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|  | VISAKH REFINERY | |
| | APPROVED WELDING ELECTRODES | |
| | INSPECTION DIVISION | Advisory no.: TSD/INSP/GEN/24 Rev. 3 Date of issue: 20.03.2018 Date of first issue: 04.12.2011 Date of second issue: 04.10.2013 |
| TECHNICAL SERVICES DEPARTMENT | | |

1.0 OBJECTIVE

To advise revision for the existing Tech Advisory TSD/Insp/Gen/24 Rev-2 for the approved welding electrodes/filler wires to be used for various welding jobs.

2.0 SCOPE

- a) To list out the approved welding electrodes/filler wires of various manufacturers to be used for welding at HPCL-VR.
- b) Minor Projects/Maintenance/Major Projects shall ensure to specify the approved welding electrodes only for various welding related jobs in the Refinery.
- c) This revision is issued to include E-6010, Stainless steel, low alloy steel & Monel electrodes of M/s SUPERON and carbon steel electrodes of M/s Nucor Weld India Pvt.Ltd.

3.0 INTRODUCTION


There are different welding electrodes/filler wires used for welding/repair jobs on various existing/new Refinery equipment. Welding electrodes of certain manufactures have been approved earlier based on their testing and performance/credentials from other Refineries.

This revision 3 of Tech. advisory is issued to provide a consolidated list of approved manufacturers for the specified welding electrodes. The newly approved electrodes are recommended based on testing, satisfactory performance and credentials.


4.0 APPROVED WELDING ELECTRODES

The following electrodes are approved by HPCL-VR:

| AWS Specification | Electrode specification | Electrode brand |
|---|-------------------------|---|
| SFA 5.1 Carbon Steel electrodes) | E6010 | ESAB, L&T, Ador Fontech, D&H Secheron, D&H Welding Electrodes (India) Ltd., Superon , Honavar, |
| | E6013 | ESAB, L&T, Ador Fontech, D&H Secheron, D&H Welding Electrodes (India) Ltd Honavar, Maruti Superon, Nucor Weld |
| | E7018-1/ER70S2-1 | |
| | E7018/ ER70S2 | |

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| Specification | Electrode specification | Electrode brand |
|---|---|--|
| <i>SFA 5.4</i> Stainless Steel electrodes | E308/ER308 | ESAB, L&T, Ador Fontech, D&H Secheron, D&H Welding Electrodes (India) Ltd., Superon Honavar, Maruti |
| | E308L/ER308L | |
| | E316L/ER316L | |
| | E309/ER309 Mo | |
| | E309L/ER309L | |
| | E310/ER310 | |
| | E347/ER347 | |
| <i>SFA 5.4</i> Stainless Steel electrodes (Duplex/Super duplex Stainless Steel) | E383 /ER383 | ESAB, L&T, Ador Fontech, D&H Secheron, Sandvik |
| | E385/ER385 | |
| | ER-2209 | |
| | E 2594-16 / ER2594 | |
| <i>SFA 5.5</i> Low Alloy Steel electrodes | E8018-B2/ER80S-B2 | ESAB, L&T, Ador Fontech, Superon , D&H Secheron |
| | E8018-B3/ER80S-B3 | |
| | E8018-B6/ER80S-B6 | |
| | E8018-B8/ER80S-B8 | |
| <i>SFA 5.6</i> Specification For Copper And Copper Alloy Arc Welding Electrodes | ECuAl- A1 | ESAB, L&T, Ador Fontech, D&H Secheron |
| | ECuAl- A2 | |
| | ECuAl- A3 | |
| | ECuAl- B | |
| <i>SFA 5.7</i> Specification For Copper And Copper Alloy Bare Welding Rods And Electrodes | E CuNi / E CuNi-2 / E CuNi-7, ER Cu Al | ESAB, L&T, Ador Fontech, D&H Secheron |
| <i>SFA 5.11/5.14</i> Specification For Nickel and Nickel Alloy for SMAW & Bare Welding Rods And Electrodes | E CuNi-2 / E NiCu-7 E NiCrFe2, E NiCrFe3 ER NiCr-2/ ERN iCr-3 | ESAB, L&T, Ador Fontech, Superon , D&H Secheron |

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| Specification | Electrode specification | Electrode brand |
|---|-------------------------|---|
| <i>SFA 5.13</i> Solid Surfacing Welding Rods And Electrodes (Stellite -1/6) | E CoCr-A | ESAB, L&T, Ador Fontech, D&H Secheron |
| | E CoCr —B | |
| | E CoCr-C | |
| <i>SFA 5.16</i> Specification For Titanium and Titanium Alloy Bare Welding Rods And Electrodes | ER Ti 1 / Ti2 | ESAB, L&T, Ador Fontech, D&H Secheron |
| <i>SFA 5.15</i> Welding electrodes and rods for Cast Iron | E Ni-CI | ESAB (OK Ni Fe CI-A), L&T, Ador Fontech, D&H Secheron |
| <i>Special Electrodes</i> | Magna 303 | Permaweld Pvt. Ltd. |
| | Magna 405 | |
| | Magna 720 | |
| | Magna 770 | |
| | Magna 8N12 | |
| | Magna 28 TIG | |
| | Magna 39 TIG | |

Note: Other reputed international brands of electrodes may be considered for usage on case to case basis. Such electrodes shall be referred to HPCL-VR Inspection for approval prior to usage.

5.0 OTHERS

a) Review of performance of the welding electrodes will be carried out by HPCL-Inspection on periodical basis. In case, the quality of the approved electrodes is not found satisfactory, HPCL-Inspection will remove the name of the manufacturer from the approved list.

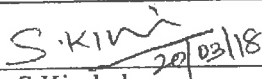
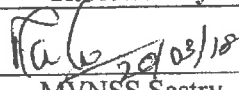
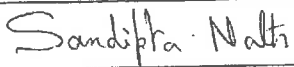
b) HPCL - Inspection Division will review/approve new welding electrodes based on testing/history/performance/credentials on request basis from any manufacturer

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6.0 RESPONSIBILITY

| S No | Description | Responsibility |
|------|--|---|
| 1 | To ensure usage of welding electrodes of approved manufacturers only, specified in the advisory for all types of welding jobs in the Refinery. | Execution Dept. (Major Projects, Minor Projects & Maintenance) |
| 2 | Contractor executing the welding job should procure the electrodes directly from manufacturers or through their designated/authorized dealer only. | Execution Dept. (Major Projects, Minor Projects & Maintenance) |
| 3 | For usage of welding electrodes other than the approved ones, the executing dept. shall take written approval from Inspection Division prior to its usage. | Execution Dept. (Major Projects, Minor Projects & Maintenance) |

This Advisory will be valid till Head-Inspection releases the next revision.

| Initiated by | Reviewed by | Approved by |
|---|---|--|
|  S. Kirubakaran 20/03/18 |  MVNSS Sastry 20/03/18 |  Sandipta Nath |
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