

SPLICE BARS, STRAIGHT AND BENT

- 1 SCOPE: This specification covers quenched carbon steel rail splice bars for use in railway track.

GENERAL REQUIREMENTS

- 2 Design, Dimensions and Tolerances

The design, dimensions and tolerances shall conform to the pertinent Standard Plan:

Standard Plan

Material

TS-1201	Rail Splice Bar for 100 lb. A.R.A.-A. Rail
TS-1202	Rail Splice Bar for 115 lb. R.E. Rail
TS-1203	Rail Splice Bar for 132 and 136 lb. R.E. Rail
TS-1204	Bent Splice Bars for 100, 115, 132 and 136 lb. Switches and Spring Frogs

- 3 Process

The steel shall be made by the open hearth, basic oxygen or electric furnace process.

- 4 Manufacture

The bars shall be heated to a suitable temperature, punched, slotted and shaped as required, and quenched in a suitable quenching medium to obtain the required mechanical properties. The heat treating process must have the prior approval of the Railway's Chief Engineer.

DETAILED REQUIREMENTS

- 5 Chemical Composition

The steel shall conform to the following requirements as to chemical composition:

Carbon	0.35% min.	0.60% max.
Manganese	-	1.20% max.
Phosphorus	-	0.04° max.
Sulphur	-	0.045% max.

- 6 Heat Analysis

A copy of the mill analysis of each heat of steel from which the bars were manufactured shall be submitted to the Railway's Quality Assurance Inspector. These analyses shall conform to the requirements specified in Section 5.

Note: Vertical bar at left margin indicates location of latest revision.

SPLICE BARS, STRAIGHT AND BENT7 Check Analysis

The Railway may make check analysis of a splice bar from each heat in the lot or shipment. When requested by the Railway's Quality Assurance Inspector, the manufacturer shall supply drillings from a finished splice bar for check analysis. The composition of the material as determined by the check analysis shall conform to the requirements specified in Section 5, subject to A. I. S. I. Standard Permissible Variations for Check Analysis, otherwise the material shall be rejected.

8 Tensile Requirements

The material shall conform to the following tensile requirements:

Tensile Strength, psi (MPa)	100,000 (690) min.
Yield Strength, psi (MPa)	70,000 (485) min.
Elongation in 2" (50 mm) %	12 min.
Reduction in area %	25 min.

9 Test Specimens

- 9.1 The tension test specimen shall be taken from the middle of the head at the centre of a finished quenched splice bar.
- 9.2 The tension test specimen shall be machined to the form and dimensions for a standard 0.500" (12.5 mm) round tension specimen with 2" (50 mm) gauge length in accordance with ASTM A-370.

10 Frequency of Testing

- 10.1 One tension test shall be made from each lot of 1000 bars or less but not less than one from each heat treatment lot in the shipment.
- 10.2 If the results of the tension test do not meet the requirements, 2 additional pieces from the same lot shall be tested and if either one of these fails the heat treatment lot shall be rejected.
- 10.3 The manufacturer may re-treat such a lot but not more than twice and the re-treated lot shall pass the tests as above.

11 Finish

- 11.1 The splice bars shall be smoothly rolled, true to the template and shall accurately fit the rail section for which they are intended.
- 11.2 The splice bars shall be free from injurious defects such as flaws, seams, checks and fins.
- 11.3 Any variation from a straight line in a vertical plane shall be such as will make the bars high in the centre. The camber in either plane shall not exceed 1/32" (0.8 mm) in 24" (610 mm) bars and 1/16" (1.6 mm) in 36" (915 mm) bars.

12 Identification

The name or brand of the manufacturer, the section designation, and the year of manufacture shall be rolled in raised letters and figures on the side of each bar.

SPLICE BARS, STRAIGHT AND BENTQUALITY ASSURANCE13 Application

Material ordered to this specification is subject to inspection with respect to all of the requirements of the specification.

14 Plant Access

The Railway's Quality Assurance Inspector shall have, during working hours, free entry to all parts of the manufacturer's plant used in the manufacture of material ordered to this specification. Inspection and all tests, except check analysis, shall be made at the place of manufacture prior to shipment, unless otherwise specified.

15 Quality Assurance Provisions

It is the manufacturer's responsibility to satisfy the Railway's Quality Assurance Inspector that the splice bars conform to this specification. This may be accomplished by either performing the tests prescribed in this specification or by demonstrating to the Railway's Quality Assurance Inspector that the manufacturing processes and techniques are so controlled that conformity to this specification is assured. The manufacturer shall maintain complete records of his examination and tests which shall be available to the Railway's Quality Assurance Inspector.

The Railway reserves the right to perform any of the tests set forth in the specification where such tests are deemed necessary to assure the splice bars conform to the prescribed requirements.

