

ISRAEL RAILWAYS LTD.

INFRASTRUCTURE DIVISION

Technical Specifications
for
Manufacture and Supply of

- **Track Wood Sleepers;**
- **Bearers (Crossing Timbers);**
- **Bridge Timbers (280x280x2800 mm).**

No. E-01-0021.3

July 2020



**TRACK WOOD SLEEPERS; BEARERS (CROSSING TIMBERS);
AND BRIDGE TIMBERS No. E-01-0021.3 JULY 2020**

1. **GENERAL**

- 1.1. The technical specifications described the requirements for the manufacture and supply of Track Wood Sleepers, Bearers (Crossing Timbers) and Bridge Timbers (all together "**Wooden Sleepers**").
- 1.2. The conditions for the manufacture and acceptance shall be in accordance with EN13145, except as stated below.
- 1.3. Wood Species: the Wooden Sleepers shall be made of **European Oak** or **White American Oak** or **Tropical timber**.
- 1.4. The Wooden Sleepers defects and quality features shall be measured/ assessed after seasoning and before preservation treatment and at delivery, as defined in EN13145, section 6.2, table 2 ,and also in the Technical Appendix B and the Technical Appendix C, below.

2. **REFERENCE DOCUMENTS (*)**

EN13145	Railway applications - Track - Wood sleepers and bearers;
UIC 863	Technical specifications for the supply of non-treated track supports wooden sleepers for standard and board gauge track and crossing timbers;
EN 13991	Derivatives from coal pyrolysis. Coal tar based oils. Creosotes. Specifications and test methods;
ISO 9001	Quality management systems – Requirements.

(*) latest edition of the referenced document

3. **DIMENSIONS**

- 3.1. Track Wood Sleepers section: Group 4, in accordance to EN 13145, annex A, table A1.
Track Wood Sleepers length: 2600 [mm].
- 3.2. Bearers section: Group 5 in accordance to EN 13145, annex A, table A2.
Bearers length: 2400 - 5000 [mm], as specified in the Technical Appendix A, below.
- 3.3. Bridge Timber section: 280x280 [mm]
Bridge Timber length: 2800 mm.
- 3.4. The Track Wood Sleepers Form in accordance to EN13145, section 5.1.1.
The Bearers and Bridge Timber Forms in accordance to EN13145 section 5.1.2.



- 3.5. The Wooden Sleepers tolerance shall conform to the tolerances defined in EN13145 section 5.3, and in Technical Appendix B.
4. **PRESERVATION TREATMENT**
The Preservative Treatment procedure shall be submitted.
5. **PRESERVATIVE MATERIAL**
The Preservative Material must comply with EN13991 grade C, or comply with AWWA Standards in regards with to creosote material.
The Material Safety Data Sheet (MSDS) shall be submitted.
6. **SEASONING**
Prior to the Preservation Treatment the Wooden Sleepers shall be completely air seasoned for not less than 8 month. Maximum period between felling and delivery shall be 12 month.
7. **METHOD OF TREATMENT**
The Wooden Sleepers are to be impregnated with Pressure process to match hazard class 4 preservatives in accordance with EN13145, section 7.2.2.
8. **PENETRATION**
Treated Wooden Sleepers shall meet the requirements of penetration class 8 (P8: full sapwood penetration), according EN13145 section 7.2.3.
9. **RETENTION**
The Wooden Sleepers minimum retention requirement shall be equal to the critical value for hazard class 4 of the preservative used, in accordance with EN13145, section 7.2.4.
10. **QUALITY CONTROL AND ASSURANCE PROGRAM**
- 10.1. The Quality Management system certificate(s), of one or more of the following certificates: ISO9001 certificate and/or WAI certificate and/or AWWA certificate and/or equivalent quality management certificate, shall be submitted.
- 10.2. A comprehensive quality control and assurance program, which will be used during the manufacturing, shall be submitted.
- 10.3. The manufacturer shall submit certificates to the seasoning and impregnation of the Wooden Sleepers (method, quantities of protective materials, etc.).



