



-- Original :-

M/S.- MAHADEV FORGE (PVT.) LTD.
536/35D/A4, SUA ROAD.NEAR-
EASTMAN CHOWK, LUDHIANA.

T.C.NO. 7639 Date :- 14/01/2018 12:36:40
Invoice No. 20188
Truck No. PB11BN-6292

GRADE	SIZE	HEAT NO.	MANUFACTURING ROUTE	COLOUR CODE	SUPPLY COND.N.	QTY. (MT)	NO. OF PCS.
16MnCr5	56 DIA	1532	E.A.F.+L.F.+V.D.+CCM+EMS	YELLOW+BROWN+GREEN SPOT	AS ROLLED	23.640	236

-: CHEMICAL COMPOSITION IN PERCENTAGE :-

	C	Mn	S	P	Si	Ni	Cr	Mo	V	Al	Cu	Sn	Ti	B	Ca
Min	0.1300	1.0000	0.0150	--	0.1500	--	0.8000	--	--	0.0200	--	--	--	--	--
Max	0.1800	1.3000	0.0300	0.0200	0.4000	0.3000	1.1000	0.1000	--	0.0500	0.3000	--	--	0.0005	0.0010
Actual	0.1750	1.2600	0.0260	0.0160	0.2200	0.0240	1.0600	0.0010	0.0032	0.0270	0.0180	0.0038	0.0032	0.0004	0.0005

-: 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					O2	15
T	H	T	H	T	H	T	H	Decarb. (MM)	0.11		N2	84
STD	2.0	1.5	2.0	1.0	0.5	0.5	1.0	1.0			H2	.926
MAX												
ACTUAL	1.5	0.5	0.5	0.0	0.0	0.0	1.0	0.0	Micro- Structure	P+F		

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.	1030-1370	735 MIN	8 MIN	-	25 J MIN	260 MAX			
Actual	1198 MPA	992 MPA	9.5	-	42 J	152-159			

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

Distance	1.5MM	5 MM	10 MM	15 MM	20 MM	25 MM	30 MM	review & Varified
Required	39-44	34.5-40.5	29-35.5	25-31.5	22.5-29	21-27.5	20-26.5	Accepted/Rejected <u>Accepted</u>
Actual	43	40	29.5	25	23	21	20	Comment <u>OK</u> Sign. (QA) <u>[Signature]</u> Date <u>15.1.18</u>

Remarks :- REDUCTION RATIO=10.4, 100% MOBILE SPECTRO DONE OK (X-RAYS)
%AL/%N2 RATIO=3.214 (2.1 MIN)
MATERIAL CONFORMS TO GRAZIANO SPEC. Q.F. 1001, REV. LEVEL 1

BILLET SIZE=160X160 MM, SURFACE SATISFACTORY
BANDING OK AS PER UNI 8449 (A MAX OF GR-4 IS ACCEPTABLE)

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 [Signature]

AUTHORISED SIGNATORY [Signature]