16 Return of Shipment

Material which does not comply with this specification or material which, notwithstanding tests, inspection or acceptance at any time or location, is found to contain deficiencies, will be subject to rejection and return to the manufacturer. The manufacturer shall be entitled to a joint inspection of defective splice bars at the Railway's premises. The manufacturer shall assume the expenses of handling and transportation in both directions.

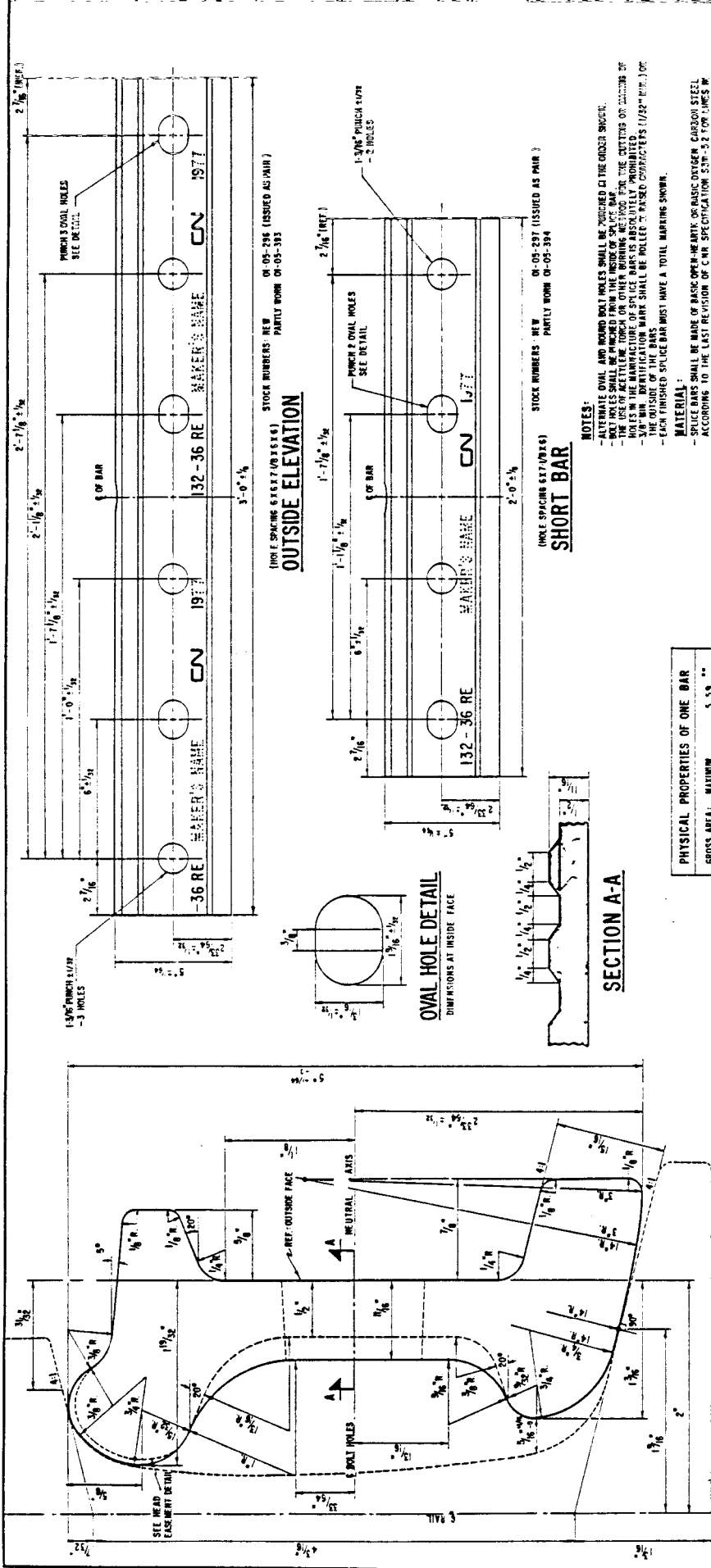
17 Rehearing

Samples tested in accordance with Section 7 which represent rejected material shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the result of the tests, the manufacturer may make claim for a rehearing within that time.

18 Weight

The weight of the finished splice bars shall not vary from the calculated weight by more than 2%.

