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Technical Specification & Quality Document			Document No.: DRDO-ARDE-DOA-TOT-209-2017				
Issue:01	Date	May 2021	Revision No.	00	Date:	May 2021	Page 31
Component / Assembly			125mm FSAPDS Practice Shot Assembly (Empty)				

TRACER PLUG ASSEMBLY

1. Drawing No. : ISX 20 SA
2. Method of manufacture : Assembly
3. Receiving Inspection : Nil
4. In-process inspection : Nil
5. Stage inspection : Nil
6. Final Inspection:
- 6.1 Visual inspection:

Features for visual examination and acceptance criteria:

6.1.1	Sr. No.	Details of features	Sample size	Acceptance criteria
	1.	Disc	100%	To be present and un-punctured

6.2 Dimensional Inspection: Nil

6.3 Details of test /checks on finished items and acceptance criteria : Nil

7. Details of tests and other information: Nil

8. **Assembly Procedure:** The following components shall be used for this assembly:

Sr. No.	Component	Drawing No.	Quantity
1	Plug	ISX 328	1
2	Disc	ISX 329	1

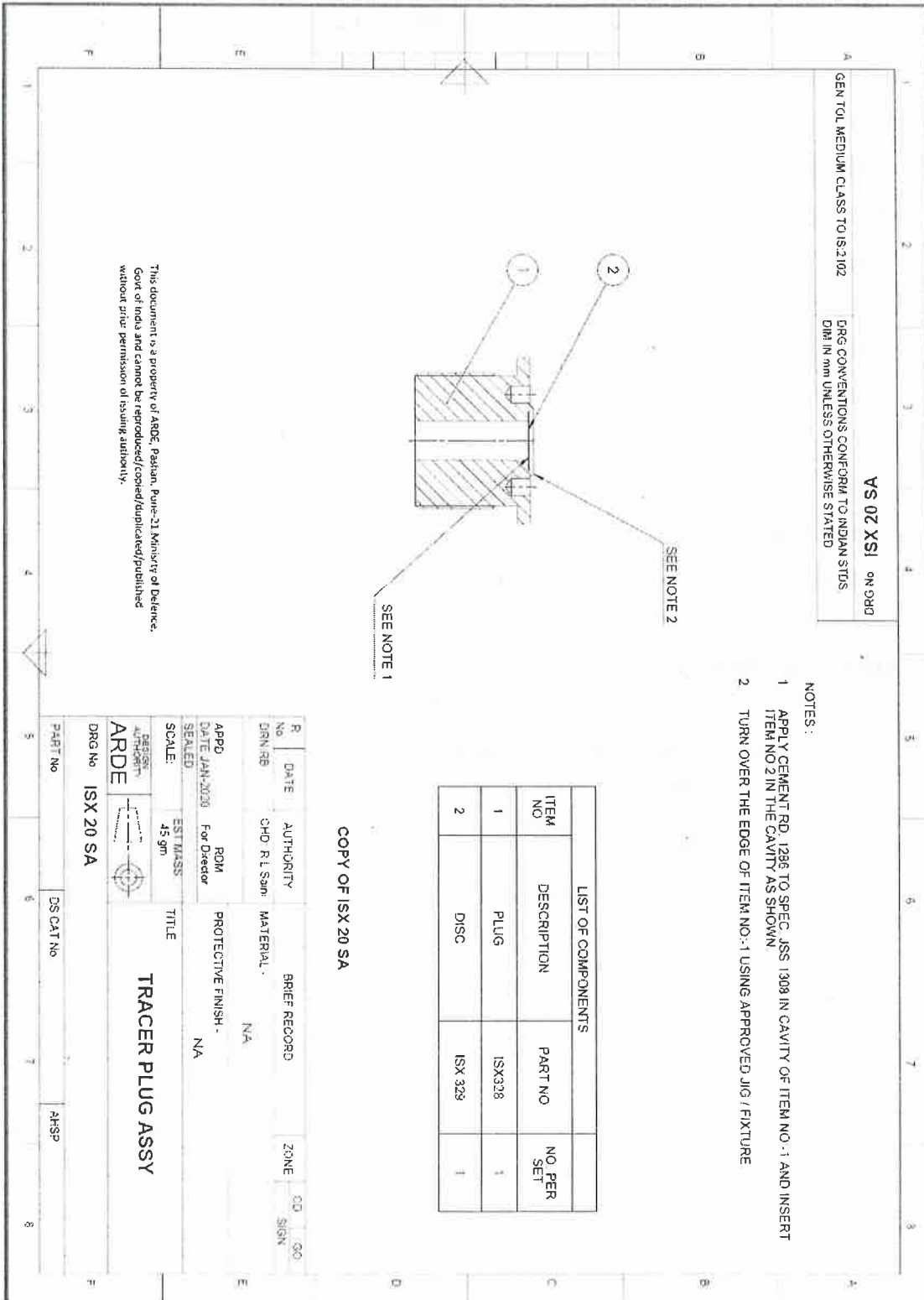
- Apply cement RD 1286 to specification JSS 1308 in cavity of item no. 1 and insert item no. 2 in the cavity as shown in drawing.
- Turn over the edge of item no. 1 using proper jig/fixture.



