

MONITORING INSTRUCTION FOR INSPECTION		Issue No. 01 Rev. No. 00
		Date of Issue 30.08.21
TRACER PLUG ASSY		HEPF/QA/SC/B/014
Rev no	Amendment	Date

DRAWING NO. : ISX 20 SA
DOCUMENT REF : DRDO-ARDE-DOA-TOT-209-2017 Rev:0 Dtd:May 2021
END USE : 125mm FSAPDS Practice Shot

SUB COMPONENTS DRG & RAW MATERIAL SPECIFICATION:

SI No	Component	Drawing No	Material	Qty
1	Plug	ISX328	Steel .B.S 970 PT1 070M20 OR B.S. 970 PT1 220 M 07 with minimum mechanical properties as specified for B.S 970.En 3A Protective finish :- Phosphate d to spec IS : 3618, class 2	1
2	Disc	ISX 329	Brass, IS: 410, Grade CuZn30 or CuZn37 'O' condition	1

TABLE A: INSPECTION CHECK TO BE CARRIED OUT AT FIRMS PREMISES FOR RAW MATERIAL CLEARANCE

Sl. No.	Characteristics	Specification / Requirement		Sample Size
		Plug	Disc	
1	Chemical Analysis	As per specification BS 970 pt1	As per IS: 410	1 sample / heat
2	Mechanical Testing	UTS(min) - 430 (MPa) 0.2% PS(min) – 215 (MPa) % Elongation (min) - 21	UTS(min) - 275 (MPa) 0.2% PS(min) – 50 (MPa) Hardness(min) – 80HV	2 samples / heat

NOTE:

- After completion of, chemical and mechanical properties, the firm has to forward the following documents to HEPF Trichy
 - The raw material original manufacturer's certificate, heat number, quantity purchased etc are to be mentioned.
 - The chemical and mechanical test certificates from NABL accredited lab or Govt approved lab as per Table A.
- All the above documents are to be forwarded to GM/HEPF.
- HEPF shall verify all the documents as above and accord clearance for production of Final components

TABLE B: INSPECTION CHECK TO BE CARRIED OUT AT FIRMS PREMISES AT FINISHED COMPONENT STAGE

Sl. No.	Characteristics	Specification / Requirement		Sample Size	Acceptance Criteria
		Plug	Disc		
1	Visual	1. Sharp Edges /Burrs 2. Damage to Threads 3.Tool marks 4. Two holes 2.8 x 3 deep	1. Tear mark 2. Cut mark, tool mark	100%	Not Permitted
2	Dimension Inspection	As per drawing (Dimensions apply before coating)	As per drawing		No deviation allowed
3	Surface Treatment	Phosphating to spec IS : 3618, class 2	--		As per specification

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Tracer Nut assembly procedure-

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

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

TABLE C: INSPECTION CHECK TO BE CARRIED OUT AT HEPF BY HEPF/SQAE REP

Sl. No.	Characteristics	Specification / Requirement	Sample Size
		Tracer Plug (Assy)	
1	Visual	Disc to be present and unpunctured	100%
2	Verification of documents	Firms Material Test Certificates, Dimensional & Visual Inspection Report	

TABLE E. VERIFICATION OF INSPECTION DOCUMENTS.
FOLLOWING INSPECTION DOCUMENTS MUST BE ENCLOSED WITH EACH SUPPLY.

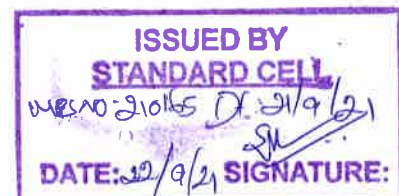
Sl. No.	Inspection Documents
1.	Firm's Material Test Certificates With Lot / Batch No. & Qty.
2.	Firm's Dimensional & Visual Inspection Report
3.	Packing Slip Indicating Lot / Batch No. & Qty. Details
4.	Inspection / Acceptance Documents Issued By HEPF / ARDE /SQAE Inspector.
5.	In addition to the above soft copies of all the certificates mentioned in Table – A, B & C shall be sent to e-mail ID's. happqa.ofb@ofb.gov.in , mmhapp.ofb@ofb.gov.in
NOTE	In case of any differences QAP shall prevail

[Signature]
04/09/21
SREENIVASA RAO BODALA
DGM / PM
MEMBER / MI COMMITTEE

[Signature]
02/09/2021.
JAGVIMAL PHOGAAT
WM / ASSY(USER SECTION)
MEMBER / MI COMMITTEE

[Signature]
02/09/2021
SEINUNNOM JOSEPH KIPGEN
DGM / QA
MEMBER / MI COMMITTEE

[Signature]
07/09/21
T.PRABHU
JT.GM / Q & A
CHAIRMAN / MI COMMITTEE



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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

