TINLESS BRONZE,
processed by pressure
Grade
GOST 18175-78
EXTRACT

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TINLESS BRONZE,
processed by pressure
Grade

GOST
18175-78

I. This standard pertains to tinless bronze, processed by pressure, meant for preparing of blanks and semi-finished products.

2. Chemical composition of alloys should correspond to requirements, indicated in table 1 and 2.

3. Admixtures, not determined and not indicated in table, are considered in sum total of admixtures.

4. Characteristic properties and purpose of tinless bronze, processed by pressure, are indicated in annexure 1.

5. Forms of semi-finished products are indicated in annexure 2.

Code of grade		Chemical	
		Mass fraction	
on this standard	on standard of СЭВ 377 –76	Aluminum	Beryllium
БрА5	CuA15	4,0—6,0	—
БрА7	CuA18	6,0—8,0	—
БрАМц9—2	CuA19Mn2	8,0—10,0	—
БрАМц10—2	—	9,0—11,0	—
БрАЖ9—4	CuA19Fe3	8,0—10,0	—
БрАЖМц10—3—1,5	CuA110Fe3Mn1	9,0—11,0	—
БрАЖН10—4—4	CuA110Fe4Ni4	9,5—11,0	—
БрБ2	CuBe2Ni(Co)	—	1,8—2,1
БрБНТ1,9	CuBe2NiTi	—	1,85—2,10
БрБНТ1,9Мг	—	—	1,85—2,10
БрКМц3—1	CuSi3Mn1	—	—
БрКН1—3	—	—	—
БрМц5	—	—	—
БрАЖНМц9—4—4—1	—	8,8—10,0	—
БрМг0,8	—	—	—

Table 1

composition, % of basic components					
Iron	Manganese	Nickel	Silicon	Titanium	Cadmium
—	—	—	—	—	—
—	—	—	—	—	—
—	1,5—2,5	—	—	—	—
—	1,5—2,5	—	—	—	—
2,0—4,0	—	—	—	—	—
2,0—4,0	1,0—2,0	—	—	—	—
3,5—5,5	—	3,5—5,5	—	—	—
—	—	0,2—0,5	—	—	—
—	—	0,2—0,4	—	0,10—0,25	—
—	—	0,2—0,4	—	0,10—0,25	—
—	1,0—1,5	—	2,7—3,5	—	—
—	0,1—0,4	2,4—3,4	0,6—1,1	—	—
—	4,5—5,5	—	—	—	—
4,0—5,0	0,5—1,2	4,0—5,0	—	—	—
—	—	—	—	—	—

Code of grade		Chemical	
on this standard	on standard of СЭВ 377 –76	Mass fraction of base components	
		Magnesium	Copper
БрА5	CuA15	—	Remaining
БрА7	CuA18	—	»
БрАМц9—2	CuA19Mn2	—	»
БрАМц10—2	—	—	»
БрАЖ9—4	CuA19Fe3	—	»
БрАЖМц10—3—1,5	CuA110Fe3Mn1	—	»
БрАЖН10—4—4	CuA110Fe4Ni4	—	»
БрБ2	CuBe2Ni (Co)	—	»
БрБНТ1,9	CuBe2NiTi	—	»
БрБНТ1,9Мг	—	0,07—0,13	»
БрКМц3—1	CuSi3Mn1	—	»
БрКН1—3	—	—	»
БрМц5	—	—	»
БрАЖНМц9—4—4—1	—	—	»
БрМг0,3	—	0,2—0,5	»

Continuation of Table 1

composition, %									
Mass fraction of admixtures, is not more than									
Tin	Silicon	Aluminum	Nickel	Lead	Phosp-horus	Iron	Zinc	Mangan-ese	All
0,1	0,1	—	—	0,03	0,01	0,5	0,5	0,5	1,1
0,1	0,1	—	—	0,03	0,01	0,5	0,5	0,5	1,1
0,1	0,1	—	—	0,03	0,01	0,5	1,0	—	1,5
0,1	0,1	—	—	0,03	0,01	0,5	1,0	—	1,7
0,1	0,1	—	—	0,01	0,01	—	1,0	0,5	1,7
0,1	0,1	—	—	0,03	0,01	—	0,5	—	0,7
0,1	0,1	—	—	0,02	0,01	—	0,3	0,3	0,6
—	0,15	0,15	—	0,005	—	0,15	—	—	0,5
—	0,15	0,15	—	0,005	—	0,15	—	—	0,5
—	0,15	0,15	—	0,005	—	0,15	—	—	0,5
0,25	—	—	0,2	0,03	—	0,3	0,5	—	1,0
0,1	—	0,02	—	0,15	—	0,1	0,1	—	0,4
0,1	0,1	—	—	0,03	0,01	0,35	0,4	—	0,9
0,1	0,1	—	—	0,02	0,01	—	0,5	—	0,7
—	—	—	—	—	—	—	—	—	0,2

Notes:

1. In bronze of grade БрА5, used for production of condenser pipes, mass fraction of arsenic is permitted up to 0.46 %.

2. In bronze of grade БрАЖН10-4-4, mass fraction of aluminum is permitted up to 11.6 %, in this case mass fraction of iron and nickel should not be less than 4% each.

3. In bronze of grade БрКМц3-1 according to agreement of manufacturer with customer, it is permitted up to 2 % iron without its calculation in sum total of admixtures.

