



SOUTH EASTERN RAILWAY

TENDER DOCUMENT

Tender Notice No.: DRM (Engg)/ ADA/ 01/ 2013 Dtd. 07.01.2013

Name of the Work: O.T. for Supply of portion and welding of 52 kg/ 60 kg rail joints by Alumino Thermic SKV process with supply of portion in connection with ECW, TTR, TRR, CTR and Track Circuiting works under the jurisdiction of Sr. Divl. Engineer/ North/ Adra.

Value of Work: Rs. 49,74,700/- (Rs. Forty-nine lakhs Seventy four thousands seven hundred only)

EM: Rs.99,500/-

Date of opening of tender: 14.02.2013

**OFFICE OF THE,
DIVL. RAILWAY MANAGER (ENGG.)
SOUTH EASTERN RAILWAY, ADRA**

Name & address of the tenderer

PIN _____ Phone No. _____



ANNEXURE - I

TENDER NOTICE

- 1 The Divl.Rly. Manager /Engg/SER/Adra invites sealed open tender vide tender notice No.DRM(Engg)/ADA/01/2013 Dtd.07.1.2013 for **O.T. for Supply of portion and welding of 52 kg/ 60 kg rail joints by Alumino Thermic SKV process with supply of portion in connection with ECW, TTR, TRR, CTR and Track Circuiting works under the jurisdiction of Sr. Divl. Engineer/ North/ Adra.**

- | | <u>Date</u> | <u>Time</u> |
|--------------------------------------|---------------------------------|---|
| a) Period of tender submission: | From 11.02.2013 upto 11.30 hrs. | on 14.02.2013 |
| b) Date and time of opening tenders: | On 14.02.2013 at 12.00 hrs | or later. |
| c) Period of tender collection: | From 28.01.2013 upto 18.00 hrs. | on 13.02.2013
during office hours on working days. |
| d) Approximate value | : Rs.49,74,700/- | |
| e) Completion date | : Within 10(Ten) months | from the date of issue of
acceptance letter. |
| f) Full earnest money: | Rs.99,500/- | |
| g) Cost of tender form: | Rs.3,000/- | |

2. The tender should be in the prescribed form obtainable from the office of the DRM (Engg)/S.E.Rly/Adra & AEN-Bhojudih on production of receipt of the said amount towards the cost of tender form for each set from the Divl.Cashier/Adra or Chief Booking Clerk/Adra or Bhojudih.

Tenderers can also download the tender documents from the NIC website i.e. tenders.gov.in from 28.01.2013 and upto 18.00 hrs on 13.02.2013. This facility is available free of cost. However, as cost of tender form, the tenderer/s will have to deposit non refundable demand draft in favour of FA & CAO, Garden Reach, S.E.Railway or money receipt for requisite amount issued by Divl.Cashier/Adra or Chief Booking Clerks/Bhojudih & Adra's for the said amount per set (Cost of tender form as mentioned) which will have to be attached with the tender form otherwise the tender form will be summarily rejected.

Railway administration will not be responsible for any delay/ difficulties/ inaccessibility of the downloading facility for any reason whatsoever. In case of any discrepancy between the tender documents downloaded from internet and the master copy available in the office of the DRM (Engg)/Adra, the later shall prevail and will be binding on the tenderers. No claim on this account shall be entertained.

The tender form is not transferable.

In no circumstances will the amount paid for the tender form be refunded.

Without proper earnest money tender will be rejected.

Reference of Earnest Money _____

Permanent Account No. (i.e. PAN) _____



- N.B.: i) If in any case the date of opening mentioned above declared holiday or bundh on any account the said date shall automatically be substituted by the next working day.*
- ii) Contractor(s) will not have facility for participating in tender with his/their standing earnest money.*
3. Tenderers are required to quote their Permanent Account Number in the tender document.
 4. The tender form will not be issued after the time mentioned as 1(c) at page of Annexure-I
 5. All the pages of tender documents are required to be signed by the tenderer/s.
 - 6 (a). Tender should be accompanied by a deposit made in cash or in any of the following forms.
 - (i) Deposit receipts, pay orders, demand drafts. These forms of earnest money could be either of the State Bank of India or of any of the nationalized banks issued in favour of FA & CAO/S.E.Rly/Garden Reach. No confirmatory advice from the Reserve Bank of India will be necessary. Earnest Money in the form of guarantee bonds will not be accepted.
 - (ii) Deposit receipts executed by the Scheduled Banks (other than the State Bank of India and the Nationalized Banks) approved by the Reserve Bank of India for this purpose.
 - 6.(b) The amount mentioned in (f) page-1 of Annexure-I as Earnest Money deposit for the due performance of the stipulated to keep the offer open for the period of 120 days from the date fixed for opening the same it shall be understood that the tender documents have been sold/issued to the tenderer and the tenderer is permitted to tender in consideration of the stipulation of his part that after submitting his tender he will not resile from his offer or modify terms and conditions thereof in a manner not acceptable to the Divl. Rly. Manager (Engg)/S.E.Rly/Adra. Should the tenderer fail to observe or comply with the said stipulation, the aforesaid amount shall be liable to be forfeited to the Rly.
 7. Tenders will be received & opened at specified time and date in the office of the Divl. Railway Manager/ (Engg)/ S.E.Rly/Adra & AEN- Bhojudih simultaneously.



TENDER

To
The President of India,
Acting through the Divisional Railway Manager(Engg.),
South Eastern Railway/Adra.

I/We have read the various conditions to tender attached hereto and hereby agree to abide by the said conditions. I/We also agree to keep ,this tender open for acceptance for a period of 120(One hundred twenty) days from the date fixed for opening the same and in default thereof, I/We will be liable for forfeiture of my/our full earnest money. I/We offer to do the work which is endorsed in Annexure-I (Tender Notice page) at the rates quoted in attached schedule and hereby bind myself/ourselves to complete the work in stipulated time from the date of issue of latter of acceptance of the tender. I/We also hereby agree to abide by the General and special conditions of contract and to carry out the work according to the standard specifications for materials and works laid down by the Railway for the present contract.

2. A sum as stipulated in Annexure-I is herewith forwarded as fully earnest money mentioned above. The full value of the earnest money shall stand forfeited without prejudice to any other right or remedies if.

- a) I/We resile from my/our offer within the validity period of the tender.
- b) I/We do not execute the contract documents within fifteen days from the date of issue of acceptance letter.

3.Until a formal agreement is prepared and executed, acceptance of this tender shall constitute a binding contract between us subject to modifications as may be mutually agreed to between us and indicates in the letter of acceptance of my/our offer for this work.

Signature of the Tenderer/s

Dated:

Signature of witness:

(1)_____

(2)_____



Annexure-II

CONDITION OF TENDER.

1. The drawings for the works can be seen in the office of the Divisional Railway Manager(Engineering)/South Eastern Railway/Adra at any time during office hours.
2. General conditions of contract and specifications for materials and works are laid down in the South Eastern Railway "Schedule of Labour and Materials Rates, Revised Edition 2001(Volume-I) for Sec.-Z & USSOR 2010 and General Condition of contract (Vol-2) 2001 Part-II, III & IV and correction upto-date and Indian Railway Unified Standard Specification (Works & Materials) Vol-I & II-2010, which can be seen at the office of the Divl. Rly .Manager (Engg.)/ S.E.Rly/ Adra or had on requisite payment as the same are binding on the contract and shall form part and parcel of the contract unless otherwise stated in the special condition and specifications in the tender papers.
3. The tenderer/tenderers shall quote his/their rates as per tender schedule items only as asked in the tender schedule of Rates.
4. Tenders containing erasures and alterations of the tender documents are liable to be rejected. Any corrections made by the tenderer/tenderers in his/their entries must be attested by him/them.
5. The works are required to be completed within the time mentioned in the first page from the date of issuing acceptance letter.
6. The tender must be accompanied by full earnest money deposited in cash or in any of the form mentioned in Annexure-I, failing which tender will not be considered. The tenderer shall hold the offer open till such date as may be specified in the tender. It is understood that the tender documents have been sold/issued to the tenderers and the tenderer is permitted to tender in consideration of the stipulation on his part that after submitting his tender he will not resale from his offer or modify the terms and conditions thereof in a manner not acceptable to the Divl.Rly.Manager(Engg.)/South Eastern Railway/ Adra. Should the tenderer fails to observe or comply with the said stipulations and in case the tenderer withdraw his offer within the validity period of his offer or fails to undertake the contract after acceptance of his tender the full earnest money shall be forfeited. If the tender is accepted the amount of earnest money will be retained and adjusted as security deposit for the due and faithful fulfillment of the contract. The earnest money of the unsuccessful tenderers shall save as here-in-before provided be returned to the unsuccessful tenderers within a reasonable time but the Railway shall not be responsible for any loss or depreciation that may happen to the security for the due performance of the stipulation to keep the offer open for the period specified in the tender documents or to the earnest money while in their possession nor be liable to pay interest thereon.
7. It shall not be obligatory on the said authority to accept the lowest tender and no tenderer/tenderers shall demand any explanation for the cause of rejection of his/their tender.
8. If the tenderer(s) deliberately gives/give wrong information in his/their tender or creates/create circumstances for the acceptance of his/their tender, the Railway reserves the right to reject such tender at any stage.



9. If the tenderer(s) expires after the submission of his/their tender or after the acceptance of his tender, the Rly.shall deem such tender as cancelled. If a partner of a firm expires after the submission of their tender or after the acceptance of their tender, the Rly.shall deem such tender as cancelled unless the firm retains its character.
10. The earnest money deposited by the contractor with his tender will be retained by the railway as part of security for the due and faithful fulfillment of the contract by the contractor. The balance to make up the security deposit, the rates for which are given below may be deposited by the contractor in cash or may be recovered by percentage deduction from the contractor's "on account" bills provided also that in case of defaulting contractor, the Railway may retain any amount due for payment to the contractor on the pending on account bills so that amount so retained may not exceed 10% of the total value of the contract.

Unless otherwise specified in the special conditions,if any, the Security Deposit/rate of recovery/mode of recovery shall be as under:-

- (a) Security Deposit for each work should be 5% of the contract value.
- (b) The rate of recovery should be at the rate of 10% of the bill amount till the full security deposit is recovered.
- (c) Security Deposits will be recovered only from the running bills of the contract and no other mode of collecting SD such as SD in the form of instruments like BG, FD etc. shall be accepted towards Security Deposit.

Security Deposit shall be returned to the contractor after the physical completion of the work as certified by the Competent Authority. The Competent Authority shall normally be the authority who is competent to sign the contract. If this Competent Authority is of the rank of lower than JA Grade, then a JA Grade Officer (concerned with the work) should issue the certificate. The certificate inter alia, should mention that the work has been completed in all respects and that all the contractual obligations have been fulfilled by the contractors and that there is no due from the contractor to Railways against the contract concerned. Before releasing the SD, an unconditional and unequivocal no claim certificate from the contractor concerned should be obtained.

