Memorandum

A. Testing of the material.

1.) Cold tensile tests to be made from all the respective materials, from which the tensile strength and elongation at 20°C will be determined. One or more tests will be taken from each Charge, depending upon the various method of manufacturing. From each forged ingot a test will be taken.

2.) Warm tensile tests to be made to determine the elastic limit at those temperatures given in the works' drawings.

3.) Creep tests to be made by Pomp and Enders method. The values determined by this method are guaranteed by Vitkovice Ironworks. The limiting creep stress is the stress which causes, in the test piece, a mean hourly rate of elongation of not more than 0.0015 % of its gauge length between the 25th and 35th hour.

At the wish of Lloyd's Register the tests will be carried out to the 72nd hour, according to Hartfield method. The values obtained at the 24th and 72nd hours are for informative purposes only, and are not binding for Vitkovice.

Creep tests will be carried out on "Lof special" at a temperature of 550°C and on "Lof normal" at ~~4~~ temperetures of 450°C and 475°C. Two tests from each temperature, a total of six tests.

Should a test fail an additional test will be made, should this fail the Charge will be rejected.

The values guaranteed by Vitkovice are considered to be obtained when the mean hourly elongation of the test piece, under stress between the 25th and 35th hours, is not more than 0.0015 % of the gauge length.

4.) Straight tubes to be hydraulically tested to 280 Atm. Welded tubes to be hydraulically tested to 240 Atm.

B. Inspection of the welding.

To determine the quality of the welding, the following tests have been agreed upon:

1.) Cold tensile tests taken transversely across the joint, from "Lof special", "Lof normal" and "St 55" and their combinations, a total of five tests to be taken. The test piece will be machined on both sides. Dimensions of test piece 400 x 35 mm and about 11mm thick.

Suggest .10 in mm

2.) Warm tensile tests, one test taken from "Lof normal" transversely across the joint at a temperature of 475°C. Test piece similar to one above.

3.) Tensile strength to determine quality of welding metal. After the welding has been carried out, a test piece, having a gauge length of 10 x ø, will be taken from the welding metal and tested. These tests will be carried out on "Lof special" and "St 55" material, two tests from each, total four tests.

4.) To determine the elasticity of the weld in comparison to the parent plate, two plates, 400 x 50mm, will be welded together longitudinally and a test taken lengthways to determine the elastic limit. These tests will be carried out on the three respective materials. A total of three tests.

5.) Impact tests to be carried out on the welding from the three respective materials and their combinations. Total five tests. Test taken in way of fusion zone, weld metal and parent plates.

6.) Photomicrographs to be taken from the respective materials and their combinations in way of parent plate remote from weld, fusion zone and centre of weld. Total fifteen Photomicrographs at 100 magnifications.

7.) All the following bend tests are to be taken from the three materials viz: "Lof special" "Lof normal" and "St 55" and their combinations.

a./ Cold bend test bent through angle of 90°. Internal diameter three times plate thickness. Bend test carried out until fracture takes place.

b./ Cold bend test bent through angle of 180°. Internal diameter twice thickness of plate. Carried out as above.

c./ Warm bend test bent through angle of 180°. The test piece will be heated for 20 minutes to 600°C, and the test carried out at 400°C. Internal diameter three times plate thickness.

d./ Tempered bend test bent through engle of 90°. Internal diameter three times plate thickness. The test piece will be heated for 30minutes to 650°C and then quenched in water at temperature of 18°C.

The dimensions of all bend tests = 400 x 35 x 12mm.

8.) The tests carried out by all the men working on the welding of the "Loeffler" boiler will be as follows:
The welders will carry out a horizontal and a vertical welding test from the three respective materials and their combinations. The finished welded plates will be 400 x 200mm. A total of 20 - 30 tests will be carried out. To determine the average knowledge, each of the welders will carry out tests alternately.

Each welded plate will be cut into strips 400 x 35 mm, and these pieces will be used for the welding tests mentioned in paragraph B.

Regarding the bend tests, Vitkovice has the right to carry out the preliminary tests to determine whether the tests, agreed upon in paragraph B section 7, can be carried out satisfactorily with the special materials used. Should the result be negative, Vitkovice can make new suggestions to the Classification Societies.

The method of carrying out the tests will be determined by the Surveyors in conjunction with Vitkovice.

C.) Auxiliary arrangements and other details of "Loeffler" Boiler.

The low pressure fittings will be ordered without tests, and only hydraulically tested on board ship.

Regarding the thickness, the low pressure pipes system will be calculated either by Lloyd's Register or Registro Italiano's formula, and the formula giving the greater thickness used. Material testswill not be carried out. Hydraulic tests, carried out at ship yard, three times working pressure.

The water gauge indicator must conform to the rules of the Classification Societies. The drawing of the water gauge must be approved by the Societies.

Feed pumps will be hydraulically tested to 240 Atm.

The thickness of the desaireator must not be under 6mm. The hydraulic test will be carried out according to the rules of the Classification Societies.

Bolts and flanges will be ordered to the rules of the Classification Societies.(Cold tensile tests)

The valve covers are of cast steel and must be tested to the requirements of the Classification Societies(hammering, drop, tensile and bend tests). The valves will be hydraulically tested to 240 Atm.

The evaporator drum will also be hydraulically tested to 240 Atm.

Superheater tubes to be cold drawn and annealed.

Shell and end plates also flanges of the intermediate superheater, must be tested and inspected by the Classification Societies (tensile and bend tests). Hydraulic test 28 Atm. 14

Should a certain point, regarding the inspection or testing of the boiler parts, not be clear, a suitable solution shall then be agreed upon by the Surveyors of the Classification Societies in conjunction with Vitkovice.

Vitkovice, 20th September 1935