4. According to agreement of manufacturer with customer, it can be normalized:

a) impurity content of arsenic and antimony in bronze of grades БрА5, БрА7, БрАМц9-2, БрАМц10-2, БрАЖ9-4, БрАЖМц10-3-1.5, БрАЖН10-4-4, БрАЖНМц9-4-4 -1;

b) impurity content of arsenic, antimony and phosphorus in bronze of grades Бр, КМц3-1 and БрКН1-3. ‘

5. In bronze of grades БрА5, БрА7, БрАМц3-2, БрАМц10-2, БрАЖ-9-4, БрАЖМц10-3-1.5, BrМц5, mass fraction of nickel is permitted up to 0.5 % without its calculation in sum total of admixtures.

Table 2

Code of grade		Chemical composition, %														
		Components														Admixtures, not more than
on this standard	according to СЭВ 731-77	Aluminium	Beryllium	Iron	Manganese	Nickel	Silicon	Titan	Cadmium	Magnesium	Silver	Chromium	Phosphorus	Tellurium	Copper	Total
БрСр0,1	CuAg0,1	—	—	—	—	—	—	—	—	—	0,08—0,12	—	—	—	Остальное	0,1
БрХ1	CuCr1	—	—	—	—	—	—	—	—	—	—	0,4—1,2	—	—	»	0,3
—	CuFeP	—	—	—	—	—	—	—	—	—	—	—	0,004—0,012	0,3—0,8	»	0,2
БрКд1	CuCd1	—	—	—	—	—	—	—	0,9—1,2	—	—	—	—	—	»	0,3

Notes

1 Mass fraction of oxygen in bronze БрСр01 should not exceed 0.06 %

2 In alloy of grade CuCr1, due to copper, additional alloying components are permitted, whose sum should not exceed 0.3 %.

ANNEXURE 1

Recommended

Characteristic properties and exemplary/approximate purpose of tinless bronze, processed by pressure

Type of bronze	Grade	Characteristic property	Purpose
Aluminum bronze	БрА5 (CuA15)	Deformed in cold and hot states, corrosion- resistant, high-temperature (strength), stable to abrasion	Coins, parts, which work in sea water, part for chemical machine building
	БрА7 (CuA18)	Deformed in cold state, high-temperature (strength) and stable to abrasion, corrosively stable, in part, to sulfuric and acetic acids	Parts for chemical machine building, sliding contacts
	БрАЖМц10—3—1,5 (CuA110Fe3Mn1) БрАЖН10—4—4 (CuA110Fe4Ni4) БрАЖНМц9—4—4—1	Badly deformed in cold state, deformed in hot state, high strength with those increased temperature, corrosion-resistant, high erosional and cavitation resistance	Tube plates of condensers, part for chemical apparatus
	БрАМц9—2 (CuA19Mn2)	High resistance with alternating load	Tube plates of condensers, wear-resistant parts, screws, shafts, part for hydraulic installations
	БрАМц10—2	High resistance with alternating load	Blanks, shaped casting in shipbuilding

Continuation

Type of bronze	Grade	Characteristic property	Purpose
Aluminum bronze	БрАЖ9—4 (CuAl9Fe4)	High mechanical properties, good antifriction properties, corrosion-resistant	Gears, bush, valve seat in aircraft industry, in machine building for castings of massive parts into ground
Beryllium bronze	БрБ2 (CuBe2Ni(Co) БрБНТ1,9 (CuBe2NiTi) БрБНТ1,9Мг	High strength and wear resistance, high spring properties, good antifriction properties, average electrical conductivity and thermal conductivity, very good deformability in hardened state	Springs, springy parts of critical purpose, wear-resistant parts of all forms, nonsparking tools
Silicic bronze	БрКМц3—1 (CuSi3Mn1)	Corrosion-resistant, is suitable for welding, high-temperature (strength), high compressive strength	Parts of all forms for chemical apparatuses, spring and springy parts, part for shipbuilding, and also welded designs
	БрКН1—3 -	High mechanical and technological properties, corrosion-resistant, good antifriction properties 1	Critical parts in motor design, guide bushes
Manganic bronze	БрМц5	High mechanical properties, good deformability in hot and cold states, corrosion-resistant, increased heat resistance	Parts and units, operational at elevated temperatures
Cadmium and magnesium bronze	БрКд1 (CuCd1) БрМг0,3	High electrical conductivity and heat resistance	Collectors of electric motors, machine part of resistance welding and other parts

Continuation

Type of bronze	Grade	Characteristic property	Purpose
Silver bronze	БрСр0,1 (CuAg0,1)	-	Switchboards, manifold rings, winding of rotors of turbogenerators
Chromium bronze	БрХ1 (CuCr1)	-	Welding electrodes, electrical component, equipment of welding sets
Telluric bronze	(CuFeP)	-	Parts, processed on automata, elements of tele-technical, radio-technical, electrical and electronic devices

ANNEXURE 2

Reference

Forms of semi-finished products

Grade	Sheets	Strips	Tapes	Bars	Profile	Pipes	Wires	Wires
БрА5	×	×	×	×		×	×	
БрА7	×	×	×	×		×	×	×
БрАМц9—2		×	×	×			×	×
БрАМц10—2								×
БрАЖ9—4				×		×		×
БрАЖМц10—3—1,5				×		×	×	×
БрАЖН10—4—4				×		×		×
БрБ2		×	×	×		×	×	
БрБНТ1,9		×	×	×		×	×	
БрБНТ1,9Мг			×					
БрКМц3—1	×	×	×	×			×	
БрКН1—3				×	×			×
БрМц5								×
БрАЖНМц9—4—4—1				×				×
БрКд1					×			
БрМг0,3					×			

Note. Sign “X” indicates application of grade for preparing specified semi-finished products