11. **Performance Guarantee (PG)**

The procedure for obtaining **Performance Guarantee** is outlined below:

- (a) The successful bidder shall have to submit a Performance Guarantee (PG) within 30 (thirty) days from the date of issue of Letter Of Acceptance (LOA). Extension of time for submission of PG beyond 30 (thirty) days and upto 60 days from the date of issue of LOA may be given by the Authority who is competent to sign the contract agreement. However, a penal interest of 15% per annum shall be charged for the delay beyond 30 (thirty) days, i.e. from 31st day after the date of issue of LOA. In case the contractor fails to submit the requisite PG even after 60 days from the date of issue of LOA, the contract shall be terminated duly forfeiting EMD and other dues, if any payable against that contract. The failed contractor shall be debarred from participating in re-tender for that work.

- (b) The successful bidder shall submit the Performance Guarantee (PG) in any of the following forms, amounting to 5% of the contract value:



- (i) A deposit of Cash;
- (ii) Irrevocable Bank Guarantee;
- (iii) Government Securities including State Loan Bonds at 5% below the market value;
- (iv) Deposit Receipts, Pay Orders, Demand Drafts and Guarantee Bonds. These forms of Performance Guarantee could be either of the State Bank of India or of any of the Nationalized Banks;
- (v) Guarantee Bonds executed or Deposits Receipts tendered by all Scheduled Banks;
- (vi) A Deposit in the Post Office Saving Bank;
- (vii) A Deposit in the National Savings Certificates;
- (viii) Twelve years National Defence Certificates;
- (ix) Ten years Defence Deposits;
- (x) National Defence Bonds and
- (xi) Unit Trust Certificates at 5% below market value or at the face value whichever is less.

Also, FDR in favour of FA&CAO (free from any encumbrance) may be accepted.

NOTE: The instruments as listed above will also be acceptable for Guarantees in case of Mobilization Advance.

(c) The Performance Guarantee shall be submitted by the successful bidder after the Letter Of Acceptance (LOA) has been issued, but before signing of the contract agreement. This P.G. shall be initially valid upto the stipulated date of completion plus 60 days beyond that. In case, the time for completion of work gets extended, the contractor shall get the validity of P.G. extended to cover such extended time for completion of work plus 60 days.

(d) The value of PG to be submitted by the contractor will not change for variation upto 25% (either increase or decrease). In case during the course of execution, value of the contract increases by more than 25% of the original contract value, an additional Performance Guarantee amounting to 5% (five percent) for the excess value over the original contract value shall be deposited by the contractor."

(e) The Performance Guarantee (PG) shall be released after physical completion of the work based on 'Completion Certificate' issued by the competent authority stating that the contractor has completed the work in all respects satisfactorily. The Security Deposit shall, however, be released only after expiry of the maintenance period and after passing the final bill based on 'No Claim Certificate' from the contractor.

(f) Whenever the contract is rescinded, the Security Deposit shall be forfeited and the Performance Guarantee shall be encashed. The balance work shall be got done independently without risk & cost of the failed contractor. The failed contractor shall be debarred from participating in the tender for executing the balance work. If the failed contractor is a JV or a Partnership firm, then every member/partner of such a firm shall be debarred from participating in the tender for the balance work in his/her individual capacity or as a partner of any other JV/partnership firm.



(g) The engineer shall not make a claim under the Performance Guarantee except for amounts to which the President of India is entitled under the contract (not withstanding and/or without prejudice to any other provisions in the contract agreement) in the event of :

(i) Failure by the contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer may claim the full amount of the Performance Guarantee.

(ii) Failure by the contractor to pay President of India any amount due, either as agreed by the contractor or determined under any of the Clauses/Conditions of the Agreement, within 30 days of the service of notice to this effect by Engineer.

(iii) The Contract being determined or rescinded under provision of the GCC, the Performance Guarantee shall be forfeited in full and shall be absolutely at the disposal of the President of India.

12. Tenderers must be enclosed in sealed cover mentioning the name of work on top of the cover as mentioned in Annexure-I.
13. Non-compliance with any of the conditions set forth therein above is liable to result in the tender being rejected.
14. The authority for the acceptance of the tender will rest with the South Eastern Railway, who does not bind himself to accept the lowest or any other tender or does he undertake to assign reasons for declining to consider any particular tender or tenders.
15. The successful tenderer/tenderers shall be required to execute agreement with the President of India acting through the Divisional Railway Manager (Engineering)/South Eastern Railway/Adra for carrying out the work as per SOR'2001 (Sec-Z) & USSOR-2010 and according to the General conditions of contract, special conditions/specification annex to the tender and Indian Railway Unified standard specifications for the work and materials as given in Vol-I & II, 2010 with upto-date correction.
16. The tenderer(s) shall keep the offer open for a minimum period of 120 days from the date of opening of the tender, within which period the tenderer(s) can not withdraw his/their offer, subject to the period being extended further if required, by mutual agreement from time to time. Any intervention of the above condition will make the tenderer liable for forfeiture of his security deposit for due performance of the foregoing stipulation.
17. Should a tenderer be a retired Engineer of the Gazetted Rank or any other Gazetted Officer working before his retirement, whether in executive or Administrative capacity, or whether holding a pensionable post or not, in the Engineering department of any of the Railway owned and administered by the president of India for the time being or should a tenderer being a partnership firm have as one of its partners a retired Engineer or a retired Gazetted Officers as aforesaid , or should a tenderer being an incorporated company have any such retired Engineer or retired officer as one of its directors, or should a tenderers have in his employment any retired Engineer or retired Gazetted officer as aforesaid, the full information as to the date of retirement of such Engineer or Gazetted officer from the said service and in case where such Engineer or officer had not retired from the Govt. Service at least two years prior to the date of submission of the tender as to whether permission for



taking such contract, or if the contractor be partnership firm or an incorporated company, to become a partner or Director as the case may be, or to take employment under the contractor has been obtained by the tenderer or the Engineer or the officer as the case may be from the President of India or any officer duly authorized by him in this behalf shall be clearly stated in writing at the time of submitting the tender. Tenderers without the information above referred to or a statement to the effect that no such Retired Engineer or Retired Gazetted officer is so associated with the tenderer, as the case may be, shall be rejected.

18. Should a tenderer or contractor being an individual on the list of approved contractors, have a relative(s) or in the case of partnership firm or company of contractors one of or more of his shareholder(s) or a relative(s) of the shareholder(s) employed in gazetted capacity in the Engineering department of the South Eastern Railway, the authority inviting tenders shall be informed of the fact at the time of submission of tender, failing which the tender may be disqualified/rejected or if such fact subsequently comes to light, the contract may be rescinded in accordance with the provision of clause 62 of the General Conditions of Contract.
19. Should a tenderer find the discrepancies in, or omissions from the drawings or any of the tender forms or should be in doubt as to their meaning, he should at once notify the authority inviting tenders who may send a written instruction to all tenderers. It shall be understood that every endeavor has been made to avoid any error which can materially affect the basis of the tender and the successful tenders shall take upon himself and provide for the risk of any error which may subsequently be discovered and shall make no subsequent claim on account thereof.
20. The tenderer shall be required to deposit earnest money with the tender for the due performance of the stipulation to keep the offer open till such date as specified in the tender, under the condition of tender, Annexure-I. The earnest money shall be as under-

Value of the work (Tender Value)	EMD
For works estimated to cost upto Rs.1 crore.	2% of the estimated cost of the work.
For works estimated to cost more than Rs.1 crore.	Rs.2 lakhs plus ½ % (half percent) of the excess of estimated cost of work beyond Rs.1 crore subject to a maximum of Rs.1 crore.

The earnest shall be rounded to the next Rs. 10/-.

(a) The Earnest Money should be in cash or in any of the following forms:-

- (i) Deposit receipts, pay orders, demand drafts. These forms of earnest money could be either of the State Bank of India or of any of the nationalized banks. No confirmatory advice from the Reserve Bank of India will be necessary.
- (ii) Deposit receipts executed by the Scheduled Banks (other than the State Bank of India and the Nationalised Banks) approved by the Reserve Bank of India for this purpose. The Railways will not, however, accept deposit receipt without getting in writing the concurrence of the Reserve Bank of India.



In case the tenderer withdraws his offer within the validity period of his offer or fails to Undertake the contract after acceptance of his tender the full earnest money should be forfeited.

In case of labour co-operative societies only 50% of the earnest money normally taken from the contractors is to be obtained in respect of works contractors.

Registered unemployed civil Engineering graduates need not deposit earnest money along with tender for civil engineering works up to limit of Rs.1, 00,000/-each.

In case of acceptance of the tender, the earnest money will be retained by the Railway as part of the security for the due and faithful fulfillment of the contract in terms of clause-16 of the General conditions of contract.

The Railway Administration, however, reserves the right to fix a lower or higher percentage and or the maximum amount of earnest money for any individual work.

21. If the tender is accepted this earnest money will be retained as part security for the due and faithful fulfillment of the contract in terms of clause-16 of the General Conditions of Contract. The earnest money of other tenderers shall save as herein before Provided, be returned to them but the Railway shall not be responsible for any loss of depreciation that may happen there to while in their possession, not be liable to pay interest thereon.
- 22(a) Before submitting a tender, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the works, that all conditions liable to be encountered during the execution of the works are taken into account and that the rates he entered in the tender form are adequate and all inclusive to accord with the provisions in clause-37 of the General Conditions of Contract for the completion of work to the entire satisfaction of the engineer.
- 22(b) when work is tendered for by a firm or company of contractors, the tender shall be signed by the individual legally authorized to enter into the commitment on their behalf. The railway will not be bound by any power of attorney granted by the tenderer or by changes in the composition of the firm made subsequent to the execution of the contractor. It may however, recognize such power of attorney and changes after obtaining proper legal advise the cost of which will be chargeable to the contractor as under:-
- (i) For initial vetting - Rs.100/-
 - (ii) For subsequent vetting – Rs. 30/-
- 22 (c) The tenderer shall clearly specify whether the tender is submitted on his own or on behalf of a partnership concern. If the tender is submitted on behalf of a partnership concern, he should submit the certified copy of partnership deed along with the tender and authorization to sign the tender documents on behalf of partnership firm. If these documents are not enclosed along with the tender documents, the tender will be treated as having been submitted by individual signing the tender documents.

The tenderer whether sole proprietor, a limited company or a partnership firm if they want to act through agent or individual partner(s) should submit along with the tender or at a later stage, a power of attorney duly stamped and authenticated by a Notary public or by Magistrate in favour of the specific person whether he/they be partner(s) of the firm or any other person specifically authorizing him/them to submit the tender, sign the agreement, receive money, witness measurement, sign Measurement Books, compromise, settle, relinquish



any claim(s) preferred by the firm and signed " No claim certificate" and refer all or any dispute to arbitration.

