भारतीय मानक

IS 3095 : 2024

Indian Standard

आभूषण बनाने में प्रयुक्त स्वर्ण टांके — विशिष्टि

(तीसरा पुनरीक्षण)

GOLD SOLDERS FOR USE IN MANUFACTURE OF JEWELLERY — SPECIFICATION

(Third Revision)

ICS 39.060

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July 2024 **Price Group**

Precious Metals Sectional Committee, MTD 10

FOREWORD

This standard was earlier published in 1965 and subsequently revised in 1981 and 1999. This revision has been brought out to bring the standard in the latest style and format of the Indian Standards. In addition, following significant changes have been made:

a) Reference clause has been included;

b) Clause 1, 'Scope' of the standard has been revised in line with the grades of Gold Jewellery/Artefacts specified in IS 1417:2016 'Gold and Gold Alloys, Jewellery/Artefacts-Fineness and Marking-Specification';

c) Clause for Terminology has been inserted after the 'References' clause;

d) Clause 3, i.e., grades of cadmium free yellow and white gold solder have been revised in line with the revision made in the scope;

e) Tables 1 and 2 have been merged into a single Table 1, and Table 2 has been deleted; and

f) Table 3 has been modified and renumbered as Table 2.

Assistance has been derived from International Standard ISO 22764 : 2020 ' Jewellery and precious Metals- Fineness of solders used with precious metal jewellery alloys' issued by International Organization for Standardization.

The composition of the committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2: 2022 'Rules for rounding off numerical values(*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

GOLD SOLDERS FOR USE IN MANUFACTURE OF JEWELLERY — SPECIFICATION

(*Third Revision)*

1 SCOPE

This standard lays down the requirements for gold solders for use in the manufacture of gold jewellery artefacts of 24, 23, 22, 20, 18 and 14 carat.

2 REFERENCE

The following standard contains provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below:

IS No.	*Title*
IS 1417 : 2016	Gold and gold alloys, jewellery/ artefacts — Fineness and marking — Specification (*fourth revision*)

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Carat — The ratio between the mass of gold content and the total mass expressed in parts per twenty four.

3.2 Fineness — The ratio between the mass of gold content and the total mass expressed in parts per thousand (‰).

3.3 Gold — The metallic element gold free from any other element.

3.4 Gold Alloy — Gold alloyed with one or more other elements.

3.5 Gold Solder — Gold alloy used to join parts of gold metal/alloy.

4 GRADES

The cadmium free yellow and white gold solders shall be of the following grades in carat:

Sl No.	*Cadmium Free Yellow Gold Solders*	*Cadmium Free White Gold Solders*
(1)	(2)	(3)
i)	22	18
ii)	20	14
iii)	18	

iv) 14

NOTE – For articles/ornaments of 24 carat and 23 carat, solder of grade 22 may be used, provided the skin purity of 24 carat and 23 carat gold alloy is kept slightly on higher side so that the melting purity conforms to the declared quality/grade.

5 FORM

The solders used shall preferably be in form of paste. However other forms like sheet, wire, strip, snippet etc may also be used subject to condition that the final purity of the jewellery is as declared and conforms to the prescribed grades.

6 MANUFACTURE

Gold solders shall be made from standard gold of fineness 995 or above as prescribed in IS 1417 and silver and base metal of minimum fineness of 999 parts per thousand (‰) and free from other harmful elements. The base metal content may vary to get desired colour and other physical characteristics but the gold content shall remain unchanged as per the respective grades as per **4.1** of IS 1417.

7 TYPICAL CHEMICAL COMPOSITIONS

Typical chemical compositions of various grades of gold solders are given in Tables **1** and **2**.

8 PACKING

The material shall be suitably packed to avoid any damage during transport.

9 MARKING

9.1 The package or the container of the solder shall be marked as below:

a) Manufacturer's name and identification mark;

b) Batch number; and

c) Grade and purity.

9.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

Table 1 Typical Chemical Composition of Cadmium Free Yellow Gold Solders

(*Clause* 6)

Sl No.	Grades in Carat	Metals, Present By Mass						Meeting Range[1)] °C	
		Au	Ag	Cu	Zn	In	Ga		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
i)	14 Easy	58.33	13.34	15.00	8.75	4.58	-	669	741
ii)	Medium	58.33	14.50	14.25	9.17	3.75	-	660	745
iii)	Hard	58.33	14.16	14.58	10.00	2.93	-	668	748
iv)	Easy	58.33	18.00	15.47	5.00	3.00	-	720	760
v)	Medium	58.33	21.00	16.97	2.00	1.50	-	750	620
vi)	Hard	58.33	22.47	17.00	2.00	-	-	800	620
vii)	18 Easy	75.00	6.25	8.50	5.50	4.75	-	730	765
viii)	Medium	75.00	5.75	9.50	6.00	3.75	-	682	767
ix)	Hard	75.00	5.25	12.25	6.50	1.00	-	792	829
x)	Easy	75.20	5.80	11.00	5.00	3.00	-	700	740
xi)	Medium	75.20	6.90	13.10	2.80	2.00	-	750	770
xii)	Hard	75.20	8.80	13.20	1.80	1.00	-	820	840
xiii)	20	83.5	4.12	5.61	3.63	3.14	-	-	-
xiv)	22 Easy	91.80	2.40	2.00	1.00	280	-	850	895
xv)	Medium	91.80	3.00	2.60	1.00	1.60	-	900	925
xvi)	Hard	91.80	420	3.00	1.00	-	-	940	960
xvii)	Very Easy	91.75	-	-	1.65	4.13	2.47	-	-