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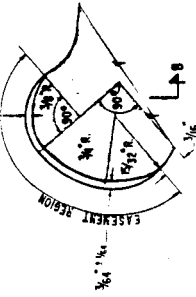


PHYSICAL PROPERTIES OF ONE BAR

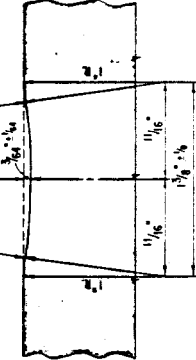
GROSS AREA:	MAXIMUM	5.59	**
	MINIMUM	5.12	**
	AVERAGE	5.356	**
MOMENT OF INERTIA		13.726	IN ⁴
SECTION MODULUS	TOP	5.48	IN ³
	BOTTOM	5.46	IN ³
NEUTRAL AXIS FROM TOP		2.516	IN
	FROM BOTTOM	2.516	IN
NET WEIGHT OF 6 HOLE BAR		33.27	LBS
	4 HOLE BAR	35.51	LBS

END VIEW

TOLEANCE NOTE: THE SPICE BARS MUST FIT PERFECTLY WITH THE HEAD, BASE, AND DRILLINGS OF SAMPLE RAIL FROGS WHICH WILL BE SUPPLIED BY THE RAILWAY COMPANY AT THE MANUFACTURER'S REQUEST.



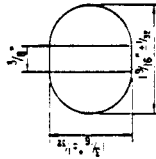
HEAD EASEMENT DETAIL



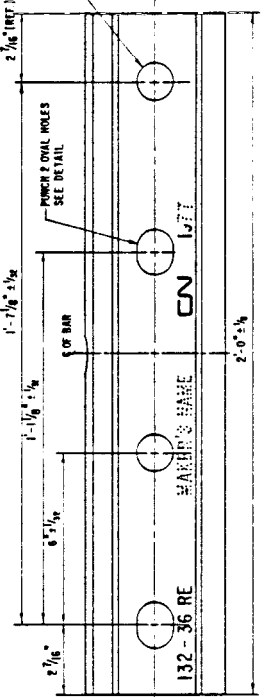
SECTION B-B

SECTION A-A

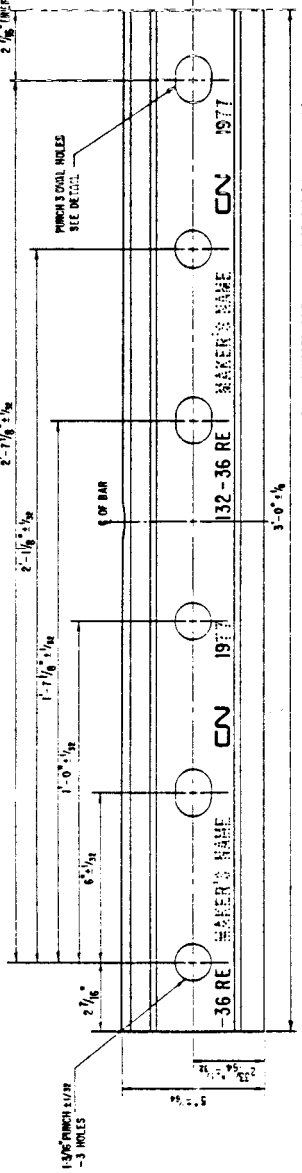
OVAL HOLE DETAIL
DIMENSIONS AT INSIDE FACE



SHORT BAR



OUTSIDE ELEVATION



NOTES:

- ALTERNATE OVAL AND ROUND BOLT HOLES SHALL BE ORDERED IN THE ORDER SHOWN.
- BOLT HOLES SHALL BE PUNCHED FROM THE INSIDE OF SPICE BAR.
- PUNCHING SHALL BE DONE BY THE MANUFACTURER.
- HOLES IN THE MANUFACTURE OF SPICE BARS IS ABSOLUTELY UNLIMITED.
- 3/8" MIN. IDENTIFICATION MARK SHALL BE MOLDED TO RAISED CHARACTERS (1/32" MIN.) ON THE OUTSIDE OF THE BARS.
- EACH FINISHED SPICE BAR MUST HAVE A TOTAL MARKING SHOWN.

MATERIAL:

- SPICE BARS SHALL BE MADE OF BASIC OVEN-HEAT TREATED CARBON STEEL.
- ACCORDING TO THE LAST REVISION OF C.M.R. SPECIFICATION S3W-52 FOR LINES IN CHARGE OR S3W-141 FOR LINES IN UNITED STATES.

THIS DRAWING SUPERSEDES DRAWING NO. JCS-10 AS DATED JANUARY 1964.
 1. REV. 04 SHORT BAR (ISSUED AS PART OF PROJECT 55-5222)
 2. REV. 77 NEW HEAD SHAPE FOR 132 & 136 LB. RAIL ADDED.

No	Date	Revision
1	9/07/73	NEW HEAD SHAPE FOR 132 & 136 LB. RAIL ADDED
2	10/17/77	NEW HEAD SHAPE FOR 132 & 136 LB. RAIL ADDED

Standard / Norme
HEAD FREE RAIL SPICE BAR
 FOR 132 & 136 LB. RAIL

Checked: G.W.M. Approved: [Signature]
 Design: Verification: [Signature]

Office of Chief Engineer
Bureau de l'ingénieur en chef



Date: 30 APR. 1973 Drawing Number: FS-1203
 Dessin numéro: FS-1203