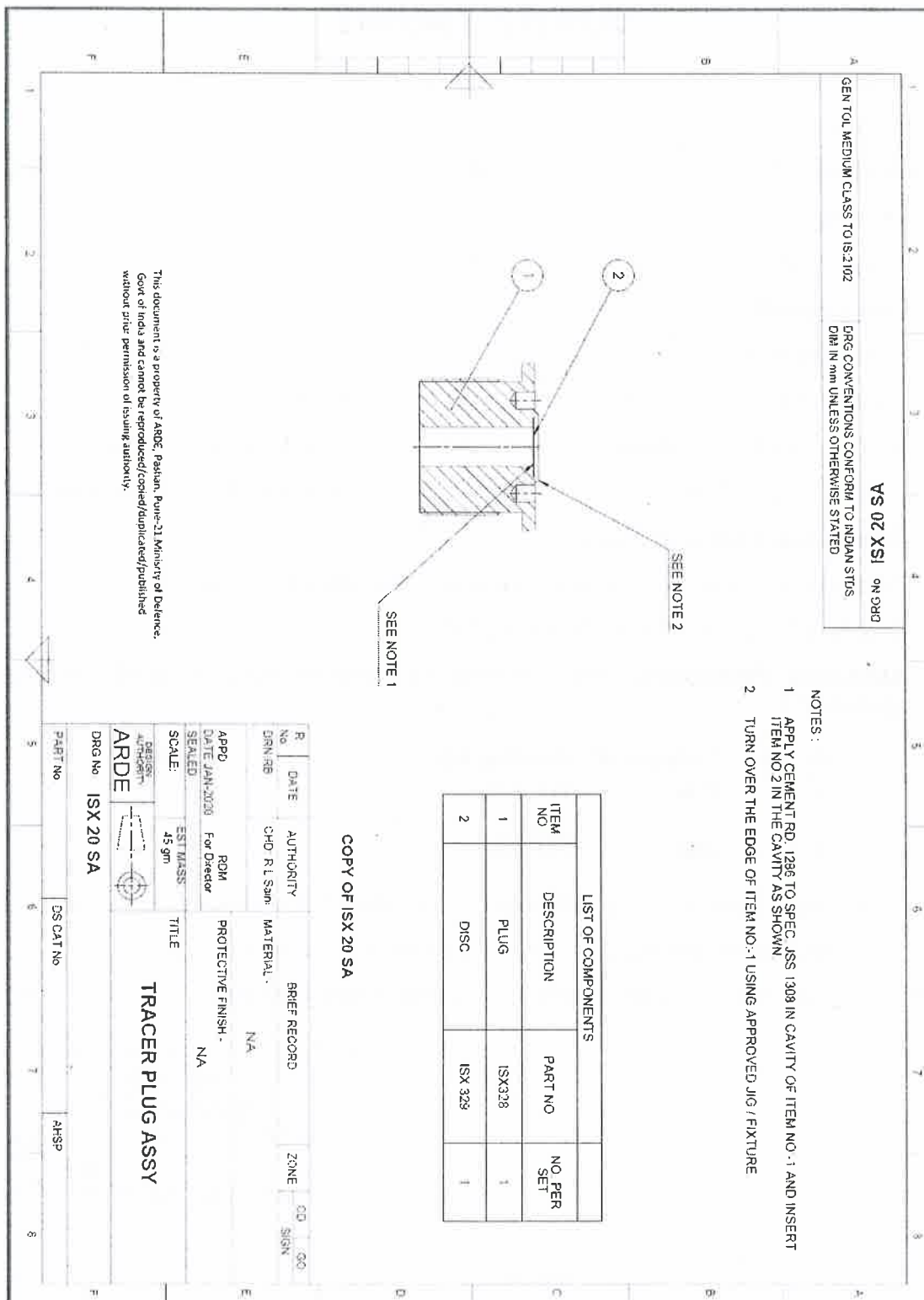
- Apply cement RD 1286 to specification JSS 1308 in cavity of item no. 1 and insert item no. 2 in the cavity as shown in drawing.
- Turn over the edge of item no. 1 using proper jig/fixture.