Table 2 Typical Chemical Composition of Cadmium Free White Gold Solders

(*Clause* 6)

Sl No.	Grades in Carat	Metals, Present By Mass						Meeting Range[1)] °C	
		Au	Ag	Cu	Ni	Zn	In	Solidus Temperature	Liquidus Temperature
(1)	(2)	(3)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	14 Easy	58.33	22.0	4.42	1.25	12.0	2.0	695	716
ii)	Hard	58.33	26.0	3.67	3.00	9.0	-	755	805
iii)	Easy	58.33	15.75	5.00	5.00	15.92	-	707	729
iv)	Hard	58.33	15.75	11.00	5.00	9.92	-	800	833
v)	18 Easy	75.00	-	6.0	5.50	13.50	-	802	826
vi)	Hard	75.00	-	9.0	9.0	7.00	-	843	870
vii)	Easy	75.00	-	6.50	12.00	6.50	-	803	834
viii)	Hard	75.00	-	1.00	16.50	7.50	-	888	902
ix)	20	83.0	-	-	10.0	6.7	-	855	885

[1)] Melting ranges are given for guidance only. Solidus is the temperature at which the solder starts melting and liquidus is the temperature at which the solder is completely liquid.

NOTE — Composition of cadmium free gold solders given in Tables 1 and 2 are indicative and not exhaustive. The base metal contents may vary to get desired colour and other physical characteristics, but gold content shall remain unchanged as per respective grades as per 3.1.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Precious Metals Sectional Committee, MTD 10

Organization	*Representative(s)*
Geological Survey of India, New Delhi	SHRI. PARAVJEET SINGH ***(Chairperson)***
All India Gems and Jewellery Trade Federation, Mumbai	SHRI D. D. KAREL
	SHRI SURESH I DHRUV (*Alternate*)
Association of Gold Refineries and Mints, New Delhi	SHRI ANIL C KANSARA (*Alternate*)
Bhartiya Swarnkar Sangh, Jaipur	SHRI DULI CHAND KAREL
	SHRI PREM KUMAR SONI (*Alternate*)
CGR Metalloys Private Limited, Kochi	SHRI JAMES JOSE
	SHRI JOSEPH K JAMES (*Alternate*)
CSIR - National Physical Laboratory, New Delhi	DR N. VIJAYAN
CSIR - Indian Institute of Toxicology Research, Lucknow	SHRI R. C. MURTHY
CSIR - National Metallurgical Laboratory, Jamshedpur	DR K. K. SAHU
	DR ASHOK K MOHANTY (*Alternate*)
Consumer Education and Research Centre, Ahmedabad	DR. C. J. SHISHOO
Consumer Guidance Society of India, Mumbai	DR. SITARAM DIXIT
	DR. M. S. KRAMATH (*Alternate*)
Gem and Jewellery Export Promotion Council, Mumbai	SHRI. SABYASACHI RAY
Gujarat Gold Centre, Ahmedabad	SHRI SHARAD C KANSARA (*Alternate*)
Hindalco Industries Limited, Mumbai	SHRI. JAYESH PAWAR
	SHRI DIVYANG SHAH (*Alternate*)
India Government Mint, Mumbai	SHRI BIMAL PARSAD

	SHRI RAVINDRA GUNDERAO JADHAV (*Alternate*)
Indian Association of Hallmarking Centres, New Delhi	SHRI. HARSHAD AJMERA
	SHRI. UDAY SHINDE (*Alternate*)
Indian Diamond Institute, Surat	SHRI SAMIR D. JOSHI
	SHRI HITESH VERMA (*Alternate*)
Indian Institute of Technology Bombay, Mumbai	SHRI SMRUTIRANJAN PARIDA
	SHRI N. K. KHOSLA (*Alternate*)
Institute of Chemical Technology, Mumbai	DR B. M. BHANAGE
	SHRI RADHE V. JAYARAM (*Alternate*)
Jalan and Company, Chandni Chowk, New Delhi	SHRI ISHWAR. JALAN
	SHRI VINAY JALAN (*Alternate*)
MMTC-PAMP India Private Limited, New Delhi	SHRI PANKAJ Deshmukh
	SHRI ANKUR GOYAL (*Alternate*)
National Centre for Compositional Characterization of Materials, New Delhi	DR R. SHEKAR
	SHRI N. N MEERAVALE (*Alternate*)
National Chemical Laboratory, Pune	SHRI C. S. GOPINATH
	DR. E BALARAMAN (*Alternate*)
National Mineral Development Corporation, Hyderabad	DR. CH SARVAN KUMAR
	DR. K. SRIRAMGURU (*Alternate*)
National Refinery Private Limited, Mumbai	SHRI ASHISH SONEWALA
	SHRI AMIT J (*Alternate*)
National Test House, Kolkata	DR A. B. MONDAL (*Alternate*)
Sigma Four, New Delhi	SHRI A K BAHL
	SMT ANITA BHATIA (*Alternate*)
Titan Company Limited, Bangalore	SMT MEENAKSHI SUNDARAM
	SHRI ANIKESH NANDY (*Alternate*)
Voluntary Organisation in Interest of Consumer Education (VOICE), New Delhi	SHRI B. K. MUKHOPADHYAY
	SHRI M. A. U. KHAN (*Alternate*)
World Gold Council, New Delhi	SHRI P R SOMASUNDARAM
BIS Directorate General	SHRI SANJIV MAINI, SCIENTIST 'F' AND SENIOR DIRECTOR AND HEAD (METALLURGICAL ENGINEERING) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary

SHRI Kunal Kumar
Scientist 'E'/ Director
(METALLURGICAL ENGINEERING), BIS