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Vs 02 XSI ON GRD
 DRG CONVENTIONS CONFORM TO INDIAN STDS
 DIM IN mm UNLESS OTHERWISE STATED

- NOTES:
- 1 APPLY CEMENT PD. 1286 TO SPEC. JSS 1309 IN CAVITY OF ITEM NO. 1 AND INSERT ITEM NO 2 IN THE CAVITY AS SHOWN
 - 2 TURN OVER THE EDGE OF ITEM NO.: 1 USING APPROVED JIG / FIXTURE

ITEM NO	DESCRIPTION	PART NO	NO. PER SET
1	PLUG	ISX328	1
2	DISC	ISX 329	1

COPY OF ISX 20 SA

R. No.	DATE	AUTHORITY	BRIEF RECORD	ZONE	CD SIGN
DRN/RB		CHD. R. L. Sam	NA		
APPD	DATE	RDM	PROTECTIVE FINISH		
	JAN-2020	For Director	NA		
SCALE:		EST MASS	TITLE		
45 gm			TRACER PLUG ASSY		
DESIGN AUTHORITY					
ARDE					
DRG No ISX 20 SA					
PART No	DS CAT No	AHSP			

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PLUG

1. Drawing No. : ISX 328
2. Method of manufacture : Machining and Phosphating
3. Receiving Inspection :
- 3.1 Raw material : Steel as per specification BS 970 pt1, Grade 070 M20 (En 3A)

Tests/checks and acceptance criteria for raw material:

1. Chemical analysis : As per specification BS 970 pt1, 070M20(En 3A)
2. Mechanical Properties :

Sr. No.	Properties	Acceptance criteria
1.	UTS	430 MPa (min)
2.	0.2% PS	215 MPa (min)
3.	% Elongation	21 (min)

4. In-process inspection : Nil
5. Stage inspection : Nil
6. Final Inspection:
- 6.1 Visual inspection:

6.1.1 Features for visual examination and acceptance criteria:

Sr. No.	Details of features	Sample size	Acceptance criteria
9.	Burrs	100 %	Not Permitted
10.	Damage to thread	100 %	Not Permitted
11.	Tool Marks	100 %	Not Permitted
12.	Two holes $\varnothing 2.8 \times 3$ deep	100 %	To be present

6.2. Dimensional Inspection:

6.2.1 Critical Inspection:

Sr. No.	Dimension/feature	Drg Zone	Inspection Method
1.	M 22 X 1.5 - 4h LH	D3	Thread gauge

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							GO/NO GO
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6.2.2 Geometrical features : Nil

6.2.3 Major dimensions:

Sr. No.	Dimension	Drg Zone	Inspection Method
1.	Ø6.3 drilled hole	C3	General engineering /gauge
2.	Ø 10.80 - 0.25	B3	
3.	Ø 27 - 0.2	B3	
4.	18.5 - 0.2	C4	
5.	16.5 + 0.2	C4	
6.	Ø2.8 x 3 deep	C4	

6.2.4 Minor dimensions : Nil

6.3 Details of tests /checks on finished items and acceptance criteria:

Sr. No.	Tests/Surface Treatment	Acceptance value	Defect Classification	Inspection Method
1.	Phosphating to spec IS : 3618, class 2	As per specification	Major	Coating thickness tester
2.	Fitment with tail unit	Fit	Major	Fitment to full thread length

