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*Indian Standard*

METAL POLISH, LIQUID — SPECIFICATION

( *First Revision* )

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**BUREAU OF INDIAN STANDARDS**  
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## FOREWORD

This Indian Standard ( First Revision ) was adopted by the Bureau of Indian Standards, after the draft finalized by the Polishes Sectional Committee had been approved by the Chemical Division Council.

The term 'metal polish' is in general used for those preparations which possess comparatively good abrasive and cleaning properties and which are used primarily on copper, brass, zinc, steel and allied metals. A good metal polish when applied has a three-fold function:

- a) To remove all dirt, grease and tarnish;
- b) To produce a fresh shining surface; and
- c) To leave on the surface of the metal a fine film of protective yet indiscernible material which will considerably retard any further deterioration or tarnishing within a reasonable time.

This standard was first published in 1969. In the light of technological developments, the Committee responsible for the preparation of this standard, decided to revise it. In this revision besides addition of new requirements concerning safety, a titrimetric method for the determination of total ammonia has also been included.

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 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value shall be the same as that of the specified value in this standard.

## *Indian Standard*

# METAL POLISH, LIQUID — SPECIFICATION

( *First Revision* )

### 1 SCOPE

This standard prescribes requirements and methods of sampling and test for the metal polish, liquid, which is suitable for general application to copper, brass, bronze, zinc, steel and allied metals.

### 2 REFERENCES

**2.1** The Indian Standards listed below are necessary adjuncts to this standard:

<i>IS No.</i>	<i>Title</i>
1070 : 1992	Reagent grade water — Specification ( <i>third revision</i> )
1448 ( Part 20 ) : 1982	Determination of flash point by Abel apparatus ( <i>first revision</i> )
8171 : 1992	Glossary of terms relating to polishes and related materials ( <i>second revision</i> )

### 3 TERMINOLOGY

**3.1** For the purpose of this standard, the definitions given in IS 8171 and the following shall apply.

#### 3.1.1 *Ambient Temperature*

It is the temperature between 21 and 38°C.

### 4 REQUIREMENTS

#### 4.1 Composition

The polish shall consist essentially of a stable suspension of finely divided abrasive or polishing earth in a suitable petroleum hydrocarbon solvent and ammonia soap of a suitable fatty acid. It shall be free from mineral acids, cyanides, grit and other ingredients having detrimental effect on the metals or the container and also shall not cause injury or irritation to the skin.

**4.1.1** The polish shall contain no ingredients which may be injurious to health under normal conditions of use.

**4.2** The metal polish should be easy to apply with a piece of cotton cloth and shall rub out easily leaving a shining attractive surface. It shall not have any disagreeable odour.

#### 4.3 Consistency

The polish shall not show any perceptible caking of the abrasive material inside the container, and if any caking is noticed, it shall be readily convertible into uniform and stable suspension free from any hard caking by thoroughly shaking the container when tested as prescribed in A-1.

#### 4.4 Stability

After the polish is thoroughly shaken, the abrasive earth shall remain in suspension and no separation of clear liquid shall occur within 15 minutes when tested as prescribed in A-2.

#### 4.5 Polishing Property

The polish shall clean tarnished metal surface and make it bright without scratching the metal and without leaving the metal discoloured or greasy or caked with abrasive material when tested as prescribed in A-3.

**4.5.1** It shall clean quickly leaving a bright polished surface with full lustre on metal being polished and the surface shall remain free of corrosion or discolouration for a period of at least 24 hours when the metal surface is exposed to ambient temperature.

#### 4.6 Acidity of the Aqueous Extract

The aqueous extract shall not change blue litmus to red when tested as prescribed in A-4.

#### 4.7 Keeping Quality

The polish shall not cake hard inside the container and shall comply with the requirements of this specification for two years when stored in its original sealed containers under cover at ambient temperature.

**4.8** The polish shall also comply with the requirements given in Table 1.

### 5 PACKING AND MARKING

#### 5.1 Packing

**5.1.1** The polish shall be supplied in sound, clean and dry cylindrical metal/plastic containers tapered into a small neck at the top and fitted with suitable caps. The sizes of containers shall preferably be 50, 100, 200 and 400 ml or as agreed to between the purchaser and the supplier. The caps, undercaps and wads when

fitted to the metal containers shall prevent evaporation of solvent and ingress of dirt.

