
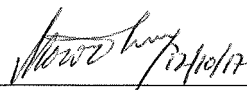

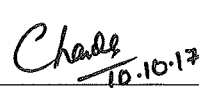


**GOVERNMENT OF INDIA
(Ministry of Railways)**

**SPECIFICATION FOR
CALCINED (BURNT) LIME**

Issued by

**MECHANICAL DRAWING OFFICE
RAIL WHEEL FACTORY
YELAHANKA, BANGALORE-560 064
INDIA**

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|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
|  12/10 |  12/10/17 |  12/10/17 |  10.10.17 |
| CWEM | AED/M&C | Dy. CME/Mfg | SSE/D |
| APPROVED | REVIEWED | VERIFIED | PREPARED |

SPECIFICATION FOR CALCINED (BURNT) LIME

1.0 SCOPE

This specification covers the requirement and supply of Calcined (Burnt) Lime for use in Electric Arc Furnace during steel making at Rail Wheel Factory, Yelahanka, Bangalore - 560 064.

2.0 JOB REQUIREMENT

Calcined (Burnt) Lime obtained by calcination of low silica and low sulphur lime-stones conforming to flux Grade-I lime-stones, used in steel plants to IS 10345:1992. The fuel used during calcination in kilns shall be such that sulphur content is not increased during calcination.

This Calcined Lime is used as flux for making slag in the steel making process through Electric Arc Furnace melting practice.

3.0 CHEMICAL COMPOSITION

| Sl No. | Characteristics | Requirement |
|--------|--------------------------------------------------|-------------|
| 1 | Effective Lime (CaO % - 3 x Si O ₂ %) | 85.5% min |
| 2 | Loss on Ignition (LOI) | 5% max |
| 3 | Total sulphur | 0.20% max |

Note: CaO 90% min and Si O₂ 1.5% max is recommended to get the desired value of effective lime.

4.0 SIZE RANGE : 25 -75 mm (1"-3")

4.1 The Calcined Lime shall be free from foreign matter like clinkers, mud, slag, stone, ash etc., which imparts deleterious effects while usage in steel making. It shall not contain un-burnt limestone also.

5.0 TESTING FACILITY AND TEST CERTIFICATE

The manufacturer shall have the testing facility for all parameters specified in Clause 3.0 including sulphur and Clauses 4.0 and 4.1. The supplier shall submit the test certificate pertaining to the lot. Lots conforming to RWF specification only to be despatched.

6.0 QUALITY ASSURANCE PLAN (QAP)

The manufacturer shall submit their Quality Assurance Plan (QAP) along with their bid for approval by RWF, which will be followed in the manufacturing of Calcined Lime to satisfy the technical requirement as required under this specification.

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Manufacturer shall get their QAP approved from RWF in advance, unless a waiver is given to this effect.

7.0 SAMPLING NORM

For each lot quantity, the number of bags selected to collect samples are indicated below:

| Total quantity (MT) | No. of bags to be sampled |
|---------------------|---------------------------|
| 10 or less | 4 bags at random |
| >10 to 25 | 8 bags at random |
| >25 to 50 | 16 bags at random |
| >50 to 100 | 28 bags at random |

A composite sample shall be made.

8.0 CRITERIA FOR CONFORMITY ON COMPOSITE SAMPLE

For declaring the conformity of the lot to the requirements of characteristics tested on the composite samples, the test results shall satisfy the corresponding specified requirements as stipulated under Clauses 3.0, 4.0 & 4.1.

9.0 METHOD OF CHEMICAL ANALYSIS & TESTING

Each composite sample will be tested as per IS 1760:1991 (Part 1, 2) & IS 1760:1992 (Part 3) / ASTM C-25/99. Sulphur testing can also be carried out on Leco Carbon and Sulphur equipment.

10.0 TRIAL OF THE SUPPLY

The material for trial shall necessarily meet all the requirements mentioned elsewhere in this specification prior to shop floor trial. Only after this, the material will be taken up for shop floor trial by RWF as per Trial Scheme at Annexure-1 and the corresponding Trial Report shall be prepared as per Annexure-2.

11.0 PACKING

Calcined Lime is highly hygroscopic and requires special packing to avoid the moisture ingress. Each bag will have 25 kg net Calcined Lime packed in double lined thick airtight bags and these bags shall be packed in thick jumbo bags each containing 650 ± 25 kg.

Use eco-friendly biodegradable packing material.

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12.0 TRANSPORTATION

Being hygroscopic in nature, special care shall be taken while transporting the Calcined Lime to RWF. Water or moisture ingression shall be avoided especially during rainy season and damp atmosphere. It shall be transported under covered condition.

