

Reasoned document on Final Draft Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19- 2021

| Clause no. of uploaded specification | 3.4.1(i) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|--------|------------|--------|----|--------|-----|----|--------|-------|----|------|--------|----|---------|--------|----|---------|------|----|------------------|--------|----|-------------------|------|----|---------------------|-------|
| Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19-2020 | <p>52 Kg & above Rail Sections :</p> <p>(i) The portion of 52 Kg and above rail sections shall be packed in bags of different colour as per Rail Grades and combination of Rail grades. The colour of bags containing portions shall be as per table below:</p> <table border="1" data-bbox="949 536 1583 1198"> <thead> <tr> <th>S.No.</th> <th>Rail grade</th> <th>Colour</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>72 UTS</td> <td>Red</td> </tr> <tr> <td>2.</td> <td>90 UTS</td> <td>Green</td> </tr> <tr> <td>3.</td> <td>R260</td> <td>Violet</td> </tr> <tr> <td>4.</td> <td>1080 HH</td> <td>Yellow</td> </tr> <tr> <td>5.</td> <td>1175 HT</td> <td>Blue</td> </tr> <tr> <td>6.</td> <td>R260 with 90 UTS</td> <td>Orange</td> </tr> <tr> <td>7.</td> <td>R260 with 1175 HT</td> <td>Pink</td> </tr> <tr> <td>8.</td> <td>1175 HT with 90 UTS</td> <td>Brown</td> </tr> </tbody> </table> | S.No. | Rail grade | Colour | 1. | 72 UTS | Red | 2. | 90 UTS | Green | 3. | R260 | Violet | 4. | 1080 HH | Yellow | 5. | 1175 HT | Blue | 6. | R260 with 90 UTS | Orange | 7. | R260 with 1175 HT | Pink | 8. | 1175 HT with 90 UTS | Brown |
| S.No. | Rail grade | Colour | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. | 72 UTS | Red | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. | 90 UTS | Green | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. | R260 | Violet | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. | 1080 HH | Yellow | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. | 1175 HT | Blue | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. | R260 with 90 UTS | Orange | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. | R260 with 1175 HT | Pink | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. | 1175 HT with 90 UTS | Brown | | | | | | | | | | | | | | | | | | | | | | | | | | |
| QA Civil Dte Comment | No Comment | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chakradhar Industries LLP Comment | After many telephonic reminders, firm has not submitted any comments. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M/s ITC Co. Ltd. Comment | No Comment | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | |
|--|--|
| M/s Oberoi Thermit Pvt. Ltd. Comment | No Comment |
| M/s Ora India Pvt. Ltd Comment | No Comment |
| M/s Railtech Pvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |
| M/s Raybon Metal Pvt. Ltd. Comment | No Comment |
| M/s Sagar Infra Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering Works Comment | We are agree with the changes of IRS T-19-2020 |
| Thermit Portion Plant (TPP) Comment | After many telephonic reminders, TPP has not submitted any comments. |
| M&C Dte RDSO comment | No Comment |
| Track Design Dte RDSO Remarks | Different colour bag for different grade of portion is specified for easy identification of different grade of portion in the field. |
| Modified final draft specification after incorporating accepted comments. | No change. |

| Clause no. of uploaded specification | 4.4.2 | | | | | | | | | | | | | | | | |
|--|--|-------------|-----------|-------------------------|--------------------|--------------|-------------|-------------|-----------|-------------------------|--------------------|--------------------------------|------|------------|---------|---------|----------|
| Indian Railway Standard Specification for Fusion Welding of Rails By Aluminothermic Process Serial No. IRST-19-2020 | <p>Hardness test Brinell hardness test shall be carried out at the welded zone, heat affected zones and parent metal of the rails in accordance with IS: 1500, "Method for Brinell Hardness test for steel". The test shall be done on the top surface of the head of the test weld with a ball of 10 mm Dia. and a test load of 3000 kg maintained for 10 secs. The hardness values of different rail chemistry on rail running surface of unaffected parent rail as per testing procedure and provisions specified in IRS/T-12-2009 are given in Table 1A for reference –</p> <p style="text-align: center;"><u>Table - 1A</u></p> <table border="1" data-bbox="781 517 1973 1008"> <thead> <tr> <th data-bbox="786 520 956 699">Type of rail</th> <th data-bbox="960 520 1095 699">72 UTS rail</th> <th data-bbox="1099 520 1234 699">90 UTS rail</th> <th data-bbox="1238 520 1440 699">R260 rail</th> <th data-bbox="1444 520 1695 699">1080 Head Hardened rail</th> <th data-bbox="1700 520 1968 699">1175 HT grade rail</th> </tr> </thead> <tbody> <tr> <td data-bbox="786 702 956 1005">Running Surface Hardness (BHN)</td> <td data-bbox="960 702 1095 1005">229*</td> <td data-bbox="1099 702 1234 1005">Min 260</td> <td data-bbox="1238 702 1440 1005">260-300</td> <td data-bbox="1444 702 1695 1005">340-390</td> <td data-bbox="1700 702 1968 1005">350 -390</td> </tr> </tbody> </table> <p style="text-align: center;">* For 72 UTS rail, average hardness (BHN) is 229</p> | | | | | Type of rail | 72 UTS rail | 90 UTS rail | R260 rail | 1080 Head Hardened rail | 1175 HT grade rail | Running Surface Hardness (BHN) | 229* | Min 260 | 260-300 | 340-390 | 350 -390 |
| Type of rail | 72 UTS rail | 90 UTS rail | R260 rail | 1080 Head Hardened rail | 1175 HT grade rail | | | | | | | | | | | | |
| Running Surface Hardness (BHN) | 229* | Min 260 | 260-300 | 340-390 | 350 -390 | | | | | | | | | | | | |

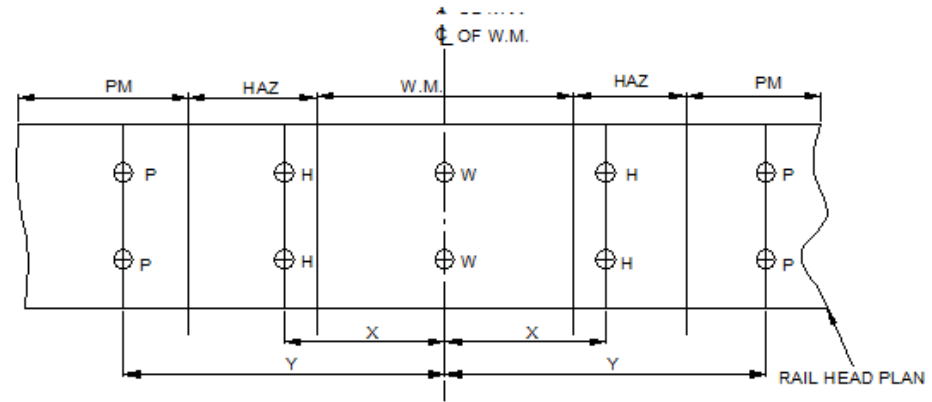


Fig.1

The average hardness number (of two readings) determined for the weld metal (WM), heat affected zone (HAZ) and parent metal (PM) at location shown as 'W' 'H' & 'P' respectively in fig. 1 shall be as per table – 1B given below:

(i) For 25mm gap SKV welding & for any preheating device used.