23. The Railway reserves the right of not invite tenders for any of the railway work/works or to invite open or limited tenders and when tenders are called, to accept a tender in whole or in part or reject any tender or all tenders without assigning reasons for such action.
24. The tenderers whose tender is accepted shall be required to appear at the office of the Divisional Railway Manager/Engg/South Eastern Railway/Adra in person or if a Firm or Corporation a duly authorized representative shall so appear and to execute the contract documents within fifteen days after the issue of LOA. Failure to do so shall constitute a breach of the agreement effected by the acceptance of the tender in which case the full value of the earnest money accompanying the tender shall stand forfeited by the Railway without prejudice to any other rights or remedies.
25. In the event of any tenderer whose tender is accepted shall refuses to execute the contract documents as herein before provided, the Rly. may determine that such tenderer has abandoned the contract and there upon his tender and the acceptance thereof shall be treated as cancelled and the Railway shall be entitled to forfeit the full amount to earnest money and to recover the damages for such default.

26. Variation in contract quantities.

The procedure detailed below shall be adopted for dealing with variations in quantities during execution of works contracts:

1.0 Individual NS items in contracts shall be operated with variation of plus or minus 25% and payment would be made as per the agreement rate. For this, no finance Concurrence would be required.

2.0 In case an increase in quantity of an individual item by more than 25% of the agreement quantity is considered unavoidable, the same shall be got executed by floating a fresh tender. If floating a fresh tender for operating that item is considered not practicable, quantity of that item may be operated in excess of 125% of the agreement quantity subject to the following conditions:

(a) Operation of an item by more than 125% of the agreement quantity needs the approval of an officer of the rank not less than S.A. Grade;

(i) Quantities operated in excess of 125% but upto 140% of the agreement quantity of the concerned item, shall be paid at 98% of the rate awarded for that item in that particular tender;

(ii) Quantities operated in excess of 140% but upto 150% of the agreement quantity of the concerned item shall be paid at 96% of the rate awarded for that item in that particular tender;

(iii) Variation in quantities of individual items beyond 150% will be prohibited and would be permitted only in exceptional unavoidable circumstances with the concurrence of associate finance and shall be paid at 96% of the rate awarded for that item in that particular tender.

(b) The variation in quantities as per the above formula will apply only to the Individual items of the contract and not on the overall contract value.

(c) Execution of quantities beyond 150% the overall agreemental value should not be permitted and, if found necessary, should be only through fresh tenders or by negotiating with existing contractor, with prior personal concurrence of FA&CAO / FA&CAO(C) and approval of General Manager.



- 3.0 In cases where decrease is involved during execution of contract:
- (a) The contract signing authority can decrease the items upto 25% individual item without finance concurrence.
 - (b) For decrease beyond 25% for individual items or 25% of contract agreement value, the approval of an officer not less than rank of S.A. Grade may be taken, after obtaining 'No Claim Certificate' from the contractor and with finance concurrence, giving detailed reasons for each such decrease in the quantities.
 - (c) It should be certified that the work proposed to be reduced will not be required in the same work.
- 4.0 The limit for varying quantities for minor value items shall be 100% (as against 25% prescribed for other items). A minor value item for this purpose is defined as an item whose original agreement value is less than 1% of the total original agreement value.
- 5.0 No such quantity variation limit shall apply for foundation items.
- 6.0 As far as SOR items are concerned, the limit of 25% would apply to the value of SOR schedule as a whole and not on individual SOR items. However, in case of NS items, the limit of 25% would apply on the individual items irrespective of the manner of quoting the rate (single percentage rate or individual item rate).
- 7.0 For the tenders accepted at Zonal Railways level, variations in the quantities will be approved by the authority in whose powers revised value of the agreement lies.
- 8.0 For tenders accepted by General Manager, variations upto 125% of the original agreement value may be accepted by General Manager.
- 9.0 For tenders accepted by Board Members and Railway Ministers, variations upto 110% of the original agreement value may be accepted by General Manager.
- 10.0 The aspect of vitiation of tender with respect to variation in quantities should be checked and avoided. In case of vitiation of the tender (both for increase as well as decrease of value of contract agreement), sanction of the competent authority as per single tender should be obtained.
27. The places, locations where contractor's vehicles are permitted to ply adjacent to the running lines the contractors are required to erect a bamboo barricade 10'-0" away from the center of the track to give an indication to the plying vehicles to keep strict watch of the barricade. Rly. Administration will post an experienced Gang man to act as Flagman at the location to prevent any accident. Wages involved for posting of such Flagman shall be borne by the contractor.
28. For settlements of disputes & Arbitration provision of relevant clauses of GCC Vol-2, 2001 edition of S.E. Railway with up-to-date correction slip will be followed.
29. All these conditions and specifications should carefully be studied by the tenderer/tenderers before submitting his/their tender. He/they should in his/their own interest be well acquainted with the site of work.

The above particulars and conditions and instructions are understood and accepted by me/ us.

Date

Signature of the tenderer/s



South Eastern Railway
RATE SHEET

ANNEXURE-III

Schedule of rate for O.T. for Supply of portion and welding of 52 kg/ 60 kg rail joints by Alumino Thermic SKV process with supply of portion in connection with ECW, TTR, TRR, CTR and Track Circuiting works under the jurisdiction of Sr. Divl. Engineer/ North/ Adra.

[Ch. To Est. Nos. under head of allocations 4073/Sig/04, 4076/Sig/04, 4065/Sig/04, 4045/Sig/03, 4141/Sig/08, 4068/Sig/04/Rev/08, 116/ADA/09, 134/ADA/11 & 126/ADA/12 under allocation DRF/Q-3141-44 & Deposit.]

SCHEDULE OF RATE:

Sl. No.	Description of work	Approx Basic value (Rs).	<u>Rates</u> <u>In figure/words</u>
1.	Execution of Spl. item of work under Sl. No.1 of Annexure-IIIA (Welding of 52 Kg 90UTS rail)	35,21,387/-	@-----% ----- percent) above/below
2.	Execution of Spl. item of work under Sl. No.2 of Annexure-IIIA (Welding of 60 Kg 90UTS rail)	14,53,276/-	@-----% ----- percent) above/below



South Eastern Railway

Annexure-III 'A'

Abstract of cost for O.T. for Supply of portion and welding of 52 kg/ 60 kg rail joints by Alumino Thermic SKV process with supply of portion in connection with ECW, TTR, TRR, CTR and Track Circuiting works under the jurisdiction of Sr. Divl. Engineer/ North/ Adra .

[Ch. To Est. Nos. under head of allocations 4073/Sig/04, 4076/Sig/04, 4065/Sig/04, 4045/Sig/03, 4141/Sig/08, 4068/Sig/04/Rev/08, 116/ADA/09, 134/ADA/11 & 126/ADA/12 under allocation DRF/Q-3141-44 & Deposit.]

SCHEDULE OF WORKS

Sl. No.	Description of work	Approx Basic value (Rs).	Rate	Amount (Rs.)
1.	Execution of Spl item of work under Sl. No. 1 of Schedule-'A' of Annexure-III A (Welding of 52 Kg 90UTS rail)	3521387	AT PAR	3521387
2.	Execution of Spl item of work under Sl. No.1 of Schedule-'B' of Annexure-III A (Welding of 60 Kg 90UTS rail)	1453276	AT PAR	1453276
				Total: Rs.4974663/ - Say: Rs.49,74,700/ - Earnest Money: Rs.99,500/ -



South Eastern Railway

Details of cost for - O.T. for Supply of portion and welding of 52 kg/ 60 kg rail joints by Alumino Thermic SKV process with supply of portion in connection with ECW, TTR, TRR, CTR and Track Circuiting works under the jurisdiction of Sr. Divl. Engineer/ North/ Adra .

[Ch. To Est. Nos. under head of allocations 4073/Sig/04, 4076/Sig/04, 4065/Sig/04, 4045/Sig/03, 4141/Sig/08, 4068/Sig/04/Rev/08, 116/ADA/09, 134/ADA/11 & 126/ADA/12 under allocation DRF/Q-3141-44 & Deposit.]

(I).Execution of All Spl. Works – Schedule-‘A’ of Annexure-III A.

Sl. No.	Description of work	Approx Qty.	Rate	Unit	Amount (Rs.)
1.	Conversion of 52 kg 90 UTS rail from SR/SWR to longer panel on running track including finishing, supply of portion, cost of transportation and other associated equipments complete by road from firm workshop to nearest PWI's stores including insurance and loading, unloading and stacking will be done by concerned PWI. During transit, octroi or any other charges will be on contractor's account. Rate also includes supervision & supply of welder with RDSO competency certificate for the purpose. Compressed air only be used for welding. Pressure tank will not be used. Note: If this item is operated on cess, 20/- per joint will be deducted from the accepted rate for number of joints done on cess.	1733 Joints	2031.96	Per joint	3521387
				Total Rs.	3521387

(II).Execution of All Spl. Works – Schedule-‘B’ of Annexure-III A

Sl. No.	Description of work	Approx Qty.	Rate	Unit	Amount (Rs.)
1.	Conversion of 60kg 90 UTS rail from SR/SWR to longer panel on running track including finishing, supply of portion, cost of transportation and other associated equipments complete by road from firm	673 Joints	2159.4	Per joint	1453276



	<p>workshop to nearest PWI's stores including insurance and loading, unloading and stacking will be done by concerned PWI. During transit, octroi or any other charges will be on contractor's account. Rate also includes supervision & supply of welder with RDSO competency certificate for the purpose. Compressed air only be used for welding. Pressure tank will not be used.</p> <p>Note: If this item is operated on cess, 20/- per joint will be deducted from the accepted rate for number of joints done on cess</p>				
				Total Rs.	1453276

Grand total: Rs. 3521387 + 1453276= Rs.49,74,663/-

Sr. No.	Station	No. of portion	
		60 Kg	52 Kg
1.	Chas	60 Nos.	162 Nos.
2.	TLE South Block Cabin	-	42 Nos.
3.	TLE West Block Cabin	39 Nos.	6 Nos
4.	Sanka	144 Nos.	-
5.	Sudamdih	165 Nos	30 Nos.
6.	Jamuniatand	108 Nos.	78 Nos.
7.	Ispatnagar	132 Nos.	24 Nos.
8.	Munidih Siding (Est. No. 116/ADA/09)	-	500 Nos.
9.	BJ Siding (Est. No. 134/ADA/11)	-	370 Nos.
10.	TTR work (Est. No. 126/ADA/12)		450 Nos.
11.	Mohishila	14 Nos.	36 Nos.
12.	Bankura	11 Nos	35 Nos.
	Total:	673 Nos.	1733 Nos.