**5.1.2** The containers shall be packed in lots in cartons and the cartons in turn, in cardboard or wooden boxes or as agreed to between the purchaser and the supplier.

## 5.2 Marking

**5.2.1** The containers shall be marked with the following:

- a) Indication of the source of manufacture;
- b) Net volume of the material when packed;

- c) The words 'Metal Polish for Brass, Copper, Bronze, Zinc and Steel';
- d) Directions for use;
- e) Month and year of manufacture; and
- f) Safety precautions, if any.

NOTE — Any other marking required under *Weights and Measures (Packaged Commodities) Regulations 1977*, may also be complied with.

## 6 SAMPLING

Representative samples for test shall be drawn as prescribed in Annex B.

**Table 1 Requirements for Metal Polish, Liquid**  
( Clause 4.8 )

Sl No.	Characteristic	Requirement	Method of Test, Ref to	
			Cl No. in Annex A	Indian Standard
(1)	(2)	(3)	(4)	(5)
i)	Total solids (excluding oils and fatty matter), percent by mass	25 to 30	A-5	—
ii)	Total ammonia (as NH <sub>3</sub> ), percent by mass	0.4 to 0.6	A-6	—
iii)	Residue on 75-micron IS Sieve	To pass test	A-7	—
iv)	Cyanides	To pass test	A-8	—
v)	Flash point (Abel), °C, Min	30	—	IS 1448 (Part 20) : 1982
vi)	Oleic acid content, percent by mass, Min	5	A-9	—

## ANNEX A

( Clauses 4.3, 4.4, 4.5 and 4.6 and Table 1 )

### METHODS OF TEST FOR METAL POLISH, LIQUID

#### A-0 QUALITY OF REAGENTS

**A-0.1** Unless specified otherwise, pure chemicals and distilled water (see IS 1070 : 1992) shall be used in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

#### A-1 TESTS FOR CONSISTENCY

**A-1.1** Shake vigorously a filled container for 5 minutes and pour the contents into a glass bottle. Insert a clean metal rod into the container and examine if any hard cake has formed.

#### A-2 TEST FOR STABILITY

**A-2.1** Pour quickly well-mixed polish to mark into a 100-ml stoppered graduated cylinder and

allow to stand for 15 minutes. Note if liquid has separated at the top.

#### A-3 TEST FOR POLISHING PROPERTY

**A-3.1** Take a polished brass plate free from scratches and tarnish it uniformly by applying a film of concentrated ammonia liquor (0.896 sp gr) and allow it to remain in a well-ventilated room for at least 24 hours. Divide the tarnished plate into two sections. Apply the polish from the sample under test with a swab on the half section of the tarnished plate, allow to stand for 10 minutes and then rub with a soft cotton cloth. Examine the polished surface for brightness and scratches and note the ease of removal of the tarnish.

#### A-4 TEST FOR ACIDITY

**A-4.1** Mix about 10 g of the polish with 100-ml of distilled water, stir well and allow to stand

till the aqueous layer separates. Test the aqueous layer with blue litmus paper.

## A-5 DETERMINATION OF TOTAL SOLIDS

### A-5.1 Procedure

Weigh accurately about 10 g of the well-mixed sample into a centrifuge tube and dilute with a solvent mixture consisting of 6 parts of petroleum hydrocarbon solvent 60/80, 3 parts of xylene or toluene and 1 part of acetone. Centrifuge at 1 400 rev/min for 30 minutes. Remove the supernatant liquid portion. Extract the solid residue in the tube twice exactly as above to remove all fatty and greasy matter. Finally, dry the residue at 105°C to 110°C to constant weight, cool and weigh.

### A-5.2 Calculation

$$\text{Total solids, percent by mass} = \frac{100 W_1}{W}$$

where

$W$  = mass, in g, of the sample taken for the test; and

$W_1$  = mass, in g, of the residue.

## A-6 DETERMINATION OF TOTAL AMMONIA

**A-6.0** Two methods are given below and ammonia may be estimated by any of these. However, in case of dispute distillation method shall be used.