(a) For 52 Kg Section

X = 40 mm

Y = 100 mm

(b) For 60 Kg / 60 E1 Section

X = 45 mm

Y = 100 mm

(ii) For 50mm gap combination joint welding & for any preheating device used

X = 60 mm

Y = 120 mm

(iii) For ~~For~~ 75 mm wide gap welding & for any preheating device used

X = 80 mm

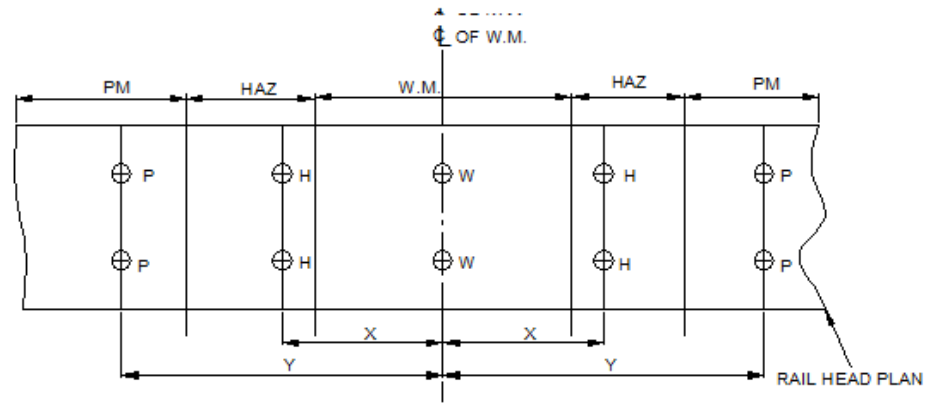
Y = 150 mm

Table 1B

| S.No. | Rail Section/ Grade | Hardness BHN | |
|-------|--|--------------------------------------|---|
| | | Weld Metal (W) (Weld centre-line) | Heat affected zone(H) (at locations shown in Fig. 1 above) |
| 1. | 72 UTS rail of all sections with normal & wide gap | 229 + 20 - 0 | ± 20 of actual parent metal hardness (location 'P') |
| 2. | 90 UTS (880 grade) rails of all sections with normal & wide gap | 265 + 30 - 0 | +30 to -10 of actual parent metal Hardness (Location 'P') |
| 3. | 52 kg (90 UTS) Vs 90R (72 UTS) combination joint with 50mm gap | 265 + 30 - 0 | +30 to -10 of actual parent metal Hardness (Location 'P') |
| 4. | 60 kg (90 UTS) Vs 52kg (90 UTS) combination joints with 50mm gap | 265 + 30 - 0 | +30 to -10 of actual parent metal Hardness (Location 'P') |
| 5. | 60kg, 1080 H.H. rail, | 321 (min.) | Not less than [actual parent metal hardness (Location 'P') - 100] BHN |
| 6. | 60 kg / 60 E1, R260 grade rail | 265 + 30 - 0 | +30 to -10 of actual parent metal hardness (location 'P') |
| 7. | 60 kg / 60 E1, 1175 HT grade rail | 350±20 | Not less than [Actual parent metal hardness (location 'P')- 100] BHN |

| | |
|--|--|
| | <p>Note: For Combination Joint of 60kg (R260) Vs 52kg (90UTS) rail with 50mm gap or Joint of 60kg (R260) Vs 60kg (90UTS) rail with 25mm nominal gap, Hardness values corresponding to R260 grade rail as specified above shall be considered.</p> <p>Similarly, for AT welding Joints of 60kg (90UTS) Vs 60kg/60E1 (1175 HT grade) rails and 60kg/60E1 (R260) Vs 60kg/60E1 (1175 HT grade) rails, with 25 mm Nominal gap, Hardness values corresponding to 60kg/60E1 (1175 HT grade) rail as specified above shall be considered.</p> |
| QA Civil Dte Comment | No Comment |
| Chakradhar Industries LLP Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s ITC Co. Ltd. Comment | No Comment |
| M/s Oberoi ThermitPvt. Ltd. Comment | No Comment |
| M/s Ora India Pvt. Ltd Comment | No Comment |
| M/s RailtechPvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |
| M/s Raybon Metal Pvt. Ltd. Comment | No Comment |
| M/s Sagar Infra Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering Works Comment | We are agree with the changes of IRS T-19-2020 |
| Thermit Portion Plant (TPP) Comment | After many telephonic reminders, TPP has not submitted any comments. |
| M&C Dte RDSO comment | <p>Agreed.</p> <p>Rail used for AT welding shall be confirming to IRST-12-2009. Certificate regarding parent metal hardness shall be provided by AT weld portion manufacturer firms at the time of approval of AT welding technique and whenever required by RDSO.”</p> |

| Track Design Dte RDSO Remarks | After getting comments of M&C Dte, modified para has been added. | | | | | | | | | | | | |
|--|--|---------------------|--------------------|--------------------------------|---------------------------|--------------------------------|---------------------------|--------------------------------|------|------------|---------|---------|----------|
| Modified final draft specification after incorporating accepted comments. | <p>Hardness test Brinell hardness test shall be carried out at the welded zone, heat affected zones and parent metal of the rails in accordance with IS: 1500, "Method for Brinell Hardness test for steel". The test shall be done on the top surface of the head of the test weld with a ball of 10 mm Dia. and a test load of 3000 kg maintained for 10 secs. The hardness values of different rail chemistry on rail running surface of unaffected parent rail as per testing procedure and provisions specified in IRS/T-12-2009 are given in Table 1A for reference –</p> <p style="text-align: center;"><u>Table - 1A</u></p> <table border="1" data-bbox="779 555 1973 1046"> <thead> <tr> <th data-bbox="779 555 956 738">Type of rail</th> <th data-bbox="960 555 1093 738">72 UTS rail</th> <th data-bbox="1097 555 1229 738">90 UTS rail</th> <th data-bbox="1234 555 1440 738">R260 rail</th> <th data-bbox="1444 555 1695 738">1080 Head Hardened rail</th> <th data-bbox="1700 555 1973 738">1175 HT grade rail</th> </tr> </thead> <tbody> <tr> <td data-bbox="779 742 956 1046">Running Surface Hardness (BHN)</td> <td data-bbox="960 742 1093 1046">229*</td> <td data-bbox="1097 742 1229 1046">Min 260</td> <td data-bbox="1234 742 1440 1046">260-300</td> <td data-bbox="1444 742 1695 1046">340-390</td> <td data-bbox="1700 742 1973 1046">350 -390</td> </tr> </tbody> </table> <p style="text-align: center;">* For 72 UTS rail, average hardness (BHN) is 229</p> | Type of rail | 72 UTS rail | 90 UTS rail | R260 rail | 1080 Head Hardened rail | 1175 HT grade rail | Running Surface Hardness (BHN) | 229* | Min 260 | 260-300 | 340-390 | 350 -390 |
| Type of rail | 72 UTS rail | 90 UTS rail | R260 rail | 1080 Head Hardened rail | 1175 HT grade rail | | | | | | | | |
| Running Surface Hardness (BHN) | 229* | Min 260 | 260-300 | 340-390 | 350 -390 | | | | | | | | |



The average hardness number (of two readings) determined for the weld metal (WM), heat affected zone (HAZ) and parent metal (PM) at location shown as 'W' 'H' & 'P' respectively in fig. 1 shall be as per table – 1B given below:

(i) For 25mm gap SKV welding & for any preheating device used.