NOTE

1. For welding of new rails the contractor will have to use his hydraulic trimmer with power jack rail profile weld grinder, generator and for welding of old rails with the approval of Engineer-in-charge. The contractor may be allowed manual chipping, mechanical grinding. The generator, grinding stones will be supplied by the contractor. Manual filing will not be permitted in any case.
2. The rates are inclusive of all taxes including Commercial Taxes, where applicable and other charges Leviable by the Govt.
3. No lead, lift or any other charges will be paid to the contractor.
4. Labour, petrol and K. Oil for welding of joints will be supplied by the Railways.
5. The rates quoted for welding of rail joints shall be for the work of complete in all respect including supply of portion, welding, finishing of joints as well as painting as per special conditions and specifications attached with the schedule.
6. The Rly. will not be responsible for idling of contractor's labours due to non-availability of traffic block due to unforeseen circumstances.
7. Safety is of paramount importance. The contractor during all stages of execution of work shall ensure safe passage of traffic over the work site and also take all precautions to ensure his/their labours for which Railway will not be liable for any compensation whatsoever.
8. Employment of Diploma holder/Engg. Graduate by the contractor shall be required to employ unemployed civil Engg. Graduate/Diploma holder on monthly salary during the execution of work as indicated below:-

<u>Contract value</u>	<u>No. of Engg. Diploma/ Graduate.</u>	<u>Duration</u>
a) Above Rs. 5 Lakhs but less than Rs. 15 Lakhs	One qualified Diploma holder/Overseer.	During the period of currency of contract.
b) Rs. 15 Lakhs and above	One qualified Civil Engg. Graduate.	During the period of currency of contract.

In case of contractor fails to employ the technical staff as aforesaid he shall be liable to pay a reasonable amount not exceeding a sum of Rs.7000/- (for diploma holder/overseer) and not exceeding a sum of Rs.10000/- (for Civil Engg. Graduate) for each month of default. The decision of the Engineer-in-charge as to the period for which the required Technical staff was not employed by the contractor as to the reasonableness of amount to be deducted on this account shall be final and binding on the contractor.

9. Maximum percentage of defective welds during initial weld testing should not exceed 2%. In addition to free replacement of defective weld, a penalty of Rs. 600/- be also imposed for each defective weld ranging from 2 to 4% and penalty of Rs.1,000/- if the defective weld is found more than 4%. The percentage of defective welds shall be assessed on the entire joints welded against contract.
10. The responsibility of safe running of track at work site rests entirely with all departmental supervisory staff. No contractor should be permitted to carryout any activity affecting the safety of track without presence of an Engineering supervisory staff of appropriate level. No work should be executed by the contractor without authorization being available.



11. Income tax/Con.cess where applicable will be deducted at source as per permissible rate.
12. The agency should depute a trained and certified supervisor duly certified by ADEN.
13. The following documents should be specified for submission along with tender:
 - a) List of personnel, organization available on hand and proposed to be engaged for the subject work.
 - b) List of Plant & Machinery available on hand (own) and proposed to be inducted (own and hired to be given separately) for the subject work.
 - c) List of works completed in the last three financial years giving description of work, organization for whom executed approximate value of contract at the time of award, date of award and date of scheduled completion of work. Date of actual completion and final value of contract should also be given.
 - d) List of works on hand indication description of work, contract value and approximate value of balance work yet to be done and date of award.

Note: - *(i) in case of items (c) and (d) above, supportive documents certificates from the organizations with whom they worked/are working should be enclosed.*
(ii) Certificates from private individuals for whom such works are executed being executed should not be accepted.

The tenderer/s should quote item wise separate percentage rate as per tender schedule of rate at **Annexure-III** and pen through the words either above or below otherwise his/their tender will be dealt as incomplete one. No cognizance will be given of the rates quoted for items other than items mentioned in the schedule as well as of incomplete one.

I/we have gone through the conditions and I/we am/are agreed to the same.

Date:

Signature of the tenderer(s)



SPECIAL CONDITIONS AND SPECIFICATIONS FROM WELDING OF 52KG/90 UTS/UTC RAIL JOINTS & 60 KG/90UTS RAIL JOINTS BY ALUMINO THERMIC SKV PROCESS.

1. These special conditions and specifications are supplementary to the General conditions of contract and standard specifications for works as contained in the General conditions of contract and standard specifications of the S. E. Railway (Revised Editions 2001 as corrected up to date). In matters wherein the provisions of these special "Conditions and specifications are at variance with those of the General conditions of contract and standard Specifications for works, the former shall prevail.
2. The work shall be carried out strictly in accordance with IRS Specification No. T -19-1994 for Fusion Welding of Rails by use of compressed air petrol/ LPG along with three piece mould by automatic tapping thimbles only and manual for fusion welding of rails by the Alumino Thermic SKV process (January-1998) with the latest amendments, except as modified hereinafter and the Thermit portions will be inspected and passed by RDSO and the welding work will be inspected by the Engineer-in-charge of respective divisions.
- 3(a) The rates quoted for the work shall be firm and inclusive of excise duty and any other tax or duty locally leviable, as well as license fees and royalty charges, if any. The rates shall not be subject to any variation for any reason whatsoever during the currency of the contract, except to the extent escalation is provided for in the clause 3 (b), 3(c), 3(d) & 3 (e) below.
- 3.(b) The railway will recommend to the concerned authorities for the Allotment of Commercial Grade/Electrical Grade Alumino to the contractor at the rate of 3.0 kg. for each joint ordered. This will be made on receipt of request from the contractor. The responsibility for obtaining the raw materials, even those recommended by the Railway, will rest solely on the contractor. Delay in the execution of the contract due to non-supply of any raw materials will not be accounted as a valid reason for non fulfillment or delay in the completion of the contract.
- 3(c) The departmental rates are based on the base price of the Commercial Grade Aluminium ingot at Rs. 140522.20 (Rupees one lakh forty thousand five hundred twenty two and paise twenty only) per MT including excise duty 16%. For this purpose the average quantity of Aluminium per joint shall be taken as 3.00 Kg including wastage. Any variation in this rate of Aluminium due to increase of cost of aluminium by way of any statutory increase in basic cost of aluminium will be borne by the Railway. The variation will be applicable from the date of issue of test certificate by RDSO after the date on which the variation of rate of aluminium is notified by the Government/Manufacturers. In support of proof of such variation the contractor will produce manufacturer's (M/s. Bharat Aluminium Co. Ltd's or M/s. NALCO's certificate). Railway Admn. shall make an additional payment of 3 paise per welded joint for every ten rupees increase in the controlled/manufacturer's rates of Commercial Grade/Electrical grade Aluminium including excise duty per tonne. The variation will be applicable for balance joints for which portions will be dispatched after announcement from the date of issue of test certificate by RDSO



regarding increase/decrease in the price of the said Aluminium subject to production of documentary evidence. The date of issue of RDSO's test certificate will be the date on which the revised prices will be compared for price variation.

- 3 (d) Any increase or decrease of excise duty or any other levy during the currency of contract on thermit portions and on any other consumable materials above/below the percentage prevailing on the date of opening of the offer will be to the Railway's account. The contractor shall, however produce authentic documentary proof of increase/decrease in excise duty. On the basis of the cost of portions, consumable materials and equipments as included in the rate of welding per joint, for one percent increase/decrease in the rate of excise duty the rate of welding per joint shall increase/decrease at the rate of Rs. 2.50 per joint.
- 3 (e) The above variation will be applicable for the joints which will be done after announcement regarding increase/decrease in the excise duty subject to production of documentary evidence.
- 3 (f) Any variation in price will only be considered as per clause 3 (b), (c), (d) & (e) above and all other taxes/levies/Octroi etc. on the portion during transportation of portion and equipments has to be borne by the agency.
4. The number of joints shown against each item of the schedule of work are approximate and liable for variation in the actual execution according to the needs of the Railway. The railway however, accepts no liability for any extra payment on account of such variations, either in the quantum of work or in the locations.
5. The rails to be welded will confirm to any of the IRS specification Nos. T-12-64, T-12-88, T-43-92, T-12-96. The contractor shall satisfy himself, from time to time, as required, about the metallurgical properties of the rails to be welded and apply correct technique to produce satisfactory welds. For this purpose, he may arrange for chemical analysis of test rail pieces which will be supplied to him by the Railway, free of cost, at firm's premises on request at the rates of 2 meters rail length for every 1000 joints on non returnable basis.
- 5.1 For quality at AT welding para 4.1.3 has amended vide A & C slip No. 2 of 07.12.99 to IRS specification for fusion welding of rails by A T welding process. IRS T-19-1994 for incorporating the full chemistry of the thermit welding portion materials and providing for USFD testing of the rail joint made in the premises of the portion manufacturer as part of the acceptance tests. Since stabilizing, the chemistry of portion as per the required norms would take some time, guide line communicated vide RDSO's letter of even No. dtd.13.01.2000 that A & C would be effective slip No. 2 from 04.04.2000 as per GM (Engg)/GRC's letter No. TC/A-T-Welding policy/1141, dtd.10.03.2000. Accordingly it will be effective in this contract also.
6. The contractor shall be responsible to ensure that the rails are correctly aligned vertically, longitudinally and transversely and spiked and held in position, with the proper gap between the rails ends.



6.1 In the case of welding of rails on the cess, the railway will arrange to lay out two strings of rails to be welded supported on wooden blocks. This will be done at least one day before the rails are offered to the contractor for welding.

6.1.1 In the case of welding of rails in situ, the Rly. will arrange to pull the rails so as to create the correct amount of gap, as specified by the contractor and to shift the sleepers as may be required, as well as to pull back the rails and repack the sleepers after the welding is done. The railway shall also be responsible for clearing the rails ends of all grease, dirt, under the contractor's supervision prior to welding of the joint as well as to open out fish plates, bolts, nuts etc. and to put them back as and when necessary.

6.1.2 The Railway shall be responsible for the removal of all kinds of twist in the rails, particularly within 1.8m from either end.

6.2. The above items of work of clause 6.1, 6.1.1, and 6.1.2 will be carried out by Railway.

6.3 Once the rails to be welded have been aligned, leveled, cleaned and provided with the specified amount of gap, it shall be the responsibility of the contractor to weld the joint and to guarantee its satisfactory performance, vide clause -19 of IRS-T-19-1994.

6.4 The Railway will make necessary arrangements for the safe conduct of the welding work without interference with track working. This will however, not relieve the contractor of his liability for any damage or loss caused to the Railway due to his own negligence. The decision of the Chief Engineer/S. E. Railway as to whether or not there has been any negligence on the part of the contractor shall be final and binding. The contractor shall be responsible to ensure that the rails are set to the correct alignment and level before welding.

7. A finished joint will be accepted as good on consideration of dimensional accuracy, if it satisfies the following tolerance as per clause 18.1 of IRS-T-19-1994.

(i)	Finishing of top table surface	$\pm 0.4\text{mm}$	Measured at the end of 10 cm straight edge.
(ii)	Head finishing (on sides)	$\pm 0.3\text{mm}$	On gauge side measured at centre of 10 cm straight edge.
(iii)	Vertical alignment	$\pm 1.0\text{mm}$ -0.0mm	Measured at the end of 1 m Straight edge
(iv)	Lateral alignment	$\pm 0.5\text{mm}$	Measured at the centre of 1 m straight edge.

Note: Dispersion for joint geometry, in case of old rails may be permitted by Sr. Divl. Engineer. The details of geometry of each joint shall be jointly signed by the firms



and Railway's representative and kept as a record. Any joint found not confirming to the above stipulations shall be cut and re-welded free of cost by the firm.