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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

LIST OF COMPONENTS			
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	N/A		
APPD	DATE	RDM	PROTECTIVE FINISH		
	JAN-2020	For Director	N/A		
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

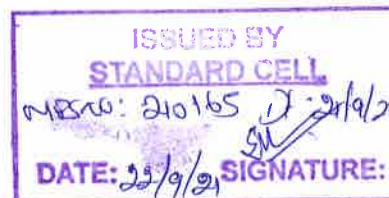
- 6.2. Dimensional Inspection:

- 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

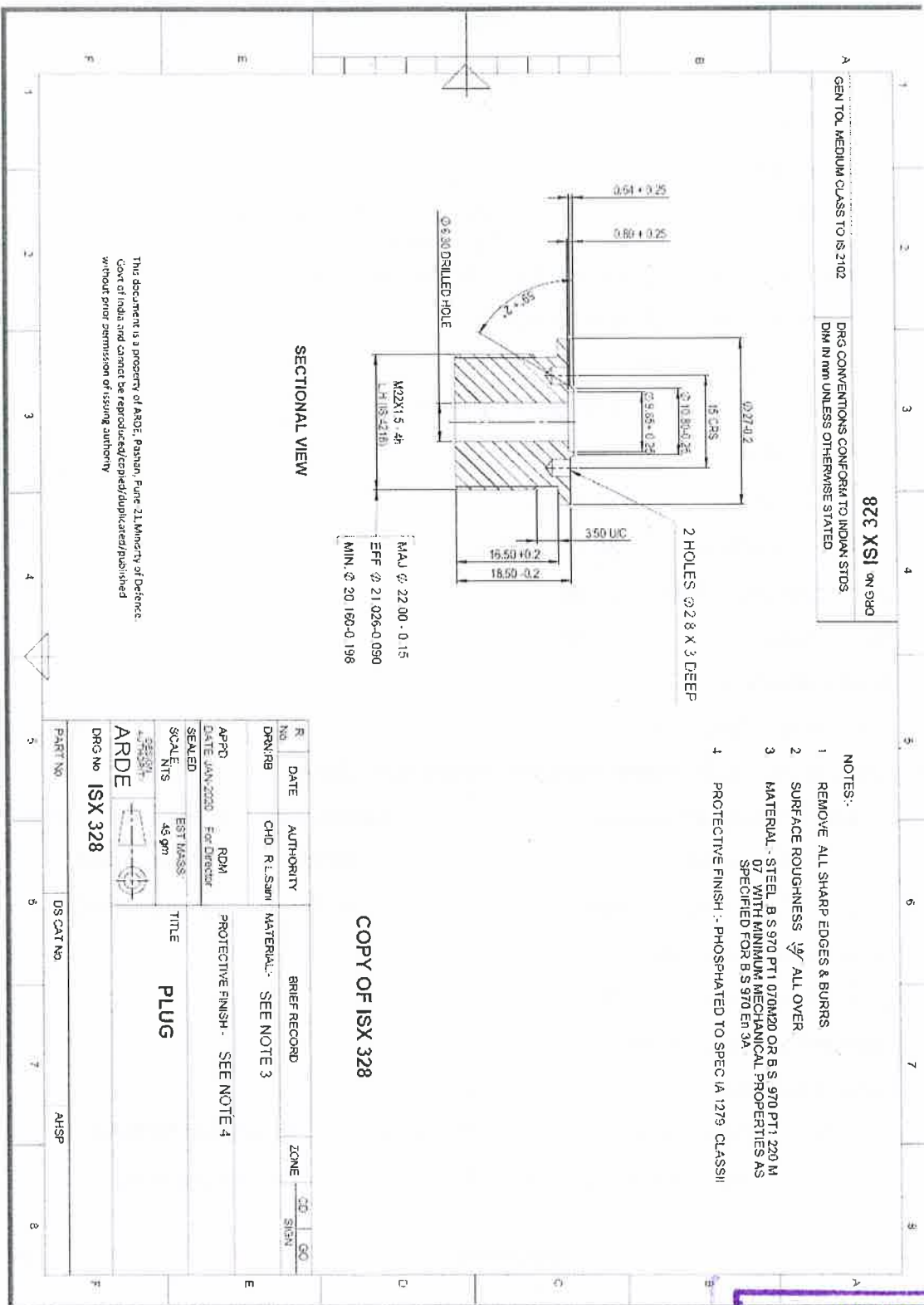
7. Details of tests and other information: Nil

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R. No	DATE	AUTHORITY	BRIEF RECORD	ZONE	CD	GO
DRW/RB	CHD R.L.Sami	MATERIAL:-	SEE NOTE 3			
APPD	DATE	ROD	PROTECTIVE FINISH -	SEE NOTE 4		
DATE JAN-2020	For Director					
SEALD	EST MASS	TITLE				
SCALE	45 gm	PLUG				
NTS						
ARDE						
DRG No	ISX 328					
PART No	DS CAT No	AHSP				