(a) For 52 Kg Section

X = 40 mm

Y = 100 mm

(b) For 60 Kg / 60 E1 Section

X = 45 mm

Y = 100 mm

(ii) For 50mm gap combination joint welding & for any preheating device used

X = 60 mm

Y = 120 mm

(iii) For ~~For~~ 75 mm wide gap welding & for any preheating device used

X = 80 mm

Y = 150 mm

Table 1B

| S.No. | Rail Section/ Grade | Hardness BHN | |
|-------|--|--------------------------------------|---|
| | | Weld Metal (W) (Weld centre-line) | Heat affected zone(H) (at locations shown in Fig. 1 above) |
| 1. | 72 UTS rail of all sections with normal & wide gap | 229 + 20 - 0 | + 20 of actual parent metal hardness (location 'P') |
| 2. | 90 UTS (880 grade) rails of all sections with normal & wide gap | 265 + 30 - 0 | +30 to -10 of actual parent metal Hardness (Location 'P') |
| 3. | 52 kg (90 UTS) Vs 90R (72 UTS) combination joint with 50mm gap | 265 + 30 - 0 | +30 to -10 of actual parent metal Hardness (Location 'P') |
| 4. | 60 kg (90 UTS) Vs 52kg (90 UTS) combination joints with 50mm gap | 265 + 30 - 0 | +30 to -10 of actual parent metal Hardness (Location 'P') |
| 5. | 60kg, 1080 H.H. rail, | 321 (min.) | Not less than [actual parent metal hardness (Location 'P') - 100] BHN |
| 6. | 60 kg / 60 E1, R260 grade rail | 265 + 30 - 0 | +30 to -10 of actual parent metal hardness (location 'P') |
| 7. | 60 kg / 60 E1, 1175 HT grade rail | 350±20 | Not less than [Actual parent metal hardness (location 'P')- 100] BHN |

Note: For Combination Joint of 60kg (R260) Vs 52kg (90UTS) rail with 50mm gap or Joint of 60kg (R260) Vs 60kg (90UTS) rail with 25mm nominal gap, Hardness values corresponding to

| | |
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| | <p>R260 grade rail as specified above shall be considered.</p> <p>Similarly, for AT welding Joints of 60kg (90UTS) Vs 60kg/60E1 (1175 HT grade) rails and 60kg/60E1 (R260) Vs 60kg/60E1 (1175 HT grade) rails, with 25 mm Nominal gap, Hardness values corresponding to 60kg/60E1 (1175 HT grade) rail as specified above shall be considered.</p> <p>Rail used for AT welding shall be confirming to IRST-12-2009. Certificate regarding parent metal hardness shall be provided by AT weld portion manufacturer firms at the time of approval of AT welding technique and whenever required by RDSO.</p> |
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|---|---|--|--------------|--|--|
| Clause no. of uploaded specification | 4.4.3.1 | | | | |
| Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19-2020 | <p>The test weld shall be supported on cylindrical or semi cylindrical supports having a distance of one meter between them from centre to centre. The weld shall be at the centre of the span and loaded in such manner that the foot of the rail is in tension. The diameter of mandrel and the supports shall be between 30 to 50mm. The load shall be gradually increased (rate of loading shall not exceed 2.5 t/sec) till rupture occurs. The test weld shall withstand minimum transverse breaking load as indicated in column 4 of Table-2. The deflection at center at the actual transverse breaking load shall not be less than that specified in column 5 of Table-2.</p> | | | | |
| | <u>Table – 2</u> | | | | |
| | S. No. | Rail type | Rail Section | Min. transverse breaking load in tones | Min. deflection in mm at the centre at the actual transverse breaking load |
| | 1. | 2. | 3. | 4. | 5. |
| | A. | 72 UTS to IRS T-12 for normal gap welding & wide gap (75 mm) welding | 60R 75R | 50 55 | 15 15 |

| | | | | |
|----|---|---------------------------------|-------|----|
| | | 90R | 65 | 15 |
| | | 52Kg | 85 | 18 |
| | | 60 Kg | 95 | 18 |
| B. | 90 UTS to IRS T-12 for normal & wide gap(75mm) welding | 75R | 60 | 15 |
| | | 90R | 80 | 15 |
| | | 52kg | 90 | 15 |
| | | 60 kg | 115 | 15 |
| C. | Combination joint (50mm gap) | *52kg (90 UTS)/ 90R (72 UTS) | 70 | 15 |
| | | 60kg (90 UTS)/ 52kg (90 UTS) | 90 | 15 |
| D. | 1080 Head Hardened Rails to IRS T-12 for normal gap welding | 60kg | 115 | 12 |
| E. | 60 kg / 60 E1, R260 grade rail for Normal & wide gap (75mm) welding | 60kg / 60 E1 | 122.5 | 15 |
| H. | 60 kg / 60 E1, 1175 HT grade rail or Normal & wide gap (75mm) welding | 60kg / 60 E1 | 122.5 | 12 |

*** 90UTS portion shall be used in 52Kg/90R combination joints.**

Note: For Combination Joint of 60kg (R260) Vs 52kg (90UTS) rails with 50mm gap –transverse breaking load and min. deflection values corresponding 52kg (90UTS) joint and for Joint of 60kg (R260) Vs 60kg (90UTS) rails with 25mm nominal gap - transverse breaking load and min. deflection values corresponding to 60kg/60E1, R260 grade rail as specified above shall be considered.

Similarly, for AT welding Joints of 60kg (90UTS) Vs 60kg/60E1 (1175 HT grade) rails and

| | |
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| | 60kg/60E1 (R260) Vs 60kg/60E1 (1175 HT grade) rails, with 25 mm Nominal gap, transverse breaking load and min. deflection values corresponding to 60kg/60E1, 1175 HT grade rail as specified above shall be considered. |
| QA Civil Dte Comment | No Comment |
| Chakradhar Industries LLP Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s ITC Co. Ltd. | No Comment |
| M/s Oberoi ThermitPvt. Ltd. Comment | No Comment |
| M/s Ora India Pvt. Ltd Comment | No Comment |
| M/s RailtechPvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |
| M/s Raybon Metal Pvt. Ltd. Comment | No Comment |
| M/s Sagar Infra Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering Works Comment | We are agree with the changes of IRS T-19-2020 |
| Thermit Portion Plant (TPP) Comment | After many telephonic reminders, TPP has not submitted any comments. |
| M&C Dte RDSO comment | Agreed |
| Track Design Dte RDSO Remarks | After getting no comments from all stack holders, modified para has been accepted. |
| Modified final draft specification after incorporating accepted comments. | No change |