13.0 SHELF LIFE

In packed condition the material should have a shelf life of minimum ten days from the date of receipt at RWF. The date of manufacture of Calcined lime must be indicated on every bag.

14.0 MATERIAL ACCEPTANCE CRITERIA

Supplier shall ensure the material as per specification. However, the acceptance or rejection of the material which is having deviation is at the discretion of RWF. In case of deviation, the acceptance criteria is worked out as below. Accordingly, the payment deduction will be enforced based on effective lime content of supply and additional quantity of lime required to be added to meet stipulated furnace basicity.

Calculation for deduction for deviation

Standard Quality Lime shall be with CaO% 90 min & SiO₂ % 1.5 max.

$$\text{Effective Lime \%} = [\text{Measured CaO \%} - (3 \times \text{Measured SiO}_2 \text{ \%})]$$

$$\begin{array}{l} \text{Effective Lime \% with} \\ \text{Standard Quality Lime} \end{array} = [90 - (3 \times 1.5)] = 85.5\%$$

Factor for Additional lime % to maintain over the Standard Quantity for stipulated basicity = $\{(85.5/e) - 1\}$, where "e" is the effective lime% of the supply.

$$\text{Payment deduction \% imposed} = [(85.5/e) - 1] \times 100 \%$$

No supply of calcined lime shall be accepted if effective lime percentage is less than 75%.

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TRIAL SCHEME OF CALCINED LIME

| | | |
|----|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| 1 | Trial scheme No. | RWF/M/SPECN-1/047/1997 alt --- / Trial Scheme PL NO..... |
| 2 | Objective of Trial | To establish the suitability of Calcined lime as per Specn No. RWF/M/SPECN-1/047/1997 alt --- |
| 3 | Description of Material PO Number & PO date PO Qty. Supplier | CALCINED LIME |
| 4 | IDN Number & Date IDN Qty. | |
| 5 | Authority for conducting Trial | Dy. CME/ Mfg |
| 6 | Earlier trial details | Fist Time Supply/ Second time/ Third time/...../..... |
| 7 | Trial Parameters | As mentioned in Trial Scheme |
| 8 | Specification | RWF/M/SPECN-1/047/1997 alt --- |
| 9 | Pre-trial Testing details | Met. Lab Report & MTC |
| 10 | Trial qty | Full IDN Qty/ 5% of the tendered quantity |
| 11 | Equipment / Station process | EAF-A, B, C |

(..... to be filled by Team Members)

Trial Parameters:

1. Total quantity Calcined lime to be drawn and trial conducted on the entire quantity under the purchase order/5% of the tendered quantity, whichever is less.
2. Inspection & testing by shop and whenever required by laboratory completely in line (not in part) with the specification. Sampling for inspection as per RWF specification.
3. Examination of MTC (Manufacturer's Test Certificate) and comments on its suitability.

Specific Requirements:

Compare the basicity observed in matching number of other makes by ensuring same process parameter during use and in the same period (or just preceding/succeeding period) and shall be comparable to 90% to established make already in use.

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TRIAL REPORT OF CALCINED LIME

| | | |
|----|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| 1 | Trial No. | RWF/M/SPECN-1/047/1997 alt --- / Trial Scheme PL NO..... |
| 2 | Objective of Trial | To establish the suitability of Calcined lime as per Specn No RWF/M/SPECN-1/047/1997 alt --- |
| 3 | Description of Material PO Number & PO date PO Qty. Supplier | CALCINED LIME |
| 4 | IDN Number & Date IDN Qty. | |
| 5 | Authority for conducting Trial | Dy. CME/ Mfg |
| 6 | Earlier trial details | Fist Time Supply/ Second time/ Third time/...../..... |
| 7 | Trial Parameters | As mentioned in Trial Scheme |
| 8 | Specification | RWF/M/SPECN-1/047/1997 alt --- |
| 9 | Pre-trial Testing details | Met. Lab Report & MTC |
| 10 | Trial qty | Full IDN Qty/ 5% of the tendered quantity |
| 11 | Equipment / Station process | EAF-A,B,C |
| 12 | Nominated Officers | ACMT/W & AWM/SMS |

(..... to be filled by Team Members)

Application Test: Shop Floor test conducted from date _____ to date _____ & H. No. _____

Trial Parameters

- Total quantity Calcined lime to be drawn and trial conducted on the entire quantity under the purchase order/5% of the tendered quantity, whichever is less.

Comments:

- Inspection & testing by shop and whenever required by laboratory completely in line (not in part) with the specification. Sampling for inspection as per RWF specification.