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- 10.4. The ISR technical team and/or an inspection body appointed by the ISR shall have the privilege to inspect the manufacture processes, and its compliance with the requirements of EN13145, and this technical specifications.
11. **MARKING & PACKING**
- 11.1. Each Wooden Sleeper shall bear an identification mark of the producer.
- 11.2. Each Wooden Sleeper shall be protected and immunized against crack by gang nails on both end.
- 11.3. The Bearers shall be marked by a nail that shows their length.
- 11.4. Every delivery of Wooden Bearers shall be accompanied by documentation in accordance with EN13145 paragraph 9.
- 11.5. The Wooden Sleepers shall be bundled as follow:
- 11.5.1. Each bundle must contain 20 wooden sleepers (arrange in horizontal rows of 5 sleepers).
- 11.5.2. Each bundle of Wooden Sleepers shall be laid down on wood beams, to enable the forklift operator to pick the bundles easily without damage the Wooden Sleepers.
- 11.5.3. Each bundle of Wooden Sleepers at the length 2,300-3,400 [mm] shall be tied with steel bands 3/4" wide in three places, one band in the middle and the other two bands 50 [cm] from each side.
- 11.5.4. Each bundle of Wooden Sleepers at the length greater than 3,400 [mm] shall be tied with steel bands 3/4" wide in five places, one band in the middle, two bands 50 [cm] from each side and two bands each one at the middle between the middle band and 50 [cm] band.
12. **LIST OF DOCUMENTS TO BE SUBMITTED WITH BIDDER'S PROPOSAL**
- 12.1. The Quality Management system certificate(s): ISO9001 certificate and/or WAI certificate and/or AWPA certificate and/or equivalent quality management certificate).
- 12.2. A comprehensive quality control and assurance program, including the manufacturing and preservative process procedure, including cutting seasoning, storing penetration, retention and impregnation method and procedure, etc.
- 12.3. The Material Safety Data Sheet (MSDS).
- 12.4. Wooden Bearers storage instructions.



13. **LIST OF DOCUMENTS TO BE SUBMITTED WITH EVERY DELIVERED ORDER**

13.1. Every delivery of Wooden Sleepers for which compliance with this Technical Specifications is claimed shall be accompanied by documentation to give at least the following information:

- Sleepers, Bearers, Bridge Timber dimensions, quantities and capacities;
- Wood species;
- Reference to the compliance Standards (wood and preservation ;
- Wood origin;
- Wood treatment;
- Seasoning;
- Name of preservative;
- penetration class 8;
- Retention;
- Year of preservation.

13.2. The Material Safety Data Sheet (MSDS) shall be submitted.

14. **ACCEPTANCE CHECKS**

14.1. Each delivered order shall be checked:

14.1.1. The submitted documents with each order (described in section 13 above), shall be checked.

14.1.2. The Wooden Sleepers shall be visually checked to ensure its compliance with the requirements of Technical Appendix B, and Technical Appendix C.

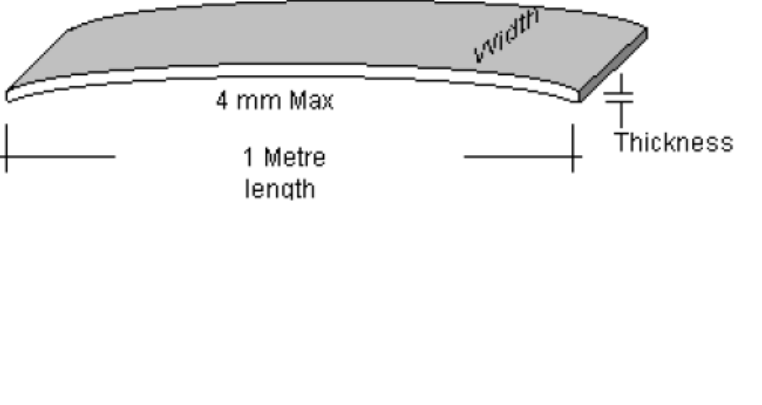
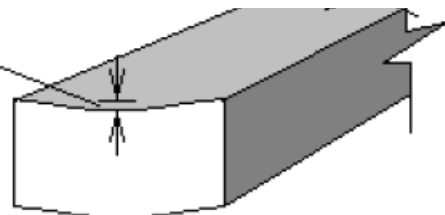
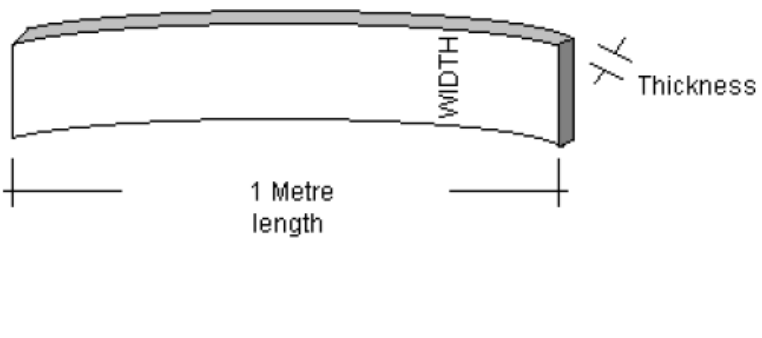
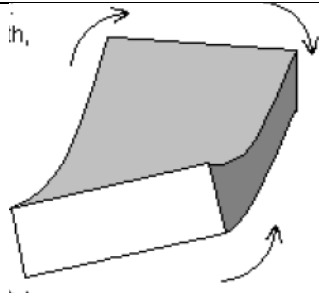


TECHNICAL APPENDIX A – SPECIFIED BEARERS LENGTH

Israel Railways turnouts contain bearers with the following lengths:

- 2400 [mm];
- 2800 [mm];
- 3200 [mm];
- 3400 [mm];
- 3800 [mm];
- 4100 [mm];
- 4300 [mm];
- 4400 [mm];
- 4700 [mm];
- 4900 [mm];
- 5000 [mm].