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|---|--|-------------------|-------------------|---------------|---------------|---------------|-------------------|-------------------|-------------------|---------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Clause no. of uploaded specification | 4.5 | | | | | | | | | | | | | | | |
| Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19-2020 | Weld Metal Chemistry Test: Full chemical analysis is to be conducted on the rail weld running surface at 10mm away from the weld transverse axis. The chemical composition of the weld so determined shall conform to the following: | | | | | | | | | | | | | | | |
| | Grade of rail | C % | Mn % | +Si % | S % | P % | V %* | Mo %* | Al% | Cr % | Cu % | Ni % | Sn % | Sb % | Ti % | Nb % |
| | 90UTS/ R260, 1080 HH | 0.45 - 0.70 | 0.80 - 1.30 | 0.50 (max) | 0.05 (max) | 0.05 (max) | 0.10 - 0.15 | 0.10 - 0.25 | 0.02 - 0.60 | 0.20 (max) | -- | -- | -- | -- | -- | -- |
| | 72 UTS | 0.40 - 0.55 | 0.80 - 1.20 | 0.50 (max) | 0.05 (max) | 0.05 (max) | 0.10 - 0.15 | 0.10 - 0.25 | 0.02 - 0.60 | 0.20 (max) | -- | -- | -- | -- | -- | -- |

| | | | | | | | | | | | | | | | |
|----------------|------|------|------|-------|-------|------|------|------|------|------|------|------|------|------|------|
| 1175 HT | 0.50 | 0.50 | 0.00 | 0.00 | 0.00 | 0.10 | 0.10 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | 1.00 | 1.40 | 1.75 | 0.035 | 0.035 | 0.65 | 0.40 | 0.60 | 0.80 | 0.20 | 0.20 | 0.02 | 0.02 | 0.05 | 0.02 |

Working range of each element for 1175 HT grade shall be as mentioned below

| SN | Element | Working range |
|----|-------------|---------------|
| 1 | Carbon | ± 0.12 |
| 2 | Silicon | ± 0.25 |
| 3 | Manganese | ± 0.20 |
| 4 | Phosphorous | Not Specified |
| 5 | Sulphur | Not Specified |
| 6 | Chromium | ± 0.20 |
| 7 | Aluminium | ± 0.20 |
| 8 | Vanadium | Not Specified |
| 9 | Niobium | Not Specified |
| 10 | Nickel | Not Specified |
| 11 | Copper | Not Specified |
| 12 | Tin | Not Specified |
| 13 | Antimony | Not Specified |
| 14 | Titanium | Not Specified |
| 15 | Molybdenum | Not Specified |

The firm shall define the mean value for each element with a working range in Table above. Actual values shall not vary by more than the working range and this range shall fit within the permitted range

* Either Vanadium or Molybdenum may be used as grain refiner.

+In case single shot crucible is used, the maximum limit of Si% may be taken as 1.20 % for 90 UTS /R260/1080 Head Hardened rail, and 72UTS rails.

Weld metal chemistry for AT welding Joint of 90UTS / R260 Vs 1175 HT grade rails shall be same as that specified for 1175 HT grade rails.

QA Civil Dte Comment

No Comment

| | |
|--|--|
| Chakradhar Industries LLP Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s ITC Co. Ltd. Comment | No Comment |
| M/s Oberoi ThermitPvt. Ltd. Comment | No Comment |
| M/s Ora India Pvt. Ltd Comment | No Comment |
| M/s RailtechPvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |
| M/s Raybon Metal Pvt. Ltd. Comment | No Comment |
| M/s Sagar Infra Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering Works Comment | We are agree with the changes of IRS T-19-2020 |
| Thermit Portion Plant (TPP) | After many telephonic reminders, TPP has not submitted any comments. |
| M&C Dte RDSO comment | Agreed |
| Track Design Dte RDSO Remarks | After getting no comments from all stack holder ,modified para has been accepted |
| Modified final draft specification after incorporating accepted comments. | No change |

| | |
|---|--|
| Clause no. of uploaded specification | 12.5.1 |
| Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19-2020 | The Portion Manufacturer shall manufacture a batch of 150 'portions' in presence of RDSO officials at his own cost. 25 number samples shall be drawn at random by the Approving Authority and their weight be recorded. The weight of the portions shall be within $\pm 0.25\%$ of the average weight. Following laboratory tests shall be carried out at the manufacturer's work premises: |
| QA Civil Dte Comment | No Comment |
| Chakradhar Industries LLP Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s ITC Co. Ltd. | No Comment |
| M/s Oberoi ThermitPvt. Ltd. | No Comment |
| M/s Ora India Pvt. Ltd Comment | No Comment |
| M/s RailtechPvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |
| M/s Raybon Metal Pvt. Ltd. | No Comment |
| M/s Sagar Infra comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering | We are agree with the changes of IRS T-19-2020 |

| | |
|--|--|
| Works Comment | |
| Thermit Portion Plant (TPP) | After many telephonic reminders, TPP has not submitted any comments. |
| M&C Dte RDSO comment | Agreed |
| Track Design Dte RDSO Remarks | After getting no comments from all stack holder , modified para has been accepted. |
| Modified final draft specification after incorporating accepted comments. | No change. |

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|---|---|
| Clause no. of uploaded specification | 12.5.1 (i) |
| Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19-2020 | Twelve test weld joints shall be made in presence of RDSO officials as per clause 4.4.1 in which six joints each shall be made with maximum gap and minimum gap respectively by considering the tolerance specified for nominal gap as specified in para 2.5 of this specification. While executing the test joints, characteristics of the alumino - thermic reaction, i.e. whether it is quiet, normal or boiling shall be observed and if the reaction is found to be boiling, the technique shall be rejected. |
| QA Civil Dte Comment | No Comment |
| Chakradhar Industries LLP Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s ITC Co. Ltd. Comment | No Comment |
| M/s Oberoi ThermitPvt. Ltd. Comment | No Comment |
| M/s Ora India Pvt. Ltd Comment | No Comment |
| M/s RailtechPvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |
| M/s Raybon Metal Pvt. Ltd. | No Comment |

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| M/s Sagar Infra Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering Works Comment | We are agree with the changes of IRS T-19-2020 |
| Thermit Portion Plant (TPP) Comment | After many telephonic reminders, TPP has not submitted any comments. |
| M&C Dte RDSO comment | Agreed |
| Track Design Dte RDSO Remarks | After getting no comments from all stack holder, modified para has been accepted. |
| Modified final draft specification after incorporating accepted comments. | No Change. |

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| Clause no. of uploaded specification | 13.1 (v) New |
| Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19-2020 | Fatigue testing of thermit welding technique shall be arranged by the firm at his own expense. Following principle shall be followed: (v) For AT welding joints of different grade of Rails viz R260 to 90 UTS, R260 to 1175HT, 90 UTS to 1175HT grade rails - Anyone section out of 60Kg / 60E1. |
| QA Civil Dte Comment | No comment |
| Chakradhar Industries LLP Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s ITC Co. Ltd. Comment | No comment |
| M/s Oberoi ThermitPvt. Ltd. Comment | No comment |
| M/s Ora India Pvt. Ltd Comment | No comment |
| M/s RailtechPvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |
| M/s Raybon Metal Pvt. Ltd. Comment | No comment |

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| M/s Sagar Infra Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering Works Comment | We are agree with the changes of IRS T-19-2020 |
| Thermit Portion Plant (TPP) comment | After many telephonic reminders, TPP has not submitted any comments. |
| M&C Dte RDSO comment | Agreed |
| Track Design Dte RDSO Remarks | After getting no comments from all stack holder ,modified para has been accepted |
| Modified final draft specification after incorporating accepted comments | No Change |