8. The Railway will provide a Permanent Way Inspector at each work site.
9. The Railway will also provide skilled, semiskilled and unskilled labour as required for the work to do all the required items of works such as lifting, packing, leveling, aligning, moulding, welding, chipping, trimming and grinding. It shall, however be understood that the labour provided by the Railway may not be familiar with the welding technique of the contractor. The contractor shall, therefore, arrange to afford them the necessary training in the welding technique, free of any charge. He shall also be responsible for providing his own technically trained personnel to exercise expert supervision of the work constantly during its progress, as well as for ensuring the quality of the welds produced by the Railway's labour. Every effort will be made to ensure that the labour provided by the Railway are not changed too frequently.
10. The contractor shall deploy sufficient number of welding supervisors for carrying out the works.
 - 10(a) The agency has to supply sufficient welding parties (one welding party for every 2000 joints with adequate number of plant and equipment) so as to complete the work within the date of completion. It is also the responsibility of the firm to ensure the finding inspection of the portions by RDSO so as to complete the supply as per date of completion. Delay on this account will not be acceptable to Rly. administration.
11. The contractor shall apply in writing to the Engineer or his representative, at least ten days in advance, indicating the proposed date of commencement of the work, the requirements of labour for the purpose and the number of joints expected to be welded each day. The contractor shall in all cases, be responsible for the efficient, utilization of the labour provided by the Railway within the constraints, if any, of the time available for doing the work. The Railway will arrange suitable traffic blocks and other facilities as required.
12. The Railway will provide the necessary tools and equipments as available for lifting, placing in position and aligning the rails for welding.
13. The Railway shall provide free of cost petrol for heating purpose at the rate of 1.80 liters per 60 kg rail joint and 1.60 liters per 52 kg joint. These quantities may vary within 10%. Any excess over and above the 10% limit of variation will be debatable to the contractor at such rate as fixed by the Railway for the time being.
14. The Railway will bear the freight charges on transport of plant equipment and all other materials required for the work from their (contractor's) works to the nearest station adjacent to the site of work and also for the transport back to their works for plants, equipments and left over materials upto 5% of the original supply. The



Railway will from time to time during the currency of the work as and when required by the contractor also arrange for the transport of the aforesaid materials and equipments as may be required during the progress of the work.

15. Arrangements will be made by the Railway to transport free of cost the contractor's materials, tools and plants required for the work by material lorry between the nearest Railway station and the site of the work, as and when necessary. Any delay or failure of the Railway in providing the lorrying facilities shall not entitle the contractor for any damages or compensation.
 - 15.1 Trimming and grinding should be done by the contractors carrying out these welds. The contractor shall introduce mechanical grinding. The power source for grinding machine and trimmer shall be arranged by the contractor. The Railway will provide fuel and operator to work the Generator set, trimmer and grinder.
 - 15.2 The quantities mentioned in the Tender Schedule/Documents are approximate and liable for variation upto 25% on either side. For increase in quantities, the contractor shall be intimated well in advance so that the increase can be completed within the original date of completion of the contract.
16. Suitable temporary accommodation for storage of the contractor's plant, tools and consumable stores will be arranged by the Railway free of charge, as close to the site of work as possible, on specific request from the contractor. Suitable accommodation for the contractor's supervisory staff will also be arranged near the site of work or at a near by station, if so desired. Such accommodation will be provided only for the duration of work and no rent will be charged for the same. The Railway shall, however, not be responsible for any loss of the contractor's plant, tools and consumable stores from the theft, fire, or any other cause.
17. The contractor, his representatives and his supervisors will be carried on push trolley from the nearest station to the site of work, provided the necessary Indemnity Bond is signed by the contractor in the first instance on behalf of himself and his personal and separate by each of the contractor's personal requiring to be carried on push trolley.
18. **Ultrasonic Testing:**

All the welded joints shall be ultrasonically tested by the Rly. in terms of clause 18.2 of IRS- T-19-1994 as per the procedure given at Annexure-I of Indian standard specification T-19-1994.

This testing shall be completed as early as possible after welding but before the welding team leaves welding site and within 30 days of welding whichever is earlier. All the joints which are found to be defective shall be cut and re-welded by the firm using their portion, equipment, labour and consumable, free of cost. If the defective joints are found to be more than 2% of welding done, re-checking by another USFD machine and with another trained operator will be undertaken at the contractor's request by the Railway.

Where one defective joint is required to be replaced by two new joints, the entire cost of both the re-welded joints shall be borne by the firm. The firm will however



be paid for one joint only in such case. Such re-welded joints shall also be tested ultrasonically and if found defective, shall again be cut and re-welded free of cost.

19. Rail joints welded by a firm shall be guaranteed against failure for a period of two years from the date of welding the joints in track or from the date such welded joints made in cess are inserted in the track. Any such welded joints which fails within the guarantee period shall be re-welded free of cost by the firm as per stipulations of clause 18.2 of Indian Standard Specification T-19-1994.
20. In the event of failure of sample test joints (ref. Clause 18.3 of IRS standard specification T-19-1994), the period of guarantee for 100 joints represented by the sample joint shall be extended for a further period of one year. In case of failure of joints or joints exhibiting signs of failure by cracking within the extended period of guarantee, the joints shall be re-welded free of cost by the supplier as per stipulation of clause 18.1 of IRS standard specification T-19-1994.
The welded joints with the extended period of guarantee shall be marked X with yellow paints on the outside of the web of the rail near the joints in addition to the marking prescribed in clause 20 of IRS standard specification no. T-19-1994.
- 20.1 If the contractor fails to re-weld the failed joints free of cost as per special condition no. 19 above, three time the cost of weld paid to the contractor as per the accepted rate for relevant item of the schedule of work will be recovered and deducted from his dues. For this purpose, a sum equal to 1% of the total amount billed out or the security deposit of 10% of the value of the work executed by the contractor, will be kept as retention money till the expiry of the guarantee period as per special condition no. 19 above.
- 20.2 The necessary recovery as per special condition no. 20.1 will be made from their dues, available with Railway, either from this contract or from any other contract and if no such dues is available at the time of recovery, the recovery will be made from the security deposit.
21. The contractor shall not carryout any work between sunset and sunrise. He should make his own arrangement to protect the work against wind and weather in the course of execution. No welding work shall be done during heavy rains.
Working during light, rains may be done in accordance with the local instructions given by the Railway supervisor at site but defective welds will be rewelded by the contractor free of cost.
22. One out of every 100 joints welded per batch shall be selected at random by the Railway within one month of welding and subjected to hardness and transverse test as per clause 4.2 of IRS standard specification no. T-19-1994 and the joint shall comply with the provision laid down therein, except that the transverse load and deflection values for 60Kg/90 UTS rails may be permitted as per T-19-1994 at the specific request of the contractor.
23. In the event of the failure of samples test joints in any of the requirements of this specification, the Railway will be at liberty to suspend further welding. However,



two more randomly selected joints from the same lot of 100 joints shall be subjected to retest as per clause 4.2 of IRS standard specification no. T-19-1994. Both the joints should clear all the tests. If the report is also not satisfactory, further welding of joints shall be suspended until the firm has examined the welding technique and satisfies the requirements of clause 4 of IRS standard specification No. T-19-1994 by welding one test joint. The clearance for re-commencement of welding shall be given by RDSO.

No payment shall be made for such sample welds, but the rails, petrol and labour required for the same shall be supplied by the Railway free of cost. The Railway will also arrange for the transport of test joints at its own cost, from the site of work to place of testing where RDSO supervisors available for testing. These test joints shall be tested under the supervision of Inspector of RDSO(Research Wing).

24. Each joint shall have a distinctive mark indicating month, year, welder's code and weld number on the web of the rails in the vicinity of the welded joint in the following manner:

Month:	Last two digit of the year	Agency	Specific Person number	Weld No.
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Details of marking should be painted at approximately 300 mm from the joint on the web of the rail with white paint on the black background. The agency and the specific person number(for welder) shall be as per clause 16.6.4 of IRS standard specification T-19-1994. The welded joints shall be serially numbered in a kilometer. Repair welds/additional welds done at a later date may be given continuing weld number in that kilometer. For example, the last thermit weld number in a particular kilometers was 88 and subsequently a thermit weld has been executed, it shall be numbered 89, irrespective of its location in that kilometer.

25. The contractor shall not directly or indirectly use any invention for the time being the subject of letters of patent, so as to infringe such patent or so as to involve the Railway, if any infringement thereof and the contractor shall hold the Railway harmless and keep the Railway indemnified against all costs, damages or expenses, arising out of or in connection with any such infringements.
- 25.1 Punching of distinctive mark may be allowed as per IRST-19-1994 at the contractor's specific request.
26. The contractor will produce hot and cold sets required for the welding work free of cost. Repairing of the same will be done by railway free of cost, whenever mechanical trimming is not resorted to on old rails.
27. **Force Majeure:** The contractor shall not be responsible for delay or failure to execute it directly or indirectly caused by or due to act of God, War, mobilization, requisition by an interference from Government of local authority, riots, Civil



commotion. The force majeure, lockouts, labour disturbance, trade dispute, strike, fire pestilence, damage or accident to machinery or any other event or circumstances whatsoever beyond his control whether due to or in consequence of any the aforesaid caused or not.

28. Alongwith every payment the Railway will send to the contractors.
- Income tax deduction certificate for the amount deducted at source towards Income Tax and
 - A copy of the bill detailing to the payment.

29. **Advance payment and rebate:**

- 29.1 The Railway shall pay 90% (ninety percent) of the cost of the welding of joint i.e. 90% of the accepted rate for item no. 1 & 2 of the schedule of work as "On account payment" after the receipt of the portions by the Railway and on their production of RDSO's test certificate for the same. If this advance payment of 90% (ninety percent) is made by the Railway within one month from the date of receipt of portions and test certificate by the firm, the rate for the work of welding will be reduced by Rs. 5 per joint. In case for some reasons or other, this advance payment of 90% (ninety percent) is not made by the Railway within one month of the receipt of the materials and test certificate, this rebate of per joint will not be applicable.
- 29.2 In case of delay in execution of formal Agreement, advance payment of 90% can be made on the strength of acceptance letter itself after receipt of welding materials.
- 29.3 The contractor shall ensure that in every case, the time lag between the receipt portions and submission of the necessary documents such as RDSO's test certificate, etc. does not exceed 2(two) days to enable the Railway to make advance payment, within the stipulated period of one month from the date of receipt of portions. In case the submission of the necessary documents by the contractor is delayed beyond 2 days as stipulated above, the time limit up to which the rebate can be availed of shall correspondingly be extended by the same period of delay. For this 90%(ninety percent) advance payment contractor shall not sign the measurement book, but this payment is subject to usual deductions towards security deposit, income tax etc. The balance 10% will be paid through on account bills during the progress of work after welding.
- 29.4 In case of urgency if Railway uses Contractor's portions for welding by Railway's departmental team and welds the joints without the firm's supervision, the 90% advance already paid to the firm as per clause 30.1 will not be deducted from the contractor for such number of portions. However 10% payment for the cost of such joints will not be made to the contractor.
- 29.5 The number of portions damaged/spoiled etc. in transits or during welding by Railway's departmental team shall also be accounted for as used by Railways'



departmental team. 90% advance paid to the firm as on account payment should not be deducted from the contractor's bills at any stage.

