



An ISO/TS 16949:2009 COMPANY

AARTI STEELS LIMITED
 Registered Office : G.T.Road, Miller Ganj, Ludhiana.
 Works : Focal Point, LUDHIANA - 141010. (INDIA)
 Phone no. :- 0161-3006200 Fax :- 0161-3006250
 MANUFACTURER'S OF :- CARBON ALLOYS & SPECIAL STEELS
 - : TEST CERTIFICATE : -



-: Original :-

M/S.- HAPPY FORGINGS LTD.U-II,B-XXIX,2254 | T.C.NO. 7825 Date -: 19/01/2018 19:46:32
 /1.&OPP.HINDUSTAN TYRE. | Invoice No. 20404
 KANGANWAL ROADJUGIANA.LUDHIANA | Truck No. PB06F-9075

| GRADE | SIZE | HEAT NO. | MANUFACTURING ROUTE | COLOUR CODE | SUPPLY COND.N. | QTY. (MT) | NO. OF PCS. |
|-----------|--------|----------|--------------------------|--------------|----------------|--------------|----------------|
| 20NiCrMo2 | 65 RCS | 6080 | E.A.F.+L.F.+V.D.+CCM+EMS | BLUE+RED DOT | AS ROLLED | 32.660 | 172 |

-: CHEMICAL COMPOSITION IN PERCENTAGE :-

| | C | Mn | S | P | Si | Ni | Cr | Mo | V | Al | Cu | Sn | Ti | B | Ca |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Min | 0.1700 | 0.6000 | 0.0150 | -- | 0.1500 | 0.4000 | 0.3500 | 0.1500 | -- | 0.0200 | -- | -- | -- | -- | -- |
| Max | 0.2300 | 0.9000 | 0.0300 | 0.0200 | 0.4000 | 0.7000 | 0.6500 | 0.2500 | -- | 0.0500 | 0.3000 | -- | -- | 0.0005 | 0.0010 |
| Actual | 0.2000 | 0.8800 | 0.0240 | 0.0160 | 0.1840 | 0.4520 | 0.5600 | 0.2130 | 0.0026 | 0.0240 | 0.1330 | 0.0140 | 0.0030 | 0.0005 | 0.0008 |

-: METALLURGICAL RESULTS :-

| INCLUSION RATING IS : 4163/JK CHART/ASTM E-45A | | | | | | | | | Aust.Grain Size ASTM No. (E-112) | 7 | Gas Content (ppm) | |
|--|-----|-----|-----|-----|-----|-----|-----|-----|---|-------|----------------------|------|
| A | | B | | C | | D | | | | | | |
| T | H | T | H | T | H | T | H | | | | | |
| STD | 2.0 | 1.5 | 2.0 | 1.0 | 0.5 | 0.5 | 1.0 | 1.0 | Decarb. (MM) | 0.11 | O2 | 14 |
| MAX | | | | | | | | | | | N2 | 84 |
| ACTUAL | 1.5 | 0.5 | 0.5 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | Micro- Structure | P+F+B | H2 | .902 |

| MECHANICAL PROPERTIES (ASTM A-370/IS-1608) TEST CONDITION (N / H & T) | | | | | | | MACRO | ULTRASONIC TEST | MIX UP TEST |
|--|-----------|----------|-------|-----|-----------------|-----------------------|---|--------------------|----------------------------|
| | U.T.S. | Y.S. | EL% | RA% | Impact Value | Hardness B.H.N./Rb | BETTER THAN C2,R2,S2 MAX LEVEL AS PER PLATE 1st OF ASTM-E-381 | 100 % DONE OK | SPARK TEST 100% DONE OK |
| Reqd. | 1180-1570 | 930 MIN | 7 MIN | - | 27.5 J MIN | 260 MAX | | | |
| Actual | 1352 MPA | 1076 MPA | 9.5 | - | 44 J | 174-181 | | | |

-: HARDENABILITY (HRC) AS PER IS : 3848 :-

| | | | | | | | |
|----------|-------|-------|---------|---------|---------|---------|---------|
| Distance | 1.5MM | 5 MM | 10 MM | 15 MM | 20 MM | 25 MM | 30 MM |
| Required | 42-47 | 34-41 | 27-33.5 | 22-28.5 | 19.5-26 | 18-24.5 | 16.5-23 |
| Actual | 45 | 41 | 29 | 24.5 | 22 | 19.5 | 18 |

Remarks :- REDUCTION RATIO=9.5,100% MOBILE SPECTRO DONE OK (X-RAYS) | BILLET SIZE=200X200 MM,%AL/%N2-RATIO=2.857 (2.1 MIN)
 BANDING OK AS PER UNI 8449(A MAX OF GR-4 IS ACCEPTABLE) | MATERIAL CONFORMS TO GRAZIANO SPEC.Q.F.1001, REV.LEVEL 1
 SURFACE SATISFACTORY

Note :- TESTED FOR RADIOACTIVE CONTAMINATION *OK*

CERTIFIED THAT THE TEST FINDINGS ARE CORRECT & ARE BASED ON
 ACTUAL RESULTS CARRIED OUT ON SAMPLES DRAWN AS PER Q.A.P.

PREPARED BY

AUTHORISED SIGNATORY