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| Clause no. of uploaded specification | 13.3 (iv) |
| Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19-2020 (as per Corrigendum uploaded on 05.08.2020) | Following scheme shall be followed for fatigue testing of thermit welded rail joints: - (iv) A joint shall be deemed to have passed if it withstands a minimum of 2 million cycles except for joints of 1175 HT grade rails. For joints of 1175 HT grade rails, a joint shall be deemed to have passed if it withstands a minimum of 5 million cycles. For AT welding joints of different grade of Rails viz R260 to 90 UTS, R260 to 1175HT, 90 UTS to 1175 HT grade rails - A joint shall be deemed to have passed if it withstands a minimum of 2 million cycles |
| QA CivilDte Comment | No Comment |
| Chakradhar Industries LLP Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s ITC Co. Ltd. | No Comment |
| M/s Oberoi ThermitPvt. Ltd. | No Comment |
| M/s Ora India Pvt. Ltd | No Comment |
| M/s RailtechPvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |

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| M/s Raybon Metal Pvt. Ltd. | No Comment |
| M/s Sagar Infra Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering Works Comment | We are agree with the changes of IRS T-19-2020 |
| Thermit Portion Plant (TPP) Comment | After many telephonic reminders, TPP has not submitted any comments. |
| M&C Dte RDSO comment | Agreed |
| Track Design Dte RDSO Remarks | After getting no comments from all stack holder , modified para has been accepted |
| Modified final draft specification after incorporating accepted comments. | No Change |

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| Clause no. of uploaded specification | 13.3 (vi) |
| Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19-2020 | Following scheme shall be followed for fatigue testing of thermit welded rail joints: - (vi) Subject to the results of the tests in clause 12 and 13 above being satisfactory, firm shall be approved provisionally in the list of “RDSO vendors for developmental orders” for a period of two years. |
| QA Civil Dte Comment | No Comment |
| Chakradhar Industries LLP Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s ITC Co. Ltd. | This should be removed as this significantly lower safety standard. In all specifications in advanced countries and in EN specification, the vender is approved for any order only after field trials. If the vender is allowed to sell portions of a technique that has not proven itself in field trial it will be allowing an unproven technique’s welds to be installed in track endangering safety of passengers. This is not allowed in any advanced Railway system. |
| M/s Oberoi Thermit Pvt. Ltd. Comment | Regarding clause no. 13.3 (vi) and 14.1 – The provisional approval for two years should not be given after the clearance of the lab evaluation and fatigue testing as mentioned in the clause. |

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| | Approval of a welding technology which has not been tested in the field would be an unsafe practice for the Indian Railways. Provisional approval for two years after fatigue testing was earlier given as an upgradation to the existing Regularized approved base techniques of the vendor. That practice should be continued to ensure that the provisional approval under the upgradation scheme is being given to a technique whose base technique has a regular approval and has been working satisfactorily for a long time. We request you to kindly change this to the earlier procedure of getting provisional approval for development orders after lab evaluation and fatigue testing only as an upgradation and only if the base technique has regular approval. If this is not the case, then the regular procedure for approval of a welding technology approval after field trials may kindly be followed |
| M/s Ora India Pvt. Ltd Comment | No Comment |
| M/s RailtechPvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |
| M/s Raybon Metal Pvt. Ltd. | No Comment |
| M/s Sagar Infra Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering Works Comment | We are agree with the changes of IRS T-19-2020 |
| Thermit Portion Plant (TPP) Comment | After many telephonic reminders, TPP has not submitted any comments. |
| M&C Dte RDSO comment | No Comment |
| Track Design Dte. RDSO Remarks | Above comments are not accepted. To simplify the vendor registration process the provisional approval for two years is considered after the clearance of the lab evaluation and fatigue testing. |
| Modified final draft specification after incorporating accepted comments. | No change |

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| Clause no. of uploaded specification | 14.1 |
| Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19- 2020 | <p>14.1 Subject to the results of the tests in clause 12 and 13 above being satisfactory, firm shall be approved provisionally in list of 'RDSO vendors for development orders'. 50 to 100 joints (for AT welding technique of same grade of rails) or 25 to 50 joints (for AT welding of different grades of rails) welded by the firm in first contract shall be monitored by Zonal Railway as trial joints for a period of one year or till passage of 10 GMT traffic over the joint, whichever is earlier. welded using the above batch of portion. For the purpose of field trials, an order shall be placed by the nominated Zonal Railway on the manufacturer for supply of portions as well as welding of trial joints. The trial joints shall be distinctly marked by painting letter "T" on the web of the rail beyond 300 mm from the joints. During execution of trial welding at site, spoilt joints, if any, shall be cut and re-welded by the contractor at his own expense. Field trial report shall be prepared as per Annexure - 5 and submitted to the RDSO by the Zonal Railway after signature of firm's representative and nominated Zonal Railway official.</p> |
| QA Civil Dte Comment | No Comment |
| Chakradhar Industries LLP Comment | After many telephonic reminder, firm has not submitted any comments. |

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| <p>M/s ITC Co. Ltd. Comment</p> | <p>We request to change the above clause to original clause as it significantly lowers track safety standards as explained above. Please consider to change to original as follows:</p> <p>Subject to results of the tests in clause 12 &13 above being satisfactory, field trials for a period of one year or till passage of 10 GMT traffic over the joints, whichever is earlier, shall be undertaken on 50 to 100 trial joints welded using the above batch of portion. For the purpose of field trials, an order shall be placed by the nominated zonal Railway on the manufacturer for supply of portions as well as welding of trial joints. The trial joints shall be distinctly marked by painting letter “T” on the web of the rail beyond 300mm from the joints. During execution of trial welding at site, spoilt joints , if any, shall be cut and re-welded by the contractor at his own expense.</p> |
| <p>M/s Oberoi ThermitPvt. Ltd. Comment</p> | <p>Regarding clause no. 13.3 (vi) and 14.1 – The provisional approval for two years should not be given after the clearance of the lab evaluation and fatigue testing as mentioned in the clause. Approval of a welding technology which has not been tested in the field would be an unsafe practice for the Indian Railways. Provisional approval for two years after fatigue testing was earlier given as an upgradation to the existing Regularized approved base techniques of the vendor. That practice should be continued to ensure that the provisional approval under the upgradation scheme is being given to a technique whose base technique has a regular approval and has been working satisfactorily for a long time. We request you to kindly change this to the earlier procedure of getting provisional approval for development orders after lab evaluation and fatigue testing only as an upgradation and only if the base technique has regular approval. If this is not the case, then then the regular procedure for approval of a welding technology approval after field trials may kindly be followed.</p> |
| <p>M/s Ora India Pvt. Ltd Comment</p> | <p>As per general worldwide practice combination weld or combination joint is only done & treated as separate technique when two rails having major difference in geometry are welded together, for e.g.52Kg Rail is welded with 60Kg.</p> <p>In the given clause combination weld is being done on two symmetrical rails therefore we are of dissent to have it as a separate technique, in our opinion if firm is approved in R260 and 60Kg 90 UTS both, it should automatically be allowed to weld the combination of both as we know that international practices suggests use of portions of higher grade rail in such type of welding.</p> <p>Since, this technology has been introduced by RDSO now, we believe that field trial of Combination welds will be a much tedious job for Vendor and Railways both, execution of such welds will be carried out at different locations/Sections or sub divisions. Since, one section usually has up and down line and combination weld will be done only in case of TRR where 60Kg will be replaced with higher grade which means there will be only 4 welds at max. in one section (Two in up line and Two in down line). In order to do 25 to 50 Trial Joints, one needs to go to 8-10 different</p> |

