Specifications for Boiler Plates
Rhodesia Railways

Notes to readers

The source documents for this file were held in the National Railways of Zimbabwe Drawing Office in Bulawayo. They were discovered, in March 1998, while I was helping with searching for a complete set of drawings of the 15th Class locomotives after No. 398 had been purchased by a private group in New Zealand for eventual export to that country.

Some of the original documents were duplicated copies, hence the slightly indistinct type in some places. Some were themselves photocopies. These were photocopied (with permission) on to A4 size paper while in the Drawing Office and the photocopies scanned when we were back in New Zealand.

The scanned files have been lightly "Photoshopped" to remove most of the artefacts resulting from the photocopying and scanning processes and to increase the contrast to make them more readable.

Any alterations, amendments or corrections done by hand have all been left in place and this file contains reasonably accurate reproductions of the originals.

There are four different original documents making up this file but, since they are all relevant to steel or copper boiler plates, it was felt desirable to keep them together.

Two are Rhodesian Railways material specifications, one is from South African Railways and Harbours, and one is from a steel supplier.

Alan Bailey
December 2010

R.R. Material Spec 5424/1

Spec. No. RR/CME.2/1961

SPECIFICATION FOR LOCOMOTIVE BOILER INNER FIREBOX STEEL PLATES.

All plates are to comply with the following specification: -

1. Chemical Analysis:

Carbon	-	0.20% max.
Manganese	-	0.30% - 0.80%
Silicon	-	0.20% max.
Sulphur	-	0.04% max.
Phosphorous	-	0.04% max.

2. Physical Properties:

Tensile	-	24.5 to 29 tons/sq.in.
Yield Point	-	55% of Tensile MIN.
Elongation	-	25% on 8".

3. Physical Testing.

(a) The tensile specimens, prepared from annealed material (see para. 5), are to be prepared in accordance with B.S.18, Test Piece 'A', and are to withstand the tests shown in para. 2 above.

(b) Homogeneity Test. The fractures of the tensile test specimen shall be examined for seams and cavities. Any indications of failure to weld up, presence of gas bubbles or impurities, will be reasons for rejection.

(c) The cold bend tests are to be in accordance with B.S. 24 Part 6:1957 as specified for Inner Firebox plates on page 11 of B.S. 24.

4. All plates shall be free of mill scale, rust and general contamination. Each plate is to be subjected to a full area ultrasonic test. The presence of laminations or flaws or or both shall cause the plate to be rejected.

5. All plates are to be thoroughly annealed by the Makers after rolling, and flanged plates are to be stress relieved, by an approved process, to a maximum of 650°C after flanging. All plates shall be descaled.

6. Margins Of Manufacture:

Shall be in accordance with B.S. 24 part 6:1957 paragraph 5 and table 2 on page 9 of the B.S.

7. Identification:

As per B.S. 24 part 6:1957 paragraph 6 and additionally each plate is to be stamped, in ½" letters, with Manufacturers initials, date i.e. month and year e.g. 9/61 and the R.R. Identification No. given on the order for example "RR-3" etc.. The stamping is to be 12" in from each edge at one corner.

2/.....

8. Shipment.

Plates and/or fabricated items being shipped to Rhodesia shall be protected against corrosion by a uniformly applied coat of rust preventing oil or grease and shall, where necessary, be packed in strong skeleton cases which are to be well strutted to prevent damage during shipment.

for CHIEF MECHANICAL ENGINEER.
15/12/61.

MECHANICAL BRANCH,
ENGINEERING DIVISION,
RHODESIA RAILWAYS.
BULAWAYO.

13th December, 1961.

RHODESIA RAILWAYS

MATERIALS SPECIFICATION No. 5424/1 DATE 26th Feb., 1962.

Prepared by:-	Approved by:-	Departmental References:-
C.M.E.	C.M.E.	C.M.E.'s Spec. No. RR/CME.9/1961 C.M.E.'s letter 421/34 of 20/2/62.
Recorded by:- SUPPLIES BRANCH.	This is Sheet 1 of 2 Sheets	The following annexures form part of this specification:- NIL

CODE NUMBER			NOMENCLATURE:-
Class	Group	Series	
54	24	8125 to 8648	Steel, inner firebox, plate.

