class specified in paragraphs Nos. 2 and 4.

PHYSICAL PROPERTIES.

Tensile Tests.

4. The three classes of open-hearth boiler plate and rivet steel, namely; flange or boiler steel, fire box steel and extra soft steel, shall conform to the following physical qualities:—

	Flange or boiler steel.	Fire box steel.	Extra soft steel.
Tensile strength, pounds per square inch	55,000 to 65,000	52,000 to 62,000	45,000 to 55,000
Yield point, in pounds per square inch shall not be less than	½ T. S.	½ T. S.	½ T. S.
Elongation, per cent. in eight inches shall not be less than	25	26	28

Modifications in elongation for thin and thick material.

5. For material less than five-sixteenth inch (5-16 inch), and more than three-fourths inch (¾ inch) in thickness, the