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| | sections resulting in longer time and cost involved for the approvals. |
| M/s Railtech Pvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |
| M/s Raybon Metal Pvt. Ltd. Comment | No Comment |
| M/s Sagar Infra Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering Works Comment | We are agree with the changes of IRS T-19-2020 |
| Thermit Portion Plant (TPP) | After many telephonic reminders, TPP has not submitted any comments. |
| M&C Dte RDSO comment | No Comment |
| Track Design Dte RDSO Remarks | <p>RDSO Remark for M/s Oberoi comments- RDSO is not removing provision of Field Trials from Specification. It is still being kept during provisional developmental approval period in first contract. Fatigue testing envisaged in approval process is done for considerable high value more than 90 GMT (Approx.) whereas field trial joints are verified and monitored only for 10 GMT.</p> <p>Comments of M/s Ora India Pvt. Ltd are partially accepted and field trial joints for combination joints from 25-50 joints may be reduced to 8-10 only by considering the facts given by firm.</p> |
| Modified final draft specification after incorporating accepted comments. | <p>14.1 Subject to the results of the tests in clause 12 and 13 above being satisfactory, firm shall be approved provisionally in list of 'RDSO vendors for development orders'. 50 to 100 joints (for AT welding technique of same grade of rails) or 8 to 10 joints (for AT welding of different grades of rails) welded by the firm in first contract shall be monitored by Zonal Railway as trial joints for a period of one year or till passage of 10 GMT traffic over the joint, whichever is earlier. The trial joints shall be distinctly marked by painting letter "T" on the web of the rail beyond 300 mm from the joints. Field trial report shall be prepared as per Annexure - 5 and submitted to the RDSO by the Zonal Railway after signature of firm's representative and nominated Zonal Railway official.</p> |

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| Clause no. of uploaded specification | 14.2 |
| Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19- 2020 | 14.2 Ultrasonic test on field trial weld joints shall be carried out by the Zonal Railway as per procedure laid down for Ultrasonic testing of AT Welds in Manual for Ultrasonic testing of rails & welds’ Revised, 2012” along with its latest revision and updated correction slips, issued by RDSO, Lucknow. Up to a maximum of 2% defective welds shall be cut and re-welded by the firm at his own expense. If more than 2% joints are found defective, the trial further welding shall be discontinued considering the technique to be unsatisfactory. All the defective joints shall be removed from track by the firm at his own expense. The initial USFD report shall be prepared as per Annexure – 5A and submitted to the RDSO. |
| QA Civil Dte Comment | No Comment |
| Chakradhar Industries LLP Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s ITC Co. Ltd. Comment | No Comment |
| M/s Oberoi ThermitPvt. Ltd. Comment | No Comment |

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| M/s Ora India Pvt. Ltd Comment | No Comment |
| M/s RailtechPvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |
| M/s Raybon Metal Pvt. Ltd. Comment | No Comment |
| M/s Sagar Infra Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering Works Comment | We are agree with the changes of IRS T-19-2020 |
| Thermit Portion Plant (TPP) | After many telephonic reminders, TPP has not submitted any comments. |
| M&C Dte RDSO comment | No Comment |
| Track Design Dte RDSO Remarks | After getting no comments from all stack holders, modified para has been accepted. |
| Modified final draft specification after incorporating accepted comments. | No change |

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| Clause no. of uploaded specification | 14.3 |
| Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19- 2020 | <p>14.3 After a passage of 10 GMT traffic over the joints or a period of one year whichever is earlier, Zonal Railway shall conduct USFD test of the trial joint as per procedure given in “Manual for Ultrasonic testing of rails & welds’ Revised, 2012” along with its latest revision and updated correction slips, issued by RDSO, Lucknow. The USFD report shall be prepared as per Annexure – 5B and submitted to the RDSO. Zonal Railway shall communicate the USFD test reports of the trial joints before final inspection of the Trial joint by RDSO. Final inspection of trial joints shall be carried out as per clause 18 of this specification by RDSO Zonal Railway and Field Trial report shall be submitted as per proforma given in Annexure –5C jointly signed by the Firm’s representative and nominated Zonal Railway official. Failure of more than 2% joints during of field trial (Including Ultrasonic examination) will render the technique unacceptable and firm shall be delisted from the list of ‘RDSO vendors for developmental orders’. AT welding contract shall be short closed. AT welded joints already executed by the firm shall be Ultrasonically tested and good AT welded joints shall be allowed to remain in</p> |

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| | the Track. In case, the weld is in DFW (O) or DFW (R) category in the ultrasonic examination, the joint shall be considered as defective. |
| QA Civil Dte Comment | No Comment |
| Chakradhar Industries LLP Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s ITC Co. Ltd. Comment | After passage of 10 GMT traffic over the joints or a period of one year whichever is earlier, zonal Railway shall conduct USFD test of the trial joints as per procedure Latest revision and updated correction slips issued by RDSO, Lucknow. Zonal Railway shall communicate the USFD test report of the trial joint before final inspection of the trial joint by RDSO. Final inspection of trial joints shall be carried out as per clause 18 of this specification by RDSO. Failure of more than 2% joints during field trial (including ultrasonic examination) will render the technique unacceptable. In case, the weld is in DFW(O) or DFW(R) category in the ultrasonic examination, the joint shall be considered as defective. |
| M/s Oberoi ThermitPvt. Ltd. Comment | No Comment |
| M/s Ora India Pvt. Ltd Comment | No Comment |
| M/s RailtechPvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |
| M/s Raybon Metal Pvt. Ltd. Comment | <p>Instead of :-</p> <p>..... Unacceptable and firm shall be delisted from the list of 'RDSO vendors for developmental orders'. AT welding contract shall be short closed.....</p> <p>To insert as follows :-</p> <p>..... unacceptable and the subject technique of the firm shall be delisted from the list of 'RDSO vendors for developmental orders'. AT welding contract for the subject technique shall be short closed.....</p> <p>Basically the intention is not to mis-interpret this clause to look like a blanket delisting of the firm for all its techniques</p> |
| M/s Sagar Infra Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering Works Comment | We are agree with the changes of IRS T-19-2020 |
| Thermit Portion Plant (TPP) | After many telephonic reminders, TPP has not submitted any comments. |

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| M&C Dte RDSO comment | No Comment |
| Track Design Dte RDSO Remarks | <p>Comments of M/s ITC Kanpur are not acceptable.</p> <p>Comments of M/s Raybon Metal Pvt. Ltd. May be accepted and para may be modified by adding particular technique. ----- and firm shall be delisted from the list of 'RDSO vendors for developmental orders' for particular technique. AT welding contract shall be short closed for particular technique. AT welded joints already executed by the firm shall be Ultrasonically tested and good AT welded joints shall be allowed to remain in the Track</p> |
| Modified final draft specification after incorporating accepted comments. | <p>14.3 After a passage of 10 GMT traffic over the joints or a period of one year whichever is earlier, Zonal Railway shall conduct USFD test of the trial joint as per procedure given in "Manual for Ultrasonic testing of rails & welds' Revised, 2012" along with its latest revision and updated correction slips, issued by RDSO, Lucknow. The USFD report shall be prepared as per Annexure – 5B and submitted to the RDSO. Final inspection of trial joints shall be carried out as per clause 18 of this specification by Zonal Railway and Field Trial report shall be submitted as per proforma given in Annexure –5C jointly signed by the Firm's representative and nominated Zonal Railway official. Failure of more than 2% joints of field trial (Including Ultrasonic examination) will render the technique unacceptable and firm shall be delisted from the list of 'RDSO vendors for developmental orders for particular technique'. AT welding contract shall be short closed for particular technique. AT welded joints already executed by the firm shall be Ultrasonically tested and good AT welded joints shall be allowed to remain in the Track. In case, the weld is in DFW (O) or DFW (R) category in the ultrasonic examination, the joint shall be considered as defective.</p> |