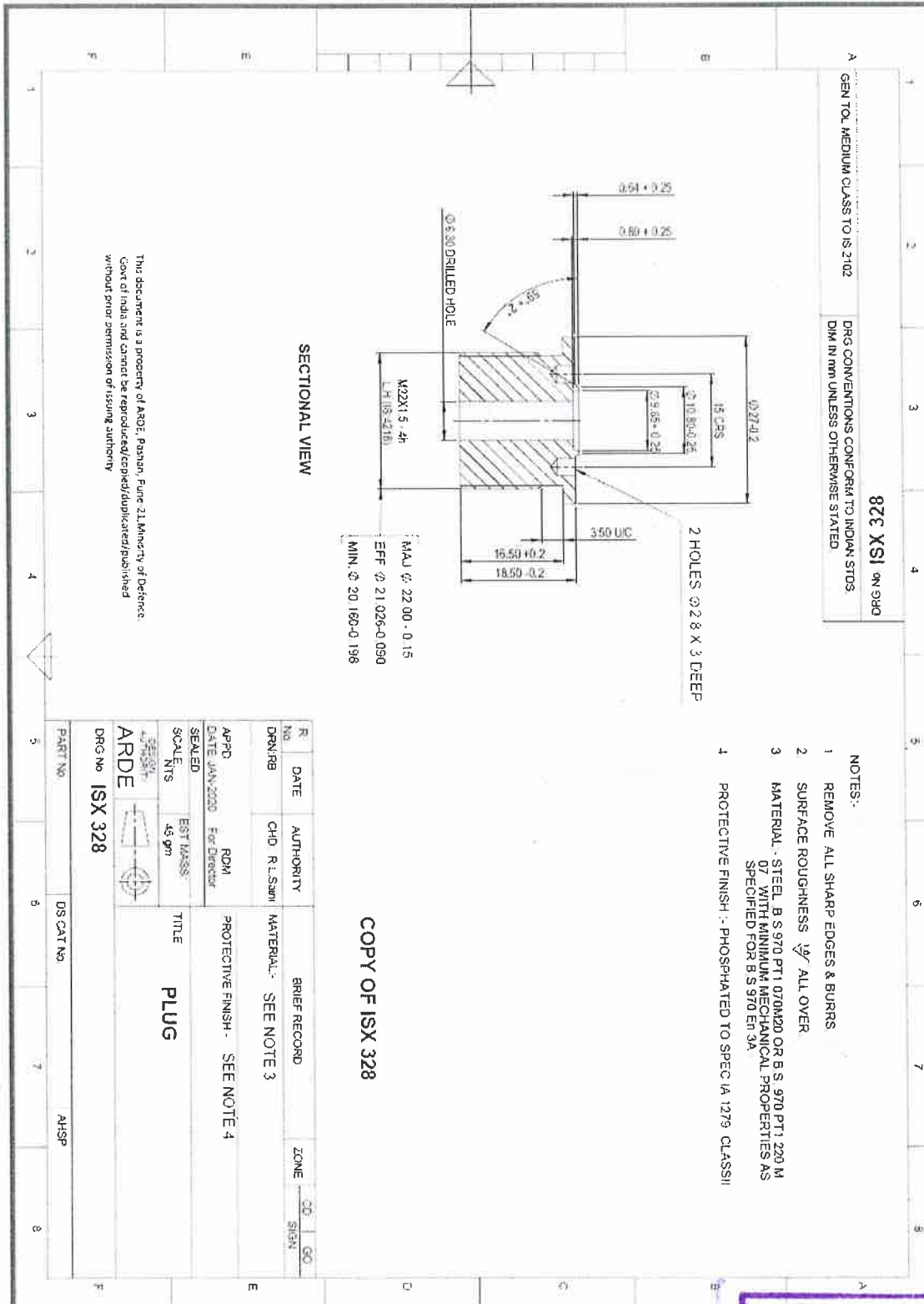
7. Details of tests and other information: Nil

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DISC

1. Drawing No. : ISX 329
2. Method of manufacture : Punching
3. Receiving Inspection :
- 3.1 Raw material : Brass, IS: 410, Grade CuZn30 or CuZn37
'O' condition

Tests/checks and acceptance criteria for raw material

1. Chemical analysis :As per IS: 410

2. Mechanical properties :

Sr. No.	Properties	Acceptance criteria
1.	UTS	275 MPa (min)
2.	%EL	50 (min)
3.	Hardness	80 HV (min)

4. In-process inspection : Nil

5. Stage inspection : Nil

6. Final Inspection:

6.1 Visual inspection:

6.1.1 Features for visual examination and acceptance criteria

Sr. No.	Details of features	Sample size	Acceptance criteria
1.	Tear mark	100%	Not permitted
2.	Cut mark, tool mark	100%	Not permitted

