

STANDARD/SPECIFICATION

NUMBER

TIN-FREE PRESSURE-WORKED BRONZE.
GRADES.

GOST 18175-78

SUPERSEDES GOST 18175-72

SHEET I OF 9

1. This standard pertains to tin-free pressure-worked bronze, meant for fabrication of blanks and semifinished products.

This standard corresponds to ST SEV 377-76 in the part of grades BrA5, BrA7, BrAM₁₂9-2, BrAZHM₁₂10-3-1.5, BrAZHN10-4-4, BrB2, BrBNTL.7, BrBNTL.9, BrKM₁₂3-1 and establishes additional requirements to grade BrAZH9-4 in the part of content of lead and phosphorus and also establishes the grades BrAM₁₂10-2, BrBNTL.9Ma, BrKN1-3, BrM₁₂5, BrAZHNH₁₂9-4-4-1, BrK01 and BrM0.3.

2. Chemical composition of alloys should correspond to the requirements, given in the table.

3. Impurities, which are not to be determined and not given in the table, are considered in total content of impurities.

4. Properties and purpose of tin-free pressure-worked bronze, are given in (recommended) appendix 1.

5. Types of semi-finished products are given in (reference) appendix 2.

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SPJ/-

APPROVED	<i>[Signature]</i>	17-2	MATL/SPECN.			
ENGINEER/ GP. INCHARGE	<i>[Signature]</i>	17-2	HEAT TREAT			
CHECKED	<i>[Signature]</i>	8.2.84	FINISH			
DRAWN	<i>[Signature]</i>	(A.G. UDIYAR)		ISS NO.	ISSD. BY	APPRD.

HINDUSTAN AERONAUTICS LIMITED-NASIK DIVIN. INDIA

REAL (NK)

HIGH-PRESSURE-WORKED BRONZE.
GRADES.

GOST 18175-78

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Table Contd.

1	2	3	4	5	6	7	8	9	10
BrM1-0	-	-	-	-	0.1-0.4	2.0-3.4	0.6-1.1	-	-
BrM2	-	-	-	-	4.0-6.0	-	-	-	-
BrM3	-	-	-	-	-	-	-	-	0.9-1.2
BrM4	-	-	-	-	-	-	-	-	-

TABLE CONTD.

Designation of grade	Parts of basic components (by weight)		Chemical composition, in %										
	Magnesium	Copper	Tin	13	14	15	15	17	18	19	20	21	22
As per this standard SZV 377-76	Parts of impurities (by weight), maximum												
As per standard SZV 377-76	Parts of impurities (by weight), maximum												
BrA5	The rest		0.1	0.1	-	-	-	0.03	0.01	0.5	0.5	0.5	1.1
BrA7	-	-	0.1	0.1	-	-	-	0.03	0.01	0.5	0.5	0.5	1.1
BrAM9-2	-	-	0.1	0.1	-	-	-	0.03	0.01	0.5	1.0	-	1.5

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Notes: (table)

1. Arsenic upto 0.4% (part by weight) is allowed in bronze of grade BrA5, which is used for production of condenser pipes.

2. Aluminium upto 11.5% (parts by weight) is allowed in bronze BRAZHN10-4-4, in this case iron and nickel should not be less than 4% (parts by weight) each.

3. By mutual agreement between manufacturer and customer, upto 2% of iron (without considering it in total impurities) is allowed in bronze of grade BrKM13-1.

4. By mutual agreement between manufacturer and customer, the following may be standardised:

a) content of impurities of arsenic and antimony in bronze of grades BrA5, BrA7, BrAM13-2, BrAM13-10-2, BRAZH9-4, BRAZHN10-3-1.5, BRAZHN10-4-4, BRAZHN13-9-4-4-1;

b) content of impurities of arsenic, antimony and phosphorus in bronze of grades BrKM13-1 and BrKN1-3.

5. Nickel upto 0.5% (part by weight), without considering it in total impurities, is allowed in bronze of grades BrA5, BrA7, BrAM13-2, BrAM13-10-2, BRAZH9-4, BRAZHN10-3-1.5, BrN13-5.

Properties and approximate purpose of tin-free
pressure-worked bronze.