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| Clause no. of uploaded specification | 14.4 |
| Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19- 2020 | After satisfactory field trial report, provisional approval of the firm in the “list of RDSO vendors for developmental orders” shall be regularized for a time period of 5 years from the date of provisional approval |
| QA Civil Dte Comment | No Comment |
| Chakradhar Industries LLP Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s ITC Co. Ltd. Comment | After field trials the vender should in the category of developmental vender. This practice is followed globally for better safety of passengers and has also been followed on Indian Railway ensuring safety of passengers. Now this modifies clause permits new vendor to skip the stage of developmental vendor and go directly to a regular vendor. This will endanger safety of passengers by lowering safety standards. Please note that in items such as “ In situ repair of CMS Crossing by translamatic robotic welding machine” RDSO has laid guidelines that field trial must be carried out in minimum 3 zonal Railways before approval in regular category. AT welding is even more critical |

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| | for safety of track and a failure can lead to derailment and loss of lives. As field trial is only being done for a very small sample size and that too only on one Railway, it should lead to approval in “Developmental category“ as done earlier. |
| M/s Oberoi Thermit Pvt. Ltd. Comment | No Comment |
| M/s Ora India Pvt. Ltd Comment | No Comment |
| M/s Railtech Pvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |
| M/s Raybon Metal Pvt. Ltd. Comment | No Comment |
| M/s Sagar Infra Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering Works Comment | We are agree with the changes of IRS T-19-2020 |
| Thermit Portion Plant (TPP) | After many telephonic reminders, TPP has not submitted any comments. |
| M&C Dte RDSO comment | No Comment |
| Track Design Dte RDSO Remarks | Above comments are not accepted. To simplify the vendor registration process the provisional approval for two years is considered after the clearance of the lab evaluation and fatigue testing. |
| Modified final draft specification after incorporating accepted comments. | No change |

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| Clause no. of uploaded specification | ANNEXURE-5 |
| Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19-2020 (as per Corrigendum uploaded on 05.08.2020) | <p style="text-align: center;">Performa for Field Trial</p> <p>General information of field trial joints for AT welding technique for..... grade rails with -----mm gap, Compressed Air-Petrol pre-heating, three piece mould (Zircon washed) and Single Shot Crucible fitted with Automatic tapping thimble developed by M/s</p> <p>1. Name of welding supervisor : _____</p> <p>2. Name of welder : _____</p> <p>3. Portion’s Batch no. : _____</p> <p>4. Date of manufacture of portion : _____</p> <p>5. Weight of portion : _____</p> <p>6. Heating Technique : _____</p> <p>7. Heating Device : _____</p> |

- 8. Type of Mould :
- 9. Welding done in situ/cess :
- 10. Tapping Time :
- 11. Chipping device and time :
- 12. Grinding done by :
- 13. Under Sr. Section Engineer :
- 14. Section :
- 15. Division :
- 16. GMT of the section :

Sign of Firm's
Representative

Sign of Nominated Railway official

Performa for Field Trial

Particulars of field trial joints for AT welding technique for ----- grade rails with ----- mm gap, Compressed Air-Petrol pre-heating, three piece mould (Zircon washed) and Single Shot Crucible fitted with Automatic tapping thimble developed by M/s.....in...Divn./ Railway.

| S.N. | Joint No. | Km/ post | Chainage | UP/ Dn., RH / LH | Between Station | Date of Welding | In Situ/Cess | Rail Gap (in mm) | Batch no. | Portion no. | Pre-heating Time (in Min.) | Tapping Time (in sec.) | Nature of Reaction | Mould waiting time (in Min.) | Tolerance in Weld | | Remarks |
|------|-----------|----------|----------|------------------|-----------------|-----------------|--------------|------------------|-----------|-------------|----------------------------|------------------------|--------------------|------------------------------|--|---|---------|
| | | | | | | | | | | | | | | | With 1m st. edge Ver: +1.0mm -0.0mm Lat: ±0.5mm | With 10 cm st. edge in head Top: +0.4mm - 0.0mm Gauge Side: ±0.3mm | |
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| M&C Dte RDSO comment | No Comment |
| Track Design Dte RDSO Remarks | After getting no comments from all stack holder, modified para has been accepted. |
| Modified final draft specification after incorporating accepted comments. | No Change |

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| Clause no. of uploaded specification | ANNEXURE-5A | | | | | | | | | | | |
| Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19-2020 (as per Corrigendum uploaded on 05.08.2020) | <p>INITIAL USFD TEST REPORT OF FIELD TRIAL JOINTS FOR AT WELDING TECHNIQUE FOR DETAILS OF AT WELDING TECHNIQUE DEVELOPED BY M/s.....</p> <p>Machine Details:- (Make, Model no. and Sl.No.)</p> | | | | | | | | | | | |
| | Sl. | Secti | nd/B | Joint | Locat | Chai | Line | LH/R | Rail | | Ultrasonic Test Results For* | Remarks# |

| | | | | | | | | | 0° PROBE/2MHZ | AT WELD HEAD scanning 70° PROBE/2MHZ | AT WELD FLANGE scanning 70° PROBE/2MHZ | AT WELD FOOT scanning 45° PROBE/2MHZ | TANDEM PROBE scanning 45° PROBE/2 MHZ | |
|----|--|----|--|--|--|--|--|--|---------------|---|---|---|--|--|
| 1 | | 1 | | | | | | | | | | | | |
| 2 | | 2 | | | | | | | | | | | | |
| 3 | | 3 | | | | | | | | | | | | |
| 4 | | 4 | | | | | | | | | | | | |
| 5 | | 5 | | | | | | | | | | | | |
| 6 | | 6 | | | | | | | | | | | | |
| 7 | | 7 | | | | | | | | | | | | |
| 8 | | 8 | | | | | | | | | | | | |
| 9 | | 9 | | | | | | | | | | | | |
| 10 | | 10 | | | | | | | | | | | | |
| - | | - | | | | | | | | | | | | |
| 50 | | 50 | | | | | | | | | | | | |

*For each type of USFD testing if any flaw peak is observed, Details of peak height (in terms of Full scale height)/travel and location (as per Note given at Chapter 8 of USFD Manual) be given ,Write "OK" if satisfactory.

Classification of AT weld as per USFD Manual be indicated Write "OK" if satisfactory.