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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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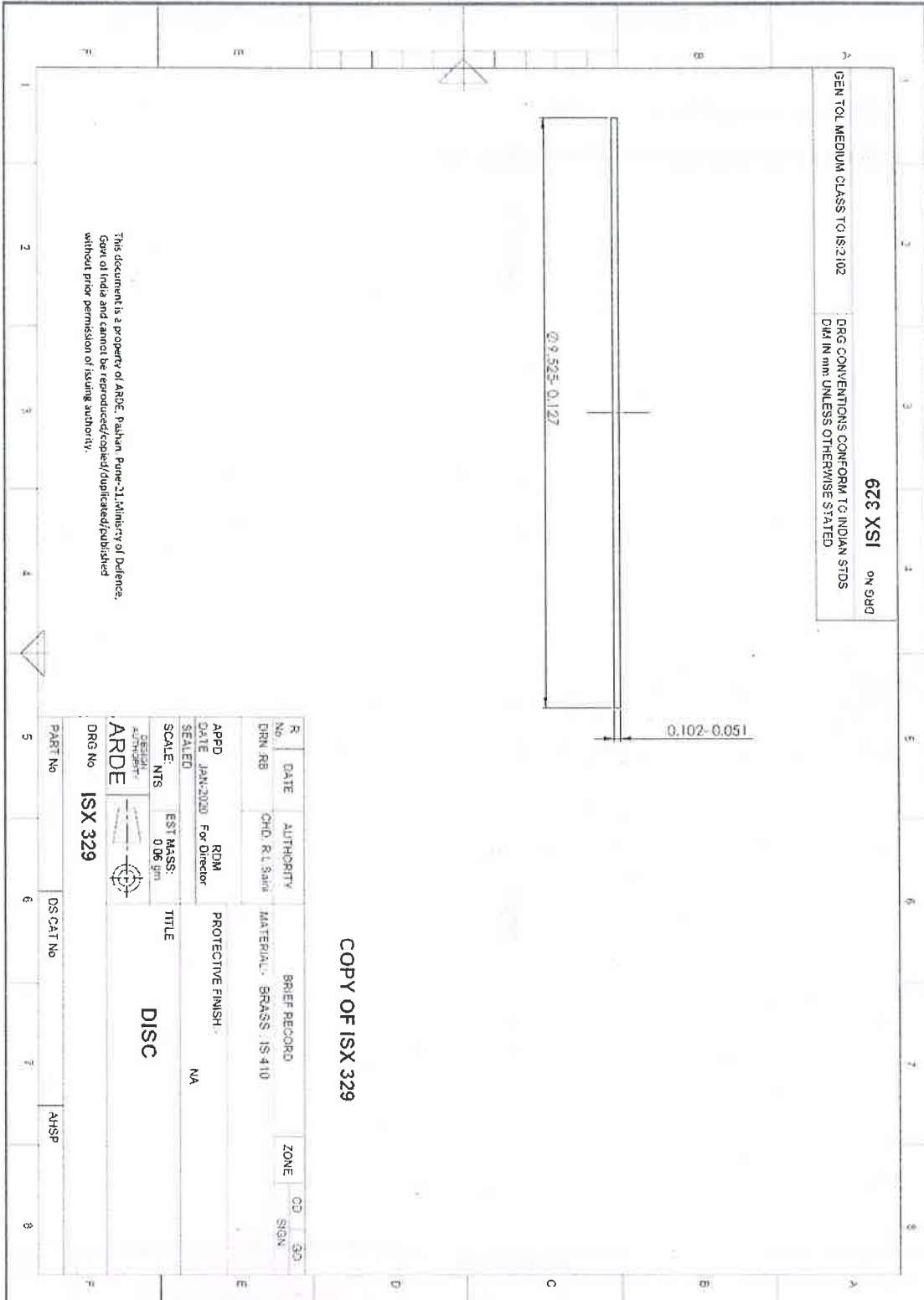


Table 4. Steels supplied as bright bar
Chemical composition and mechanical property requirements