- 29.6 The clear location of such joints welded by Railway's departmental team shall also be recorded immediately after the consignment is consumed by the Railway.
- 30 The work of welding comes under the purview of works contract and at present there is 4% Sales Tax on the works contracts. If there is any increase/decrease in the rate of Sales Tax or any other taxes are levied by the Central or State Govt. on works contracts/job works, the same would be payable by the Railway, on and from the date of such levy. The proof of such levy shall be produced by certificate in case Sales Tax amount is deducted from their bills. The firm is supposed to deposit the required Taxes to the concerned authorities if any case comes to Railway Administration where the required taxes are not deposited by the firm to the concerned authority, the same will be deducted from the firms dues with the Railways Two FORM 'D' will be provided by the firm on request.
31. At present there is no consignment tax but in case of the imposition of the same by Central/State Govt., the same will be borne by the Railway in respect of the materials supplied for work under this tender on submission of the documentary/evidence by the contractor to the Railway
32. No recovery will be made for spoilt/defective joints during welding up to 2% of the total number of joints welded. The welding of such defective joints shall be done by the firm, free of cost but the labour and fuel etc for such re-welding of joints up to first 2% will be provided by Railway at its own cost.
If the number of spoilt/defective joints exceeds the above limit of 2%, the contractor shall have to bear the cost of labour and fuel at the rate of Rs.250/- per joints only for the net joints exceeding 2%.
- a) For the each one defective joint, two new joints are to be made replacing one defective welding. Thus total three numbers of joints are to be welded instead of original one joint due to the defective welding joint done by the agency. Railway will bear the cost of only one welding joint and the remaining two welding is to be done at the firms costs.
33. Contractor will be allowed to collect his used packing materials such as polythene bags, packing cases, cartoons, equipments, consumables and chipped/stemmed weld metal free of cost.
34. If it becomes necessary to shift the thermit portions and consumables from one site to another it will be done by Railway with the contractor's consent/knowledge.



INDIAN RAILWAYS STANDARD SPECIFICATION FOR FUSION WELDING OF RAILS BY ALUMINO THERMIC PROCESS
SERIAL NO: IRS-T-19-1994

FORWARD:

This specification is issued under the fixed serial No. T-19. This was originally adopted in 1961 and was revised in 1965 and 1984. This third revision is necessitated to include current technological improvements in the process. In this revised specification, test requirements of 90 UTS, 110 and Head Hardened rails have been incorporated, acceptable percentage of porosity, tapping time and transverse breaking load requirements have been revised.

1. INTRODUCTION:

- 1.1 The soundness of the welds produced by alumino-thermic process depends on the quality of (a) alumino-thermic mixture hereinafter referred to as the 'MIXTURE' and (b) the technical control exercised during the preparation for and the execution of the welding by this process.
- 1.2 The quantity of the 'MIXTURE' required for welding one rail joint shall be called a "Portion".
- 1.3 A batch shall consist of a number of 'portions' manufactured from similarly and simultaneously treated raw materials.
- 1.4 'Portions' manufactured by agencies approved by RDSO and accepted by nominated inspecting authority shall only be used.
- 1.5 Except for welds executed for laboratory evaluation and acceptance test. All welds shall be executed under the supervision of personnel possessing valid competency certificate either from RDSO or from Thermit portion plant, Northern Railway Charbagh-Lucknow.
- 1.6 No changes in weld design, range of weld metal chemistry, its acceptance tests and the methods of welding shall be made without the consent of the approving authority. Approving authority shall mean Director Research, Design & Standard Organisation (Ministry of Railways) Nanak Nagar, Lucknow-226011 or his representative.
- 1.7 The numerical value may be rounded off as per IS:2

2. SCOPE:

- 2.1 This specification is for A. T. Welding of rails to IRS specification T-12 and UTC specification 860-0, Alloy Steel Rails viz. Chrome Manganese and Chrome-Vanadium and Head Hardened rails.
- 2.2 This Indian Railway Standard covers.
 - a) Technical requirement for hermit portions and welded joints including various acceptance tests.
 - b) Procedure for approval of Alumino-thermic "Portion" manufactures.
 - c) Procedure for approval of A. T. Welding Supervisors, welders and contracting firms.
 - d) Acceptance tests for situ and cess Alumino thermic joints.



2.3 Reference Documents: This standard refers to the following Indian Standards of the Bureau of Indian Standards. These should be available at the manufacturers works for reference.

- i) IS:2 Rules for rounding off numerical values.
- ii) IS:187 Cotton long cloth.
- iii) IS:9738 Polyethylene bags for general purposes.
- iv) IS:2500(Pt.I) Sampling inspection tables.
Part-I Inspection by Attributes and by count defects.
- v) IS:1500 Method for Brinell hardness test for metallic materials.

PART- 'A' TECHNICAL REQUIREMENTS FOR THERMIT PORTIONS:

3. Supply of the "Portions".

3.1 The "Portions" shall be submitted for acceptance batch wise. A batch shall consists of 300 portions or part thereof manufactured from similarly and simultaneously treated raw materials. Batch numbering shall be given year wise in a six digits code, whose first two digits will indicate two digits of the year of manufacture and the balance 4 digits the serial number of the batch. The batch number at the beginning of each year shall, therefore, commence from 0001.

3.2 Every portion shall be packed in a moisture proof bag of polyethylene to IS:9738, "Indian Standard Specification for Polyethylene bags for general purpose "Grade HM HDPE of 150 micron thickness which should be sealed so as to make airtight. The Polyethylene bags should then packed in a heavy duty bag made of new cloth to IS:187. The open end of the cloth bag shall be stitched and sealed in such a manner that there is no access to the "Portion" without damaging the bag or breaking its seal.

3.3 Following particulars shall be indicated on two similar labels – One placed inside the Polyethylene bag containing the portion and the other outside with the seal on the bag.

- i) Batch No.
- ii) Portion No.
- iii) Date of Manufacture
- iv) The section and grade of rail to be welded.
- v) Welding Technique
- vi) Insignia of the firm.

The insignia of the firm and rail type should be printed on the exterior of the cloth bags as per the under mentioned colour shade.

<u>Sr. No.</u>	<u>Rail type</u>	<u>Colour</u>
1.	72 UTS	Red
2.	90 UTS	Green
3.	110 UTS	Black
	(Chrome Manganese and Chrome –vanadium)	
	110 UTS Head	Yellow
	hardened.	



The bags containing portion shall be packed in sturdy wooden/heavy duty corrugated card board approved by RDSO/Metallic Container. No container with the portion bags shall weight more than 60 kg. Any bag of portion found damaged at the time of delivery shall NOT be accepted.

4. ACCEPTANCE TESTS:

The following test shall be conducted for assessing the quality of portions:-

- a) Reaction test.
- b) Mechanical and Metallurgical tests on test welds.

For this purpose, one portion shall be randomly selected per batch for tests as clause 4.1 and 4.2. The weight of each portion shall be recorded by the Inspector.

4.1 Reaction test:

4.1.1 Reaction test shall be carried out on one of the selected portions.

4.1.2 During the course of the Alumino –Thermic reaction, observations in regard to the characteristics of the reaction i.e. whether it is quit, normal or boiling shall be made. Reaction which is boiling, shall be rejected. The reaction and tapping shall be within 20+ seconds. The Alumino-Thermic Steel shall be poured in standard mould so as to obtain a bar having diameter between 25 and 35mm.

4.1.3 A TRANSVERSE SECTION SHALL BE CUT FROM THE MIDDLE THIRD PORTION OF THE BAR OF Alumino-Thermic steel obtained from reaction test as laid down in clause 4.1.2. Aluminium content of the steel shall be determined spectroscopically at two points located at the mid-radi of the cross section. The Aluminium content at both the point shall be between 0.15 to 0.65.

4.2 Mechanical and Metallurgical tests on test welds.

4.2.1 Two new rail pieces of same section and grade. Each approximately 750 mm long, shall be used to make test weld joint. The welded joint shall be made as per the technique offered by the manufacturer. The rail table and sides of rail head shall be finished to the geometrical tolerances specified in clause 18.1.

4.2.2 Hardness test:

Brinell hardness test shall be carried out at the welded zone, heat affected zones and parent metal of the rail in accordance with IS 1500, Method for Brinell Hardness test for steel. The test weld shall be done on the top surface of the head of the test shall be done on 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 average hardness number (of two readings) determined for the weld metal at locations shows as 'A' in Fig. 1 shall be within +20-0 HB of the hardness values of rail as shown in table 1. The average hardness number (of two readings) on each heat affected zone at location shown as 'B' and 'C' in Fig.1 shall be within(-) 20 HB for location B and (+)20HB for location C of the actual hardness of the parent rail

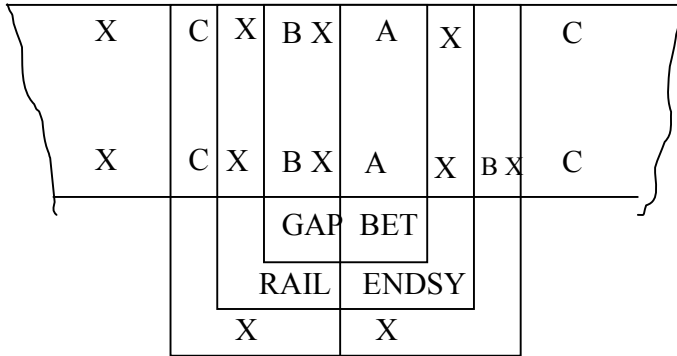


Fig.1

RAIL-HEAD-IN PLAN

Note.

1. For 25mm CAP SKV-WELDING
X=25MM
Y=15MM

2. FOR WIDE GAP WELDING
X= Gap in mm + 15mm

$$Y = \frac{\text{Gap in mm} + 5\text{mm}}{2}$$

TABLE-1

Type of Rail	72 UTS Rail	90 UTS Rail	01 G Gr. V. Steel	Mn of Alloy rail.	Head Hardened Rails.
Average Hardness (BHN)	230	265	310		365

Rail Type	Rail Section	Min. transverse Breaking load in Tones	Min. deflection in mm at the centre at the load in col.3
72 UTS to IRS T-12	60 R	50	15
- do-	75	60	15
- do-	90R	70	15
- do-	52 Kg	85	18
- do-	60 Kg	95	18
90 UTS to IRS T-12/ UTS-860 or equivalent	90R	85	15
Alloy steel(Gr. Mn or Gr.-V Type)	60 Kg	115	15
	52 Kg	95	10
	60 Kg	115	10
110 UTS Head Hardened rails	60 Kg	115	15

4.2.3.2 If the fracture does not occur through weld, a slice shall be cut transversely at the weld and etched in boiling 1:1 Hydrochloric acid for about 20 minutes to determine casting defects if any.