6.2 Dimensional Inspection:

6.2.1 Critical Inspection: Nil

6.2.2 Geometrical features :Nil

6.2.3 Major dimensions

Sr. No.	Dimension	Drg Zone	Inspection Method
1.	Thickness 0.102 -0.051	B5	Gen Engineering

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2.	Ø 9.525 -0.127	C3	Gen Engineering
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6.2.4 Minor dimensions : Nil

6.3 Test on finished Items : Nil

7. Details of tests and other information: Nil

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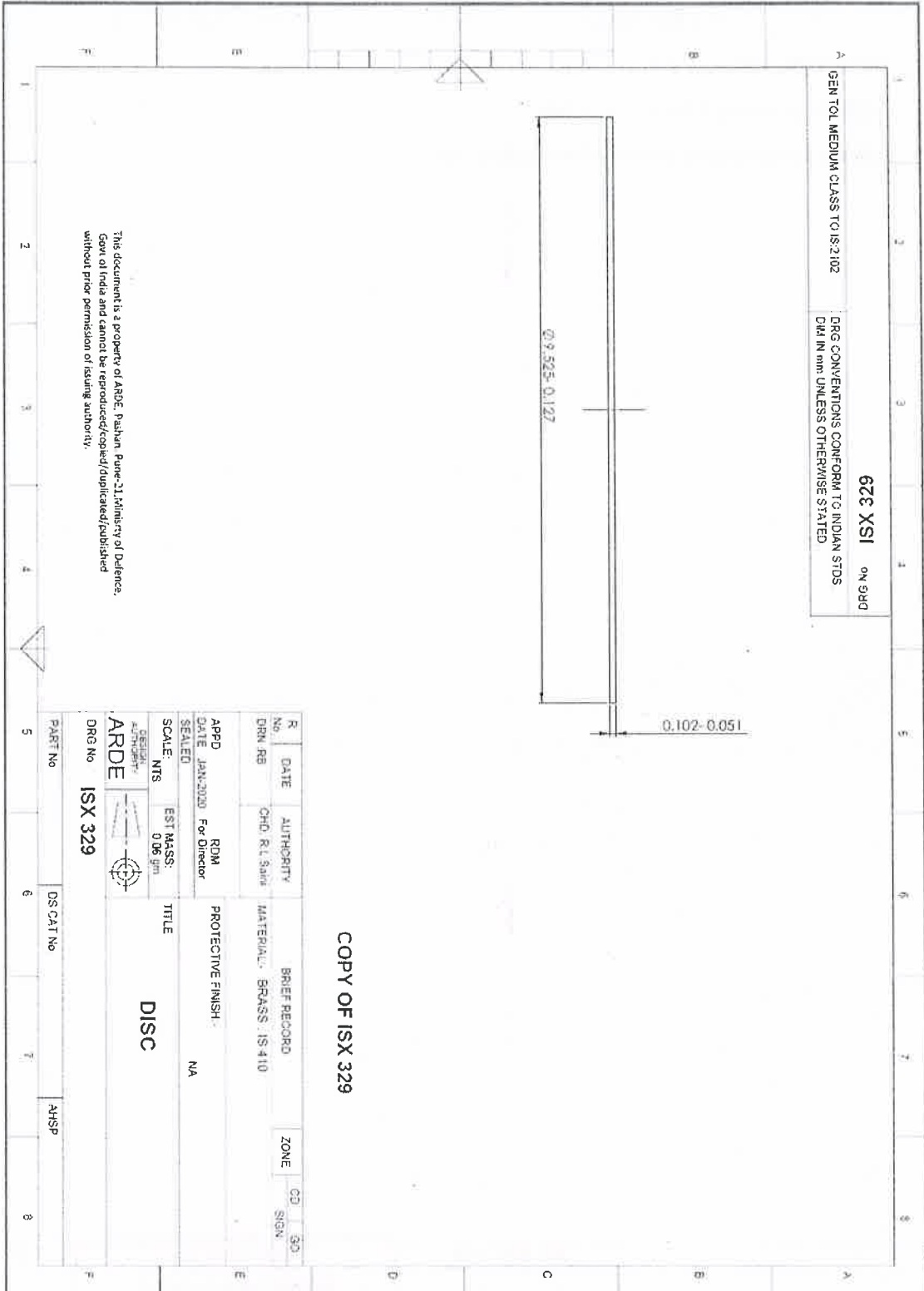


