



EXTRA LOW HYDROGEN TYPE <sup>NON</sup> SYNTHETIC COVERED ARC  
WELDING ELECTRODES FOR WELDING OF GX12CrMoWVNbN1011  
STEEL

## 1. SCOPE

This specification prescribes the requirement for a Non-synthetic shielded metal arc welding electrodes that are equivalent to nearest ASME Sec-II{c} - SFA 5.5 E9018-B9 (MODIFIED).

## 2. GENERAL

- 2.1 Electrodes shall comply with the requirements called for in the latest edition and addenda (applicable on the date of issue of purchase order) of ASME Sec-II {c}, SFA 5.5, Class E9018B9 (modified) and all tests.

Addition requirements specified in this document are also to be compiled.

- 2.2 Electrodes shall be suitable for Radiography quality welding of cast steel GX12CrMoWVNbN1011 steel.

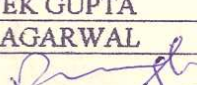
## 3. CHEMICAL COMPOSITION

The chemical composition of undiluted weld metal deposited using the electrode shall be as follows:

|                 |              |              |
|-----------------|--------------|--------------|
| C 0.08 to 0.13% | S 0.010 max  | P 0.015 max. |
| Si 0.18-0.35%   | Mn 0.5-1.0%  | Cr 8.5-10.5% |
| Mo 0.9-1.1%     | V 0.18-0.23% | W 0.9-1.1%   |
| Nb 0.05-0.08%   | N 0.04-0.07% |              |

## 4. RADIOGRAPHIC SOUNDNESS

- 4.1 The electrodes with DCEP shall deposit weld metal, which meets radiographic soundness requirements specified in ASME Sec-II {c}, SFA-5.5 E9018-B9 (Modified).

|                                                                                                 |             |  |
|-------------------------------------------------------------------------------------------------|-------------|--|
| WKD                                                                                             | VIVEK GUPTA |  |
| CHD                                                                                             | VK AGARWAL  |  |
| APPROVED:  |             |  |
| CFFP PLANT STANDARDS<br>COMMITTEE                                                               |             |  |
| ISSUED BY: WELDING TECHNOLOGY DEPTT.                                                            |             |  |

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### 5. MECHANICAL PROPERTIES

- 5.1 The mechanical properties of weld metal deposited using the electrodes after stress relieving the test plate assembly at  $740^{\circ}\text{C} \pm 10^{\circ}\text{C}$  for 120 minutes shall be as follows

|                                                           |                |
|-----------------------------------------------------------|----------------|
| Yield Strength (at 0.2% proof stress)                     | 530 MPa (min)  |
| UTS                                                       | 650-850 MPa    |
| %Elongation                                               | 17% min.       |
| % Reduction in area                                       | 40% min.       |
| Impact strength (Charpy V notch at $20^{\circ}\text{C}$ ) | 35 joules min. |
| Hardness                                                  | 210-265 BHN    |

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### 6. FILLET WELD TEST

- 6.1 Fillet weld test done using the electrodes shall meet the requirements specified in ASME Sec-II {c}, SFA 5.5, E9018 B9 (modified).

### 7. MOISTURE CONTENT

- 7.1 Moisture content of covering shall not exceed the limit specified in ASME Sec-II {c}, SFA 5.5, E9018 B9 (modified).

### 8. CORE WIRE, ARC AND GRIP END, IDENTIFICATION

#### 8.1 CORE WIRE

The core wire, and covering shall be free of defects that would interfere with uniform deposit of weld metal.

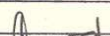
#### 8.2 ARC END and GRIP END:

The arc end of each electrode shall be sufficiently bare and covering sufficiently tapered to permit easy stripping of the arc. The grip end shall be bare for a length that is sufficient to provide electrical contact with the electrode holder.

#### 8.3 IDENTIFICATION

All electrodes shall be identified by providing imprints of the electrode classification and brand near the grip end. The numbers and letters of imprints shall be of bold block type and of a size large enough to be legible.

The ink used for imprinting shall provide sufficient contrast with the electrode covering so that the imprint remains legible after drying and welding.

|                                                                                                 |             |                                                                                                   |
|-------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------|
| WKD                                                                                             | VIVEK GUPTA | <br>13/10/99 |
| CHD                                                                                             | VK AGARWAL  |                                                                                                   |
| APPROVED:  |             |                                                                                                   |
| CFFP PLANT STANDARDS                                                                            |             |                                                                                                   |
| COMMITTEE                                                                                       |             |                                                                                                   |

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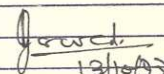
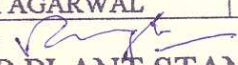


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## 9. TEST CERTIFICATE

The supplier shall submit 5 copies of test certificates giving details of following tests done for compliance to this plant standard and ASME Sec-II {c}, SFA 5.5, E9018 B9 (modified).

- a) Chemical composition of weld metal.
- b) Test for radiography soundness
- c) Tests for mechanical properties after SR as per Sec. 5.1

|                                                                                                 |             |                                                                                       |
|-------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------|
| WKD                                                                                             | VIVEK GUPTA |  |
| CHD                                                                                             | VK AGARWAL  |                                                                                       |
| APPROVED:  |             |                                                                                       |
| CFFP PLANT STANDARDS<br>COMMITTEE                                                               |             |                                                                                       |
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|--------------------------------------|-------------|---------------------------------------------------------------------------------------|
| WKD                                  | VIVEK GUPTA |  |
| CHD                                  | VK AGARWAL  |                                                                                       |
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