All plates are to comply with the following specification: -

1. Chemical Analysis:

Carbon	-	0.20% max.
Manganese	-	0.30% - 0.80%
Silicon	-	0.20% max.
Sulphur	-	0.04% max.
Phosphorous	-	0.04% max.

2. Physical Properties:

Tensile	-	24.5 to 29 tons/sq.in.
Yield Point	-	55% of Tensile MIN.
Elongation	-	25% on 8".

3. Physical Testing:

(a) The tensile specimens, prepared from annealed material (see para. 5), are to be prepared in accordance with B.S. 18, Test Piece 'A', and are to withstand the tests shown in para. 2 above.

(b) Homogeneity Test. The fractures of the tensile test specimen shall be examined for seams and cavities. Any indications of failure to weld up, presence of gas bubbles or impurities, will be reasons for rejection.

(c) The cold bend tests are to be in accordance with B.S.24 Part 6:1957 as specified for Inner Firebox plates on page 11 of B.S.24.

4. (a) All plates shall be free of mill scale, rust and general contamination.

(b) Each plate is to be ultrasonically tested strictly in accordance with the Heavy Steel Association's specification for Ultrasonic Testing of Plates dated 1st July 1961.

5. All plates are to be thoroughly annealed by the Makers after rolling and flanged plates are to be stress relieved, by an approved process, to a maximum of 650°C after flanging. All plates shall be descaled.

6. Margins Of Manufacture:

Shall be in accordance with B.S.24 part 6:1957 paragraph 5 and table 2 on page 9 of the B.S.

7. Identification:

As per B.S.24 part 6:1957 paragraph 6 and additionally each plate is to be stamped, in ½" letters, with Manufacturers initials, date i.e. month and year e.g. 9/61 and the R.R. Identification No. given on the order for example "RR-3" etc.. The stamping is to be 12" in from each edge at one corner.

8. Shipment:

~~Plates and/or fabricated items being shipped to Rhodesia~~ shall be protected against corrosion by a uniformly applied coat of rust preventing oil or grease and shall, where necessary, be packed in strong skeleton cases which are to be well strutted to prevent damage during shipment.

All practical precautions against corrosion etc: to be observed and where necessary fabricated items to be packed in strong skeleton

CSS/G.587/2000/10-50 L.E.J.111632

Specification No. CME. 77/1950.
(Revised from Specification No. CME. 77/1938 of 26/9/1938.)

SOUTH AFRICAN RAILWAYS AND HARBOURS.
MECHANICAL DEPARTMENT.

SPECIFICATION

FOR

COPPER AND STEEL PLATES FOR LOCOMOTIVE BOILERS

Steel Plates (for Inner Fireboxes). Symbol No. 10.

These are to be in accordance with the American Society for Testing Materials' Specification No. A. 30 Grade A acid or basic open hearth steel for plates of firebox quality. Each plate is to be plainly stamped with the Symbol No. "10".

Steel Plates, Symbol No. 6.

These are to be in accordance with Specification No. CME.9/1950 or latest issue. Each plate is to be plainly stamped with the Symbol No. "6".

Heat Treatment.

All steel plates Symbol Nos. 6 and 10 above referred to are required for flanging and general boiler work, and they are to be thoroughly annealed after rolling at the works of the manufacturer.

All plates which are flanged or worked locally are to be thoroughly annealed after flanging and sufficient material must be left on each plate to allow one tensile and one bend test to be made so as to ensure that the material after flanging is in accordance with the relative specification.

Copper Plates.

Copper plates for fireboxes are to be to British Standard Specification, Report No. 24, Specification No. 11.

Note.—The latest edition and any modification of the specifications referred to are to be worked to.

GENERAL.

All plates are to be supplied undrilled.