4.2.3.3 The fractured surface of the weld, or in case where macro etching is done on transverse section through the joint, shall not show defects such as blow holes, porosity and inclusion etc. exceeding total permissible area of defect shown in Table-3. However, the size of any individual defect shall not exceed 2 mm diameter. The defects should not be interconnected and none of these shall extend up to the outer surface of the weld. There shall not be any lack of fusion. The fractured surface shall also not show the presence of accretions or mirror like structure and shall be crystalline in appearance.

TABLE-3

AREA OF PERMISSIBLE DEFECTS

<u>Rail section</u>	<u>Permissible total area of defects (mm²)</u>
60R	19.0
75R	23.7
90R	28.5
52 Kg	33.0
60 Kg	38.4

4.3 Retest:

4.3.1 If the results of any of the tests referred to in clause

If 4.1 and 4.2 are found to unsatisfactory, the batch will stand rejected. However, retests can be carried out at the manufacture request. These retests shall be carried out as per para 4.1 and 4.2 on twice the original sample size.

4.3.2 If the results of all the retests samples are satisfactory. The batch represented by the sample portion shall be accepted. If any sample fails to meet the requirements of any of the tests, the batch shall be rejected.

5. REPROCESSING:

In the event of batch failing to comply with requirements of clause 4, the manufacturer may resubmit the batch after necessary reprocessing ONCE only. The reprocessed portion shall be submitted under a separate batch number with a suffix 'R' and shall be tested as per clause 4 above.

6. ACCEPTANCE:

6.1 Acceptance shall be done batch wise. Every individual batch that satisfies the conditions prescribed in this specification shall be accepted. Each bag containing the portion shall be sealed by the manufacturer and the container shall be suitably stamped /sealed by the Inspecting Officer. The stamp/seal shall be such that it shall not be possible to open the container without breaking stamp/seal.

6.2 The manufacturer shall dispatch the accepted portions to the consignee preferably within 60 days from the date of acceptance.



7. **DISPOSAL OF REJECTED PORTION:**
In case the batch fail to meet the requirements of clauses 4, it shall be rejected. The rejected portion shall be separately stores and a proper accountal shall be kept. The disposal of these rejected portions shall be advised to the inspecting agency.
8. **TESTING FACILITIES.**
The manufacturer shall, at his own expenses, supply all labour, materials, consumables, rail pieces and appliances for testing, both for initial testes and retests as may be carried out in presence of the Inspections officer, in his own premises or at any other acceptable place in accordance with his specifications.
9. **INSPECTION OF PREMISES AND RECORDS.**
The purchasers or the inspecting officer shall have free access to the premises of the manufacturer at all reasonable time. They shall be at liberty to inspect all the records and the manufacturer of portions at any stages.
10. **PART 'A' APPROVAL OF "PORTION MANUFACTURERS"**
The approval of portion Manufacturer shall be given separately for each section and metallurgy of rail and for each technique of welding.
11. For the purpose of approval, the following definitions shall apply.
 - 11.1 "Portion Manufacturer" shall mean the organization manufacturing the portion. In addition, the "Portion Manufacturer" may execute. A. T. Welding of rail joints by his technique.
 - 11.2 "Approving Authority" shall be Director General Research, Design and Standards, Organisation, Ministry of Railways Nank Nagar, Lucknow-226011 or his representative.
12. **PROCEDURE FOR APPROVAL OF "PORTION MANUFACTURER"**
 - 12.1 The application for approval shall be submitted by the "Portion Manufacturer" to the approving authority indicating the rail which portion is being offered and the welding technique.
 - 12.2 Approving authority, on receipt of such an application shall forward necessary performance to be filled in by the applicant. The amount to be deposited shall also be intimated.
 - 12.3 The applicant shall return the proforma, duly filled in, along with a demand draft for the prescribed amount drawn in favour of Director (Finance) Research Designs and Standard Organisation Manak Nagar, Luknow-22601.



12.4 If the information submitted by the applicant is prima-facia found to be satisfactory, the approving authority shall inspect the premises of the applicant for assessment. If the assessment is satisfactory, tests and trials shall be undertaken by the approving authority.

12.5 Tests and trials for approval of “Portion Manufacturers”.

12.5.1 The portion Manufacturer shall manufacture a batch of 150 portions’ at his own costs samples shall be drawn at random by the approving authority and the following laboratory tests shall be carried out at the Manufacturer’s Works premises or at a laboratory mutually agreed upon between the Manufacturer and the approving authority.

- i) Six numbers of reaction tests will be conducted as per clause 4.1.
- ii) Twelve tests weld joints shall be made as per clause 4.2.2. The joint shall be subjected to the following tests:
 - a) Ultrasonic test on all joints as per procedure laid down at Annexure-IA
 - b) Brinell Hardness test on all the joints as per clause 4.2.2
 - c) Magnetic crack detection and macro examination on deep etched longitudinal sections, across the weld on the remaining six joints. This examination shall not reveal any lack of fusion or cracks. Other welding defects, e.g. porosity, inclusion etc. shall not exceed 0.5% of the weld area in longitudinal section. The size of any individual defect shall not exceed 2mm diameter. The defects should not be interconnected and none of these shall extend up to the outer surface.

12.5.2 RETEST:

If the results of any of the tests referred to in clause 12.5.1 fail to meet the requirements of the test, the technique shall be reflected. However, retest can be carried out at the request of the “Portion Manufacturer” provided not more than 2 joints have failed in ultrasonic testing and not more than one joint has failed in each of the other tests mentioned in clause 12.5.1.

For retest, same number of test specimens as mentioned for each test in clause 12.5.1 shall be welded. None of the sample joint should fail in retest.

13. FATIGUE TEST:

13.1 Fatigue testing of hermit welding techniques shall be arranged by the manufacturer at his own expense. Following principle shall be followed:

- i) For 90UTS Metallurgy-Anyone section out 52 Kg/60Kg (when both sections have been developed the lighter section should be selected for fatigue testing)
- ii) For 72 UTS metallurgy-Anyone section out of 90R, 52Kg(when both the section have been developed the lighter section should be selected for fatigue testing).
- iii) Development of any other .AT. welding technology such as, wider gap, gas heating, chrome Manganese/Head Hardened rails shall also be got separately fatigue tested before standardization. However, One section for one technique shall be required to be fatigue tested.



- 13.2 The weld sampled shall be tested in a recognized laboratory/test centre for which prior approval of RDSO shall be necessary.
- 13.3 Following scheme shall be followed for fatigue testing of Thermit welded rail joints.
- i) There weld samples shall be made in presence of RDSO representatives.
 - ii) The wild sample shall be made with one metre long new rail pieces to have an overt all length of 2.0m. The rail and joint shall be ultrasonically.
 - iii) Testing shall be done for stress ranges of tensile 20 Kg/mm² to compressive 4 Kg/mm² (These are the stresses on the bottom surface of rail foot). The test frequency shall be any one frequency between 8.33 Hz to 12 Hz.
 - iv) A joint shall be deemed to have passed if it with stands a minimum of 2 million cycles.
 - v) The technique shall be deemed to have cleared fatigue test if all the three samples pass the above test.

13.4 Retest:

in case of failure of not more than one joint in the above test, retest can be carried out at the request of the portion manufacturer. For the purpose of retest, three more weld samples shall be made in presence of RDSO representative and subjected to the above test.

The technique shall be deemed to have passed the fatigue test if all the three retest samples pass the test.

14. FIELD TRIALS

- 14.1 Subject to the results of the tests in clause 12 and 13 being satisfactory service trials for period of one year or till passage of 10 GMT traffic over the joint, 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 300 mm from the joints. During execution of trial welding at site, spoilt joints, if any, shall be cut and rewelded by the contractor at his own expense. If more than 5% joints are found defective the trial shall be discontinued considering the technique to be unsatisfactory. All the defective joints shall be removed from track by the manufacturer at his own expense.
- 14.2 Failure of more than 2% joints during service trial will render the technique unacceptable.
15. The approving authority shall have free access to the premises of the portion manufacturer at all reasonable times. The portion manufacturer shall furnish all the technical data to the approving authority as and when called for.

16. PART-C:

PROCEDURE FOR APPROVAL OF A.T. WELDING SUPERVISORS AND WELDERS.

- 16.1 For the purpose of approval, the following definitions shall apply:-



“Welding Supervisors” shall mean an individual engaged with portion manufacturer with adequate knowledge and competence for supervising and executing Alumino Thermic Welding of rail joints.

“Welder” shall mean an individual with adequate skill and competence for executing Alumino Thermic Welding of rail.

JOINTS AT SITE:

The approval of welding supervisors/welders for execution of Alumino-Thermic welds at site shall be given separately for the following categories of welding technique:

- a) Welding of 72 UTS and 90 UTS rails with standard gap.
 - b) Wide gap welding.
 - c) Welding of 110 UTS and Head Hardened rails.
- 16.2 Competency certificate for welding supervisors and welders of the Zonal railways shall be issued by the Thermit portion Plant of Northern Railway at Lucknow. Competency certificate for welding supervisors and welders of firms shall be issued by D(M&C) R. D. S. O. Lucknow.
- 16.3 Test weld joints will be made using any rail section at the discretion of the approving authority. Welding Supervisors/welders found competent shall be deemed to be fit for A. T. welding of all rail sections for the particular category as per clause 16.1 for execution of test weld joints, the welding supervisors/welders desirous of obtaining approval shall have to utilize his own welding team, rails, implements and portions procured from approved manufacturers.
- 16.4 The firm shall pay, in advance, charges for certification of supervisors/welders as per the rates decided by RDSO for this purposes, Payment should be made through demand draft drawn in favour of Director (Finance) RDSO, Manak Nagar, Lucknow-226011.
- 16.5 Six tests welds shall be made by the welding/supervisors/welder and his team for the particulars category of welding technique (as per clause 16.1) for which approval is sought. Following testes shall be carried out at the sponsoring firm’s works premises or at RDSO, Lucknow.
- a) Ultrasonic testing as per procedure mentioned at annexure-IA.
Failure of more than one test weld will disqualify the welding supervisor/welder.
 - b) The ultrasonically sound joints will be subject to the following tests:
 - i) Brinell hardness test on all the test welds as per clause 4.2.
 - ii) Transverse load and deflection tests on any three test welds as per clause 4.2.3.
 - iii) Magnetic crack detection and macro examination of remaining three test welds longitudinally sectioned across the weld as per clause 12.(ii) (d).
 - iv) Joint geometry as per clause 18.1.
- 16.6 If the test results are satisfactory, a provision competency certificate, valid for two years, shall be issued to the welding supervisor/welder on behalf of the sponsoring firm. The provisionally approved by RDSO/TPP, Lucknow after two years for issue of competency certificate valid for five years.