Table 4. Steels supplied as bright bar
chemical composition and mechanical property requirements

Steel (7)	Chemical composition						Condition (8)	Size (8) (diameters or across flats)	R _m	R _{eH} min.	A min. at 5.65/5 ₀	Impact Load min. KJ/m ²	A ₁₀₀ (10) min.	HB						
	C	Mn	Cr	Mo	Ni	Others														
C60M15	0.12-0.18	0.60-1.00					Normalized + turned or ground	mm > 6 ≤ 63 > 63 ≤ 150	N/mm ² (2) 175 185	22 22	22 22	J	N/mm ² (2)	109-163(4) 101-152(4)						
															Hot rolled + cold drawn or hot rolled + cold drawn + ground	330 320 300	10 12 13	30 300		
															Normalized + turned or ground	215 200	21 21			126-179(4) 116-170(4)
C70M20	0.16-0.24	0.50-0.90				Hot rolled + cold drawn or hot rolled + cold drawn + ground	mm > 6 ≤ 13 > 13 ≤ 16 > 16 ≤ 40 > 40 ≤ 63 > 63 ≤ 76	N/mm ² (2) 440 420 390 340 290 280	10 12 12 13 14	10 12 12 13 14			420 390 340 290 280	143-192(4) 126-179(4)						
															Normalized + turned or ground	245 215	20 20			
															Hot rolled + cold drawn or hot rolled + cold drawn + ground	465 440 400 385 355	9 11 12 12 13	9 11 12 12 13		440 420 380 330 310
C80M30	0.22-0.30	0.50-0.90				Normalized + turned or ground	mm > 6 ≤ 63 > 63 ≤ 250	N/mm ² (2) 245 230	20 20	20 20			143-192(4) 134-183(4)							
														Hot rolled + cold drawn or hot rolled + cold drawn + ground	465 440 400 385 355	9 11 12 12 13	9 11 12 12 13		440 420 380 330 310	
														Normalized + turned or ground	245 230	20 19	20 19			
C80M30	0.26-0.34	0.60-1.00				Hot rolled + cold drawn or hot rolled + cold drawn + ground	mm > 6 ≤ 13 > 13 ≤ 16 > 16 ≤ 40 > 40 ≤ 63 > 63 ≤ 76	N/mm ² (2) 480 470 430 415 385	9 10 11 12 12	9 10 11 12 12			450 400 345 320	152-207 179-229						
															Hardened and tempered + turned or ground	340 415	18 16	25 25	28 28	310 400
															Hardened and tempered + cold drawn or hardened and tempered + cold drawn + ground	385 460	13 12	25 25	25 25	340 430

BS 970 : Part 1 : 1988

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Figures in parentheses indicate notes which appear at the end of the table.

Table 4. Steels supplied as bright bar :
chemical composition and mechanical property requirements (continued)

Steel (7)	Chemical composition					Condition (8)	Size (9) (diameter or square face)	R _m N/mm ² (2)	R _{p0.2} N/mm ² (2)	A min. on E _{80/15g}	Impact J (KV min.)	R _{act} (10) N/mm ² max.	H ₁₈							
	C	Mn	Cr	Mo	Ni									Others						
150M36	%	0.32-0.40	%	1.30-1.70	%		mm	N/mm ² (2)	N/mm ² (2)	E _{80/15g}	J (KV min.)	N/mm ² max.	H ₁₈							
														Normalized + turned or ground	> 6 < 150	620 min. 600 min.	385 355	14 15	-	179-229(4) 170-223(4)
														Hardened and tempered + turned or ground	> 19 < 150 > 13 < 63 > 6 < 29	625-775 700-850 775-925	400 480 555	18 16 14	35 30 30	370 450 525
Hardened and tempered + cold drawn or hardened and tempered + cold drawn + ground	T (11)	> 19 < 150 > 13 < 63 > 6 < 29	625-775 700-850 775-925	440 520 580	13 12 10	25 30 30	- - -	400 480 540	179-229(4) 201-255(4) 223-277(4)											
										6 < 13	850-1000	635	12	25	248-302					
										6 < 13	850-1000	665	9	25	248-302(4)					

Non-alloy free-cutting steels

Z20M07	0.15 max.	0.90-1.30				P 0.070 max. (6) S 0.20-0.30	Hot rolled + turned or ground	> 6 < 100	360 min.	215	22				103 min.
Z16M36	0.32-0.40	1.30-1.70				S: 0.25 max. P: 0.060 max. S: 0.12-0.20	Hot rolled + cold drawn or hot rolled + cold drawn + ground	> 6 < 13 > 13 < 16 > 16 < 40 > 40 < 63 > 63 < 76	680 min. 650 min. 620 min. 600 min. 570 min.	530 480 460 420	6 7 7 8 9				152-207 179-229 201-255

Four in parentheses indicate notes which appear at the end of the table.