Enclosure Details:

- Examination of M Lab report & MTC (Manufacturer's Test Certificate) and comments on its suitability

Comments with documents:

Specific Requirements:

Compare the basicity observed in matching number of other makes by ensuring same process parameter during use and in the same period (or just preceding/succeeding period) and shall be comparable to 90% to established make already in use.

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Observations:

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AWM/SMS

ACMT/W

SSE/SMS

WM/W

Remarks of Dy CME/Mfg.

Remarks of AED/M&C

CWE/W

AMENDMENT SHEET

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AMENDMENT SHEET

| Alt 'L' | | | Alt. 'm' | | | Job No. | Sign | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Clause No. | Description | | Clause No. | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| cover | PL No. 81982653 | | cover | (PL No. Removed) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3.0 | <p align="center">CHEMICAL COMPOSITION</p> <table border="1"> <thead> <tr> <th>Sl No.</th> <th>Characteristics</th> <th>Requirement</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>CaO</td> <td>90% (min)</td> </tr> <tr> <td>2</td> <td>SiO₂</td> <td>1.5% (max)</td> </tr> <tr> <td>3</td> <td>Loss on Ignition</td> <td>3% (max)</td> </tr> <tr> <td>4</td> <td>Total sulphur</td> <td>0.20% (max)</td> </tr> </tbody> </table> | | Sl No. | Characteristics | Requirement | 1 | CaO | 90% (min) | 2 | SiO ₂ | 1.5% (max) | 3 | Loss on Ignition | 3% (max) | 4 | Total sulphur | 0.20% (max) | 3.0 | <p align="center">CHEMICAL COMPOSITION</p> <table border="1"> <thead> <tr> <th>Sl No.</th> <th>Characteristics</th> <th>Requirement</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Effective Lime (CaO % - 3 x Si O₂ %)</td> <td>85.5% min</td> </tr> <tr> <td>2</td> <td>Loss on Ignition (LOI)</td> <td>5% max</td> </tr> <tr> <td>3</td> <td>Total sulphur</td> <td>0.20% max</td> </tr> </tbody> </table> <p>Note: CaO 90% min and Si O₂ 1.5% max is recommended to get the desired value of effective lime.</p> | | Sl No. | Characteristics | Requirement | 1 | Effective Lime (CaO % - 3 x Si O ₂ %) | 85.5% min | 2 | Loss on Ignition (LOI) | 5% max | 3 | Total sulphur | 0.20% max | | |
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| 1 | CaO | 90% (min) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | SiO ₂ | 1.5% (max) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Loss on Ignition | 3% (max) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Total sulphur | 0.20% (max) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sl No. | Characteristics | Requirement | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 5.0 | <p>TESTING FACILITY AND TEST CERTIFICATE The manufacturer shall have the testing facility for all parameters specified in <u>Clause 4.0 including sulphur and Clauses 5.0 and 5.1.....</u></p> | | 5.0 | <p>TESTING FACILITY AND TEST CERTIFICATE The manufacturer shall have the testing facility for all parameters specified in <u>Clause 3.0 including sulphur and Clauses 4.0 and 4.1.....</u></p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8.0 | <p>For declaring the conformity of the lot to the requirements of characteristics tested on the composite samples, the test results shall satisfy the corresponding specified requirements as stipulated under Clauses 4.0, 5.0 & 5.1.</p> | | 8.0 | <p>For declaring the conformity of the lot to the requirements of characteristics tested on the composite samples, the test results shall satisfy the corresponding specified requirements as stipulated under Clauses 3.0, 4.0 & 4.1.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -- | -- | | 14.0 | <p>Clause added</p> <p>MATERIAL ACCEPTANCE CRITERIA Supplier shall ensure the material as per specification. However, the acceptance or rejection of the material which is having deviation is at the discretion of RWF. In case of deviation, the acceptance criteria is worked out as below. Accordingly, the payment deduction will be enforced based on effective lime content of supply and additional quantity of lime required to be added to meet stipulated furnace basicity.</p> <p>Calculation for deduction for deviation Standard Quality Lime shall be with CaO% 90 min & SiO₂ 1.5 max. Effective Lime % = [Measured CaO % - (3x Measured SiO₂ %)] Effective Lime % with Standard Quality Lime = [90-(3x1.5)] = 85.5%</p> <p>Factor for Additional lime % to maintain over the Standard Quantity for stipulated basicity= $\{(85.5/e)-1\}$, where "e" is the effective lime% of the supply. Payment deduction % imposed = $\{(85.5/e)-1\} \times 100 \%$</p> <p>No supply of calcined lime shall be accepted if effective lime percentage is less than 75%.</p> | | 7022 | <i>Chande</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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