APPENDIX 1.
(Recommended)

Type of bronze	Grade	Properties	Purpose
1	2	3	4
Aluminium bronzes	BrZ15 (CuAl5)	It can be formed in cold and hot state. It is corrosion-resistant, heat-resistant, abrasion-resistant.	Coins, parts coming into contact with water, parts for chemical industry.
	BrZ17 (CuAl7)	It can be formed in cold state, it is heat-resistant and abrasion-resistant, partly corrosion-resistant to the action of sulphuric and acetic acids.	Parts for chemical industry, sliding contacts.
	BrAZ10-3-3-1.5 (CuAl10Fe3Mn1),	It cannot be easily formed in cold state, it can be formed in hot-	Condenser tube plates, parts for chemical apparatus.
	BrAZ10-4-4 (CuAl10Fe4Ni4)	state, high strength at high temperatures, corrosion-resistant, high resistance to pitting and cavitation.	

Appendix 1 Contd...

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Aluminum bronze	BRAM10-2 (CuAl3Mn2)	High resistance under alternating load.	Condenser tube plates, abrasion-resistant parts, screws, shafts, parts for hydraulic installations.
BRAM10-2	BRAM10-2	High resistance under alternating load.	Blanks, irregularly-shaped castings in ship-building.
BRAM19-4 (CuAl3Fe4)	BRAM19-4 (CuAl3Fe4)	High mechanical properties, excellent anti-friction properties, corrosion-resistant.	Pinions, bushes, valve seats in aviation industry, in machine-building for loan castings of heavy parts.
Beryllium bronze	BrB2 {CuBe2Ni(Co)} BrBNT1.7 (CuBe1.7NiTi).	High strength and abrasion-resistant, high elastic properties, excellent anti-friction properties, medium electroconductivity and thermal conductivity, very good deformability in hardened state.	Springs, critical spring (action) parts, abrasion-resistant parts of all types, tools which do not emit sparks.
BrBNT1.9 (CuBe2NiTi).	BrBNT1.9 (CuBe2NiTi).	High strength and abrasion-resistant, high elastic properties, excellent anti-friction properties, medium electroconductivity and thermal conductivity, very good deformability in hardened state.	Springs, critical spring (action) parts, abrasion-resistant parts of all types, tools which do not emit sparks.

Appendix I. Contd...

1	2	3	4
Aluminum	2024-T3	Parts of all types for chemical plants, valves, vessels, heat exchangers, and piping.	Parts for ship-building and also for welded structures.
Aluminum	5052-H32	Parts of all types for chemical plants, valves, vessels, heat exchangers, and piping.	Parts for ship-building and also for welded structures.
Aluminum	6061-T6	Parts of all types for chemical plants, valves, vessels, heat exchangers, and piping.	Parts for ship-building and also for welded structures.
Aluminum	7075-T6	Parts of all types for chemical plants, valves, vessels, heat exchangers, and piping.	Parts for ship-building and also for welded structures.
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TYPES OF SEMIFINISHED PRODUCTS.

APPENDIX 2.
(Reference)

Grade	Sheets	Bands	Strips	Nodes	Pro- files	Pipes	Wire	Forg- ings
BrA5	X	X	X	X		X	X	
BrA7	X	X	X	X		X	X	X
BrAM ₁₀ 9-2		X	X	X			X	X
BrAM ₁₀ 10-2								X
BrAZH9-4				X		X		X
BrAZHM ₁₀ 10-3-1-2				X		X	X	X
BrAZHN ₁₀ 10-4-4				X		X		X
BrB2		X	X	X		X	X	
BrBNT1.7		X	X	X		X	X	
BrBNT1.9		X	X	X		X	X	
BrBNT1.9Ma			X					
BrKM ₁₀ 3-1	X	X	X	X			X	
BrKN1-3				X	X			X
BrM ₁₀ 5								X
BrAZHNM ₁₀ 9-1-4-1				X				X
BrK ₁₀ 1					X			
BrM ₁₀ 0.3					X			

NOTE. The symbol " X " denotes application of the particular grade for manufacturing the indicated semifinished products.

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Other standards referred to in this standard :

BY SEV 377-76.

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