Signature of Operator

**Counter signed with date
With designation & date
(Not below DEN rank officer)**

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| QA Civil Dte Comment | No Comment |
| Chakradhar Industries LLP Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s ITC Co. Ltd. | No Comment |
| M/s Oberoi ThermitPvt. Ltd. | No Comment |
| M/s Ora India Pvt. Ltd | No Comment |
| M/s RailtechPvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |
| M/s Raybon Metal Pvt. Ltd. | No Comment |
| M/s Sagar Infra Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering Works Comment | We are agree with the changes of IRS T-19-2020 |
| Thermit Portion Plant (TPP) Comment | After many telephonic reminders, TPP has not submitted any comments. |
| M&C Dte RDSO comment | No Comment |
| Track Design Dte RDSO Remarks | After getting no comments from all stack holder, modified para has been accepted. |
| Modified final draft specification after incorporating accepted comments. | No Change |

| Clause no. of uploaded specification | ANNEXURE-5B | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|------|-------|-------|------|------|------|------|-------|------------------------------|----------|-----|-------|------|-------|-------|------|------|------|------|-------|------------------------------|----------|--|--|--|--|--|--|--|--|--|--|--|--|
| Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19-2020 (as per Corrigendum uploaded on 05.08.2020) | <p style="color: red; text-align: center;">USFD TEST REPORT OF FIELD TRIAL JOINTS FOR AT WELDING TECHNIQUE FOR DETAILS OF AT WELDING TECHNIQUE..... DEVELOPED BY M/s.....</p> <p style="color: red;">Machine Details:- (Make, Model no. and Sl.No.)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;">Sl.</th> <th style="width: 5%;">Secti</th> <th style="width: 5%;">No/B</th> <th style="width: 5%;">Joint</th> <th style="width: 5%;">Locat</th> <th style="width: 5%;">Chai</th> <th style="width: 5%;">Line</th> <th style="width: 5%;">LH/R</th> <th style="width: 5%;">Rail</th> <th style="width: 5%;">Gauge</th> <th style="width: 40%;">Ultrasonic Test Results For*</th> <th style="width: 10%;">Remarks#</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> | | | | | | | | | | | Sl. | Secti | No/B | Joint | Locat | Chai | Line | LH/R | Rail | Gauge | Ultrasonic Test Results For* | Remarks# | | | | | | | | | | | | |
| Sl. | Secti | No/B | Joint | Locat | Chai | Line | LH/R | Rail | Gauge | Ultrasonic Test Results For* | Remarks# | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | 0° PROBE/2MHZ | AT WELD HEAD scanning 70° PROBE/2MHZ | AT WELD FLANGE scanning 70° PROBE/2MHZ | AT WELD FOOT scanning 45° PROBE/2MHZ | TANDEM PROBE scanning 45° PROBE/2 MHZ | |
|----|--|----|--|--|--|--|--|--|---------------|---|---|---|--|--|
| 1 | | 1 | | | | | | | | | | | | |
| 2 | | 2 | | | | | | | | | | | | |
| 3 | | 3 | | | | | | | | | | | | |
| 4 | | 4 | | | | | | | | | | | | |
| 5 | | 5 | | | | | | | | | | | | |
| 6 | | 6 | | | | | | | | | | | | |
| 7 | | 7 | | | | | | | | | | | | |
| 8 | | 8 | | | | | | | | | | | | |
| 9 | | 9 | | | | | | | | | | | | |
| 10 | | 10 | | | | | | | | | | | | |
| - | | - | | | | | | | | | | | | |
| 50 | | 50 | | | | | | | | | | | | |

*For each type of USFD testing if any flaw peak is observed, Details of peak height (in terms of Full scale height)/travel and location (as per Note given at Chapter 8 of USFD Manual) be given ,Write "OK" if satisfactory.

Classification of AT weld as per USFD Manual be indicated Write "OK" if satisfactory.

Signature of Operator

**Counter signed with date
With designation & date**

| | |
|--|---|
| | (Not below DEN rank officer) |
| QA CivilDte Comment | No Comment |
| Chakradhar Industries LLP Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s ITC Co. Ltd. | No Comment |
| M/s Oberoi ThermitPvt. Ltd. | No Comment |
| M/s Ora India Pvt. Ltd | No Comment |
| M/s RailtechPvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |
| M/s Raybon Metal Pvt. Ltd. | No Comment |
| M/s Sagar Infra Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering Works Comment | We are agree with the changes of IRS T-19-2020 |
| Thermit Portion Plant (TPP) Comment | After many telephonic reminders, TPP has not submitted any comments. |
| M&C Dte RDSO comment | No Comment |
| Track Design Dte RDSO Remarks | After getting no comments from all stack holder, modified para has been accepted. |
| Modified final draft specification after incorporating accepted comments. | No Change |

| | |
|---|--------------------|
| Clause no. of uploaded specification | ANNEXURE-5C |
|---|--------------------|

Indian Railway Standard Specification for Fusion Welding of Rails By Alumino – Thermic Process Serial No. IRST-19-2020 (as per Corrigendum uploaded on 05.08.2020)

Final Inspection Report of Field Trial Joints

Final Inspection report of field trial joints for AT welding technique for.... rails with ----- mm gap, Compressed Air-Petrol pre-heating, three piece mould (Zircon washed) and Single Shot Crucible fitted with Automatic tapping thimble developed by M/s

- 1. Name of welding supervisor :
- 2. Name of welder :
- 3. Portion's Batch no. :
- 4. Date of manufacture of portion :
- 5. Weight of portion :
- 6. Heating Technique :
- 7. Heating Device :
- 8. Type of Mould :
- 9. Welding done in situ/cess :
- 10. Tapping Time :
- 11. Chipping device and time :
- 12. Grinding done by :
- 13. Under Sr. Section Engineer :
- 14. Section :
- 15. Division :
- 16. GMT of the section :

Sign of Firm's Representative

Sign of Nominated Railway official

Final Inspection Report of Field Trial Joints

Final Inspection report of field trial joints for AT welding technique for rails with ----- mm gap, Compressed Air-Petrol pre-heating, three piece mould (Zircon washed) and Single Shot Crucible fitted with Automatic tapping thimble developed by M/s

| SN | Joint No. | Km/ post | Chainage | UP/DN | LH/RH | Between Station | Date of Welding | InSitu/Cess | Date of Laying | USFD Result | Tolerance in Weld | | Physical condition | Remarks |
|----|-----------|----------|----------|-------|-------|-----------------|-----------------|-------------|----------------|-------------|--|---|--------------------|---------|
| | | | | | | | | | | | With 1m st. edge Ver: +1.0mm -0.0mm Lat: ±0.5mm | With 10 cm st. edge Top: +0.4mm -0.0mm Lat: ±0.3mm | | |
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| | | | | | | | | | | | | | | |

Sign of Firm's Representative

Sign of Nominated Railway official

QA CivilDte Comment

No Comment

| | |
|--|---|
| Chakradhar Industries LLP Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s ITC Co. Ltd. | No Comment |
| M/s Oberoi ThermitPvt. Ltd. | No Comment |
| M/s Ora India Pvt. Ltd | No Comment |
| M/s RailtechPvt. Ltd. comments | After many telephonic reminders, firm has not submitted any comments. |
| M/s Raybon Metal Pvt. Ltd. | No Comment |
| M/s Sagar Infra Comment | After many telephonic reminders, firm has not submitted any comments. |
| M/s Perfect Thermic & Engineering Works Comment | We are agree with the changes of IRS T-19-2020 |
| Thermit Portion Plant (TPP) Comment | After many telephonic reminders, TPP has not submitted any comments. |
| M&C Dte RDSO comment | No Comment |
| Track Design Dte RDSO Remarks | After getting no comments from all stack holder, modified para has been accepted. |
| Modified final draft specification after incorporating accepted comments. | No Change |