Plates required to be cut or formed to drawings must be in strict accordance therewith, or with such departures as may be directed or approved, in writing, by the Advisory Engineer to meet the requirements of the Administration.

All the copper and steel plates are to be stamped with the makers' name and contract number on one side and the drawing number (if any) on both sides, but not opposite each other.

All copper flanged or plain plates are to be crated in such a manner as to effectively protect them from any possible injury. The weights of plates when crated are not to exceed 10 cwt. per crate except by special permission.

Steel plain plates and steel flanged plates need not be crated.

The Contractors will be required to submit copies of the chemical analyses to the Inspector for transmission to the Advisory Engineer, together with the samples mechanically tested, upon which further chemical analyses may be made. The samples forwarded must be stamped thus:—

S.A.R.—S.A.S.
Contract No.
Inspector's initials or Private Mark.
Date.....

In the event of such further chemical analyses being found satisfactory, the costs will be borne by the Administration, but if the reverse is the case, the Contractors will be called upon to pay them.

421/34 ce M1

RHODESIAN STEEL SALES COMPANY (PVT.) LIMITED

DISTRIBUTORS:
IRON, STEEL AND OTHER PRODUCTS OF
ISCOR WORKS, PRETORIA & VAN DER BIJL PARK
USCO WORKS, VEREENIGING
AMCOR WORKS, NEWCASTLE & VEREENIGING

P.O. BOX 1499
TELEPHONE 60414
TELEGRAMS: "RHOSALES"

6TH FLOOR, BRADLOWS BUILDING
ABERCORN STREET
BULAWAYO

OUR REF.....

30th May, 1962.

Iron Code.

FIRE BOX PLATES FOR RHODESIAN RAILWAYS.

With reference to your enquiry CRH/MJV of 11th instant, we have pleasure in setting out the following information.

Under BS.24 of 1957 the fire box plate is covered by grade 611, but we do not make this grade nor does it conform to the specification submitted, which is very close to fire box plate ASTM.A.30-56 Grade A available at a quality extra of £3 per 2000 lbs. on 3/8" and 5/8" plates. Comparisons between the main characteristics of the specifications for these thicknesses reflect as follows:-

	BS.24	Rhod.Railways 5424/1	Acceptable for ASTM.A.30 56 Grade A.
Carbon	.16% max.	.20% max.	.25% max.
Manganese	-	.30-.80%	.30-.80%
Silicon	-	.20% max	-
Sulphur	.04% max.	.04% max.	.04% max.
Phosphorous	.04% max.	.04% max.	.035% max.
Incidental Copper	-	-	.25% max.
Tensile	23-28 tons	24.5-29 tons	24.6-29 tons
Yield Point	55% of Tensile min.	55% of Tensile = 13 T Min.	13.4 Tons Min.
Elongation	25% on 8"	25% on 8"	25% on 8"

Where we supply plate to BS.24 the testing procedure given under BS.18 is applied. The other grades of BS.24 produced by Iscor are not in accord with the specification from the Rhodesian Railways, and are designed for the following purposes:-

BS.24 - 1942 Part 6 Spec. 18 - Plates for railway rolling stock.

BS.24 - 1956 Part 4 Class A - Steel for forgings which may be case hardened.

BS.24 - 1957 Part 6 Grade 613- Boiler plate (non-flanging quality).

BS.24 - 1957 Part 6 Grade 621- Plates for railways rolling stock (ordinary quality).

In regard to the general requirements under 5424/1, we regret that we cannot undertake:-

.....2/....

30th May, 1962.

1. Ultrasonic testing. ⊗
2. Annealing and stress relieving. ⊗
3. Supply of rust-free plates.
4. Coating of plates with oil or grease.

⊗ Steel P&R is to be advised for local Supply ie Iscor these to be waived in RL Spec SM24/1.

ASTM. A.30 - 56 (Grade A) provides for homogeneity tests, and for marking very nearly the same as that called for in the specification from the Rhodesian Railways.

Silk Cruden for Inter Rail