5. CONDITION

5.1 The material shall be supplied in the following conditions:

<i>Alloy Designation</i>	<i>Temper</i>
CuZn30 & CuZn37	Annealed (O); Quarter hard (HA); Half hard (HB), Hard (HD), Extra hard (HE); Spring hard (HS)
CuZn40	Annealed (O); Half hard (HB), Hard (HD).

6. CHEMICAL COMPOSITION

6.1 The material, when analyzed in accordance with IS : 3635-1966* shall have the chemical composition given in Table 1.

TABLE 1 CHEMICAL COMPOSITION

ALLOY DESIGNATION	PERCENTAGE				
	Cu	Pb <i>Max</i>	Fe <i>Max</i>	Total Impurities (Including Iron) <i>Max</i>	Zn
(1)	(2)	(3)	(4)	(5)	(6)
CuZn30	68.5 to 71.5	0.05	0.05	0.3	Remainder
CuZn37	61.5 to 64.5	0.30	0.075	0.6	Remainder
CuZn40	58.5 to 61.5	0.30	0.10	0.75	Remainder

7. MECHANICAL TESTS (INCLUDING PREPARATION OF TEST PIECES)

7.1 Where both tensile and hardness properties are specified (see Tables 2 and 3), they are to be regarded as alternatives and the hardness shall be taken as mandatory unless otherwise agreed. The following tests shall be made on test pieces selected as specified in 9.

7.1.1 *Tensile Test* — Whenever practicable, tensile tests shall be made on the full section of the material. Alternatively, a test piece of the full thickness of the material and machined to the dimensions of the 12 mm wide rectangular section test piece specified in IS : 2654-1964† shall be used. The longitudinal axis of symmetry of the test piece shall be in the direction of rolling. The elongation shall be measured on a gauge length of 50 mm. The tensile test shall not be applied to material 0.50 mm in thickness and less. The elongation test shall not be applied to strip thinner than 0.80 mm and less than 12 mm wide. The values obtained shall comply with the appropriate requirements given in Tables 2 and 3.

*Methods of chemical analysis of brasses.

†Method for tensile testing of copper and copper alloys.

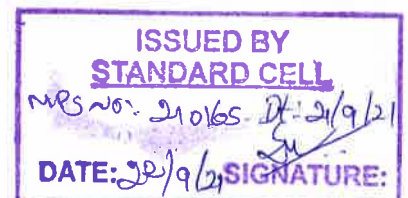


TABLE 2 MECHANICAL PROPERTIES FOR OTHER THAN TELECOMMUNICATION INDUSTRIES

(Clauses 7.1, 7.1.1, 7.1.2 and 7.1.3)

ALLOY DESIGNATION	CON-DITION	THICKNESS Over Up to and Including	TENSILE STRENGTH N/mm ² (kgf/mm ²) Up to and Including 450 mm Wide	ELONGATION ON GAUGE LENGTH OF 50 mm PERCENT Min	VICKERS HARDNESS (HV)		BEND TEST							
					Up to and Including 450 mm Wide	Over 450 mm Wide	Transverse Bend	Longitudinal Bend						
		mm	Min	Min	Max	Min	Max	deg	deg					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CuZn30	O	—	10	275 (28.0)	275 (28.0)	50	—	80	—	80	180	Close	180	Close
	HA	—	10	320 (32.5)	320 (32.5)	35	75	—	75	—	180	Close	180	Close
	HB	—	3.5	345 (35.0)	345 (35.0)	20	100	—	95	—	180	Close	180	Close
	HD	—	10	405 (41.5)	380 (39.0)	5	125	—	120	—	90	2t	90	t
CuZn37	O	—	10	275 (28.0)	275 (28.0)	40	—	80	—	80	180	Close	180	Close
	HA	—	10	335 (34.0)	320 (32.5)	30	75	—	75	—	180	Close	180	Close
	HB	—	3.5	380 (38.5)	345 (35.0)	15	110	—	100	—	180	Close	180	Close
		3.5	10								180	Close	180	t