**TECHNICAL APPENDIX B – STRAIGHTNESS, SURFACE FLATNESS
AND TWIST TOLERANCES**

<p>BOW</p>		<p>Permitted provided that all chairing areas are co-planer but limited to: Max. 0.6% of the total length for Sleepers; Max. 0.2% of the total length for Bearers</p>
<p>CUP</p>		<p>Not Permitted</p>
<p>SPRING</p>		<p><u>Tropical Timber:</u> Max. 6 [mm] for Sleepers; Max. 2 [mm/m] for Bearers <u>European Oak:</u> Max. 2% of the length of Sleepers; Max. 1% of the length of Bearers</p>
<p>TWIST</p>		<p>Max. 0.4% of the total length</p>



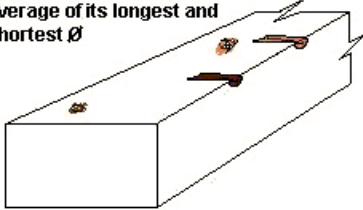
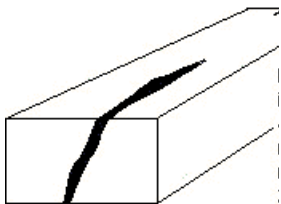
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TECHNICAL APPENDIX C – MAXIMUM DEFECTS PERMITTED

<p>SAPWOOD</p>		<p><u>Tropical Timber</u>: Permitted when sound, with a maximum of 50% of the nominal width except in the chairing area of the sleepers or 25% nominal width of the whole length of the upper surface of the bearers <u>European Oak</u>: Permitted when sound</p>
<p>INCLUDED SAPWOOD</p>		<p>Not Permitted</p>
<p>RED HEART</p>		<p>Shall be dense and free from defects and fungi and in line with the size on the left</p>
<p>GRAIN</p>		<p>Shall be straight. Maximum deviation from longitudinal axis 1 in 10 when measured a length of 600 [mm]</p>
<p>GREY AND PURPLE HEART</p>		<p>NOT PERMITTED</p>
<p>WANE (or loss of corner(s))</p>		<p>Max wane in rail seat area is 30 [mm], if on both edge, or 50 [mm] on one edge. If wane exists on last 400 [mm] from an end then wane can be 45 [mm] on both or 75 [mm] on one edge.</p>

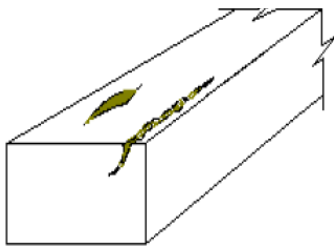



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ROT		Not permitted
SOUND KNOT	 <p>average of its longest and shortest \varnothing</p>	<p><u>European oak</u>: permitted when intergrown <u>Tropical timber</u>: permitted when intergrown with a diameter not exceeding 25% of the width of the face in which it appears, but not in the charring area</p>
DEAD KNOT LOOSE KNOT		Permitted outside the charring area with maximum diameter of 20% of the width of the face in which it appears. Drainage of water shall be ensured
UN SOUND KNOT		Not permitted in excess of 10 [mm] diameter
INDENT		<p><u>European Oak</u>: Permitted if the cross-section of the sleeper is not reduced by more than 1/15th; Drainage shall be ensured. Not permitted in the charring area and in the area located vertically underneath</p>
BARK POCKET		Permitted in bearers and outside the charring area of sleepers on one face only and limited to 150 [mm] in length
SPLIT		<p><u>European Oak</u>: Shall not exceed 250 [mm] of the ends <u>Tropical Timber</u>: Shall not exceed 200 [mm] of the ends</p>
FROST CRACKS		Not permitted
HEART SHAKE		Permitted if they do not reach the upper surface of the wood



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RING SHAKE		Only permitted on one end when the diameter of the annual ring in which it occurs does not exceed 50 [mm]
TIGHT GUM VEINS		Aggregate length on any face not exceeding one half of the length of the piece
LOOSE GUM VEINS		Not extending from face to face, width not exceeding 3 [mm], and length not exceeding one-half of the length of the piece
RESIN POCKET		Up to 150 [mm] long x 12 [mm] wide measured radially, not to be in the charring area
BORE HOLE		Permitted when the mechanical properties are not affected
HEARTWOOD CENTER/ PITH		<u>Tropical Timber</u> : Not permitted
EDGE GRAIN		<u>Tropical Timber</u> : Not permitted