- 16.6.1 For the purpose of reassessment, the welding supervisor/welder shall submit to the approving authority, the Asst. Engineer zonal Railway.
- A record of joints welded/supervised by him.
 - No. of joints failed in service.
- 16.6.2 Based on the above details and personal interview, the approving authority will issued competency certificate. Fresh competency certificate will have to be issued whenever necessary there is a change of in the process of welding or when a person who has been earlier trained and is used with a final competency certificate has not been executing welding for a period of more than 22 years or the work done by him has been rated as unsatisfactory.
- 16.6.3 Renewal of competency certificate will be made based on performance or actual testing.
- 16.6.4 A 10 character "Identification Code Number" shall be used for numbering of competency certificate and identification of supervisors and welders. The first three characters shall be alphabets which would indicate the agency (Railway or Firm) to which the supervisor or welder belongs, the next digit(S to W) would denote a supervisors or welders, the next three numbers would be allotted to the particular person (specific person number), next two numbers shall denote the year of issue of the competency certificate and the last alphabet (P or F) shall indicate whether it is "Provisional" or "Final" competency certificate. For example NROS00190F would indicate a welding Supervisor of Northern Railway with specific at person number1. The final competency certificate having been issued in the year 1990. The specific persons number will be continue for a zonal Railway/Firm. The organization issuing competency certificate shall ensure that there is no duplication of the "Identification Code Number". An Annual list of valid competency certificate will be circulated by the agency issuing the competency certificate will be circulated by the agency issuing the competency certificate to the Zonal Railways, Zonal Railways should constantly update and maintain the list of supervisors and welders along with their identification code.

PART 'D' – ACCEPTANCE TEST OF JOINT WELDED AT SITE:

17. EXECUTION OF WELDS AT SITE:

- 17.1 Alumino Thermic welding of rail shall be executed at site only under the direct supervision of welding supervisors by welders. Both having valid competency certificate issue by RDSO/TPP. Lucknow (Sec. Part-C).
- 17.2 All Alumino Thermic welding work shall be executed with the use of weld Trimmer and profile Grinder. Additionally, rail tensors shall be issued wherever work is done on welded rails.

NOTE: In case of welding of old rail dispensations for not welding Trimmers and profile grinder shall be obtained from Chief Engineer.

18. ACCEPTANCE TEST:



18.1 Joint Geometry:

All the finished welded joints shall be checked to ensure that the joint geometry is within the following tolerances:

i) Vertical	+1.0mm -0.0mm	(Measured at the end of misalignment- 1 m straight edge) (Fig 18.1 (a).
ii) Lateral	+0.0mm 0.0mm	(Measured at the centre of misalignment - 1 m straight edge) (Fig. 18.1 (b).
iii) Head finishing	.3mm on gauge side	(Measured at the centre of 10cm Straight edge (Fig. 18.1).
iv) Finishing TOP table surface	+0.4mm -0mm	(Measured at the end of 10cm straight edge) (Fig. 18.1 (d).

NOTE: Dispensation for joint geometry, in case of old rails may be permitted by Chief Engineer.

The details of geometry of each joints shall be jointly signed by the firm's and Railway representative and kept as record. Any joint found not conforming to the above stipulations shall be cut and rewelded, free of cost by the firm.

18.2 Ultrasonic Testing:

All the welded joints shall be ultrasonically tested by the Railway/contractor with his own men & machinery as per the procedure given at Annexure-IA.

This testing shall be completed as early as possible after welding but before the welding team leaves the welding site. All the joints which are found to be defective shall be cut and re-welded by the firm using their portion, equipments labour and consumables.

There one bad joint is required to be replaced by two new joints, the entire cost of both the joints shall be borne by the firm. Such re-welded joints shall also be tested by ultrasonically and if found defective, shall gain be cut and re-welded free of cost.

18.3 Sample test joint:

One out of every 100 joints welded per batch shall be selected at random by the purchaser or by the inspection officers within one month of welding and subjected to hardness and transverse test as per clause 4.2 and the joint shall comply with the provision laid down therein.

18.3.1 In the even of the failure of sample test joint in any of the requirements of this specifications, the railway will be at liberty to suspended further welding. However, two more randomly selected joints from the same lot of 100 joints shall the report is also not satisfactory, further welding of joints shall be suspended until the firm has examined the welding technique and satisfies the requirements of clause 4 by welding one test joint. The clearance for recommencement of welding shall be given by RDSO.



19. GUARANTEE:

19.1 Rail joints welded by a firm shall be guarantee against failure for a period of two years from the date of welding the joints in track for from the date such welded joints made in cess are inserted in the track. Any such welded joints which fails within the guarantee period shall be re-welded free of cost by the firm as per stipulations of clause 18.2.

19.2 In case of failure of sample test joints (refer clause 18.3) the period of guarantee for 100 joints represented by sample joints shall be extended for a further period of one year.

In case of failure of joints or joint exhibiting signes of failure cracking within extended period of guarantee, the joint shall be re-welded free of cost by the supplier as per stipulations of clause 18.2.

19.3 The welded joints with the extended period of guarantee shall be marked "X" with yellow paint on the outer side of the web of the rail near the joint in addition to the markings prescribed in clause 20. Such marked joints shall be kept under careful observation by the purchaser.

20. MARKING:

Each joint shall have a distinctive mark indicating month, year, welder's code and weld number on the web of the rail in the vicinity of the welded joint in the following manner:-

Month	Last two digit of year	Agency	Specific person number	Weld No.

This should be done by punching on an Aluminium strip which should be fixed to the web of the rail with suitable epoxy adhesive at approximately 300mm from the joint. The agency and specific person number(for welders) shall be as per clause 16.6.4. The welded joints shall be serially numbered in a kilometer. Repair/welds/additional welds done at a later date may be given continuing number in a particular kilometer. For example, the last Thermit weld number in a particular kilometer was 88 and subsequently a Thermit weld has been executed, it shall be number 89 irrespectively of its location in that kilometer.

21. WITHDRAWAL OF APPROVAL OF PORTION MANUFACTURER/WELDING SUPERVISOR/WELDER FROM APPROVED LIST:

The approving authority can delete the name of any portion manufacturer/welding supervisor/welder from the approved list based on complaints regarding tye performance.



ANNEXURE-IA

PROCEDURE FOR ULTRASONIC TESTING OF ALUMINO THERMIC RAIL JOINTS.

1. Scope:

This procedure covers the requirements of ultrasonic testing of Alumino Themit(A.T) welded rails joints immediately after execution of the weld .
2. General conditions of test.
 - 2.1 Surface preparation:

After execution of the AT weld, the welded zone shall be dressed properly to facilitate placement of probes and to avoid incidence of spurious signals on the CET. The head surface shall be dressed to obtain reasonably flat and smooth surface. The flange of the web up to a distance of 200mm on either side of the weld collar shall be thoroughly cleaned with a wire brush to ensure freedom from dust dirt, surface unevenness etc.
 - 2.2 Couplant: Water/oil shall be used as couplant.
 - 2.3 Sensitivity:

The equipment sensitivity shall be set for normal 70° to 80° probes in accordance with the procedure laid down in para 4. The sensitivity so adjusted shall be considered as normal gain sensitivity and shall be utilized during ATW testing.
The sensitivity level shall not be altered during the course of testing.
3. Apparatus required:
 - 3.1 Equipments:

Any RDSO approved model of rail tester shall be considered suitable for testing of AT welded rail joints.
 - 3.2 Probes:

During Ultrasonic examination of AT welded joints, the following probes shall be utilized;

 - a) Normal (0°), 4 MHz
 - b) 70° , 2 MHz
 - c) 80° , 1.25 MHz
 - 3.4 Cable
One co axial cable of suitable length for connecting 80° probe to flaw detector shall be used The length should not be more than 5 metre.
4. Sensitivity setting procedure:
 - 4.1 Calibration:

The equipment should be set for a depth range of 250 mm by manipulating the depth control knob suitably. Each division, therefore, shall correspond to 25 mm.
 - 4.2 Test Rail.

The sensitivity of the ultrasonic equipment shall be set with the help of a standard AT welded rail piece of 1.5 m length having a simulated flaw at standard locations as shown in Fig1.
 - 4.3 Alignment of probes:

The alignment of normal and 70° probes fitted with the trolley may be checked by placing the rail on the test rail using water/oil as a couplant and ensuring that the probes travel along the axis of the rail.



- 4.4 Sensitivity setting for 70° probes:
- 4.4.1 Place the trolley on the test rails shown in Fig1 kept the switches of all the probes in off position and turn the potentiometer knobs of all the probes to 50% of their highest working range.
- 4.4.2 Switch on only 70° forward probe and move the equipment towards the drilled holes in the rail head. When the probe is just in the reflecting range, a pause corresponding to the hole shall appear on the screen which during onward traveling shall show higher amplitude. The pause shall appear moving from right to left. The equipment should be progressively move forward till maximum height of the poles is obtained. At this location the height of the poles shall be adjusted to 60% of full screen height by suitable manipulation of the gain knob.
- 4.4.3 The forward probe shall be switched off and the 70° backward probe shall now be switched on. In this case a flaw signal shall appear moving from left to right. The signal height in this position shall also be adjusted to 60% of full screen height. This can be accomplished through suitable manipulation of relevant potentiometer.
- 4.4.4 The sensitivity setting for the normal probe has to be done while keeping all other probes in off position. Switch on duly the normal probe and bring it above 3mm dia hole of the test rail. Manipulate the potentiometer control knob to obtain echo height of 60% of full screening height at 1.0 division horizontal scale.
- 4.4.5 80° probe shall be connected to the socket available in the ultrasonic equipment. The selectors which may be set to signal crystal mode. Move the probe towards the 3mm dia hole drilled in the AT weld and manipulate knobs to obtain a 60% full screen height on the CRT.
5. Criteria for defect classification.
- 5.1 Any flaw signal obtained by normal probe of 40% height or more shall be treated as a defective AT weld joint. Any flaw signal obtained from the normal probe either from the web or the foot location shall also be cause for rejection of the AT weld.
- 5.2.1 In the case of lack of fusion, inclusions, blows holes etc. in the rail head, moving signal shall be obtained while testing the 70° probe. The position of on set of the signal and its corresponding range on the horizontal screen as well as the maximum amplitude shall be recorded. A welded joint showing the moving signal of 40% or more the full screen height shall be considered as a defective welded joint.
- 5.2.2 80° probe shall be placed on the flange at a suitable distance (1mm approx) corresponding to position "L" in Fig. 2 such that ultrasonic waves are directed towards the weld. The probe shall thereafter be moved slowly in a zigzag pattern towards the weld. A welded joint showing a flaw echo of 40% vertical height or more with the stipulated gain setting shall be treated as a defective welded joint. Similar testing shall be carried out from "C" and "U" region as shown in Fig.2. In these cases the criteria for rejection shall remain the same.
6. The defective joints based on the criteria mentioned at clause shall not be remain in service and cropped re-welded and tested again. This execution shall be done by the contractor free of cost. The re-welded joints shall be scanned ultrasonically again with the same set of acceptance criteria to ensure freedom from any harmful defects.