Steel (7)	Chemical composition							Condition (8)	Size (8) (diameters or across flats)	R _m	R _{p0.2} min.	A min. at 5.65/5 ₀	Impact Load min. KCV/min.	A ₁₀₀ (10) min.	HB
	C	Mn	Cr	Mo	Ni	Others	%								
080M15	0.12-0.18	0.60-1.00						Normalized + turned or ground	6 ≤ 63	N/mm ² (2)	175	22	J	N/mm ² (4)	109-163(4)
									63 ≤ 150		185	22			101-152(4)
070M20	0.16-0.24	0.50-0.90					Normalized + turned or ground	6 ≤ 13	N/mm ² (2)	330	10				
								13 ≤ 29		320	12				
								29 ≤ 100		300	13				
070M26	0.22-0.30	0.50-0.90					Normalized + turned or ground	6 ≤ 150	N/mm ² (2)	215	21			126-179(4)	
								150 ≤ 250		200	21			116-170(4)	
								6 ≤ 13		440	10			420	
								13 ≤ 16		420	12			390	
								16 ≤ 40		370	12			340	
080M30	0.26-0.34	0.60-1.00					Normalized + turned or ground	6 ≤ 63	N/mm ² (2)	245	20			143-192(4)	
								63 ≤ 250		215	20			126-179(4)	
								6 ≤ 13		465	9			440	
								13 ≤ 16		440	11			420	
								16 ≤ 40		400	12			380	
080M30	0.26-0.34	0.60-1.00					Normalized + turned or ground	40 ≤ 63	N/mm ² (2)	385	12			330	
								63 ≤ 76		355	13			310	
								6 ≤ 150		245	20			143-192(4)	
								150 ≤ 250		230	19			134-183(4)	
								6 ≤ 13		480	9			460	
080M30	0.26-0.34	0.60-1.00					Normalized + turned or ground	13 ≤ 16	N/mm ² (2)	470	10			450	
								16 ≤ 40		430	11			400	
								40 ≤ 63		415	12			345	
								63 ≤ 76		385	12			320	
								6 ≤ 63		340	18	25	28	310	
080M30	0.26-0.34	0.60-1.00					Normalized + turned or ground	6 ≤ 19	N/mm ² (2)	415	16	25	28	152-207	
								6 ≤ 19		415	16	25	28	179-229	
								6 ≤ 63		385	13	25	28	340	
								6 ≤ 19		460	12	25	28	152-207(4)	
								6 ≤ 19		460	12	25	28	179-229(4)	

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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 (1)	Chemical composition					Condition (9)	Size (8) (diameter or square face)	R _m N/mm ² (2)	R _{p0.2} N/mm ² (2)	A min. on E _{80/15g}	Impact test min. (KV min.)	P _{0.2} (10) max.	H ₈								
	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}	Impact test min. (KV min.)	P _{0.2} (10) max.	H ₈								
														Normalized + turned or ground	> 150 < 250	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 > 6 < 13	625-775 700-850 775-925 850-1000	400 480 555 635	18 16 14 12	35 30 30 25	42 35 35 28	370 450 525 620
Hardened and tempered + cold drawn or hardened and tempered + cold drawn + ground	> 19 < 150 > 13 < 63 > 6 < 29 > 6 < 13	625-775 700-850 775-925 850-1000	440 520 580 665	13 12 10 9	25 30 30 25	-	400 480 540 635	179-229(4) 201-255(4) 223-277(4) 248-302(4)													

Non-alloy free-cutting steels

Z20M07	0.15 max.	0.90-1.30					> 6 < 100	360 min.	215	22			360	103 min.
Z30M07	0.15 max.	0.90-1.30					> 6 < 100	360 min.	215	22			360	103 min.
Z16M36	0.32-0.40	1.30-1.70					> 6 < 100	550-700	340	20	25	25	310	152-207
							> 6 < 100	550-700	340	20	25	25	310	152-207
							> 6 < 100	550-700	340	20	25	25	310	152-207

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.

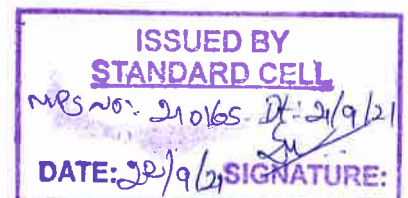


TABLE 2 MECHANICAL PROPERTIES FOR OTHER THAN TELECOMMUNICATION INDUSTRIES

(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						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
CuZn30	O	—	275 (28.0)	275 (28.0)	50	—	80	—	—	80	180	Close	180	Close
	HA	—	320 (32.5)	320 (32.5)	35	—	75	—	75	—	180	Close	180	Close
	HB	3.5	345 (35.0)	345 (35.0)	20	—	—	—	95	—	180	Close	180	Close
	HD	—	405 (41.5)	380 (39.0)	5	—	—	—	120	—	90	2t	90	t
CuZn37	O	—	275 (28.0)	275 (28.0)	40	—	80	—	—	80	180	Close	180	Close
	HA	—	335 (34.0)	320 (32.5)	30	—	—	—	75	—	180	Close	180	Close
	HB	3.5	380 (38.5)	345 (35.0)	15	—	—	—	100	—	180	Close	180	Close
		10												