### A-6.1 Distillation Method

#### A-6.1.1 Procedure

Weigh accurately about 30 to 40 g of the well-mixed sample into a 500-ml long-necked round-bottom flask fitted with a separating funnel and a splash head which is further connected to 45 cm long condenser. The other end of the condenser is connected to Kjeldahl bulb delivery tube. The lower end of this tube is kept just immersed in 50 ml of 0.1 N sulphuric acid in a conical flask.

**A-6.1.2** Add a few small pieces of clean broken porcelain and 5 g of paraffin wax to the sample. Add 100 ml of distilled water through the separating funnel followed by 15 ml of 30 percent sodium hydroxide solution. Heat the flask till about 50 ml of the liquid has distilled. Disconnect the delivery tube from the condenser and wash into the conical flask. Titrate the excess of the acid in the conical flask with approximately N/10 sodium hydroxide solution, accurately standardized, using methyl orange as indicator. Carry out a blank simultaneously with the same quantity of reagents.

### A-6.1.3 Calculation

$$\text{Total ammonia (as NH}_3\text{), percent by mass} = \frac{1.7 (V_2 - V_1) N}{W}$$

where

$V_1$  = volume, in ml, of the sodium hydroxide solution required for the sample,

$V_2$  = volume, in ml, of the sodium hydroxide solution required for the blank,

$N$  = normality of the sodium hydroxide solution, and

$W$  = mass, in g, of the sample taken for the test.

### A-6.2 Titrimetric Method

#### A-6.2.1 Procedure

Weigh accurately about 5 to 6 g of the well-mixed sample and transfer to a calibrated 200 ml stoppered cylinder containing 10 ml of 4 percent *m/v* boric acid solution in distilled water. Add distilled water to make up the volume accurately upto 100 ml. Shake vigorously and titrate with 0.1 (N) sulphuric acid using 5 ml of methyl red and methylene blue mixed indicator. Stopper the flask and shake vigorously between additions of titrant near the end point, note the volume of 0.1 (N) sulphuric acid required to produce the first permanent pink colour in the solution.

NOTE — The mixed indicator is prepared by using 5 ml of 0.005 percent *m/v* solution of methyl red in 50 percent *v/v* alcohol and sufficient quantity of 0.1 percent *m/v* aqueous solution of methylene blue to give green colour).

#### A-6.2.2 Calculation

$$\text{Total ammonia (as NH}_3\text{), percent by mass} = \frac{0.17 V}{W}$$

where

$V$  = volume, in ml, of 0.1 N sulphuric acid; and

$W$  = mass, in g, of the sample taken for the test.

## A-7 TEST FOR RESIDUE ON TEST SIEVE

**A-7.1** Weigh accurately about 50 g of the thoroughly shaken polish in 250-ml beaker and mix with 100 ml of suitable petroleum hydrocarbon solvent (mineral terpentine). Transfer the contents of the beaker to a 75-micron IS Sieve using a wash-bottle containing petroleum hydrocarbon solvent. Wash gently with petroleum hydrocarbon solvent until the washing liquid after passing through the sieve contains no solid particles. Examine the sieve. There shall be no residue left on the sieve.

## A-8 TEST FOR CYANIDES

**A-8.1** Take 10 ml of the well-mixed polish in a test-tube and make alkaline with few drops of

10 percent sodium hydroxide solution. Add a few drops each of freshly prepared ferrous sulphate and ferric chloride solutions, mix and warm for 3 to 4 minutes on a water-bath. Acidify the mixture with dilute hydrochloric acid. There shall be no blue colouration in the solution.

### A-9 DETERMINATION OF OLEIC ACID CONTENT

#### A-9.1 Procedure

Transfer by means of a measuring cylinder 150 ml of ethanol or methylated spirit to a 400-ml beaker, add 3 drops of phenolphthalein-thymol blue indicator solution, place in the hot water-bath and allow to come to the boil. Meanwhile, weigh accurately about 10 g of the well-mixed sample in a small beaker. Set this aside until required. When the ethanol or methylated spirit in the 400-ml beaker has reached boiling point, remove from the water-bath and without undue delay add sufficient amount of 0.1 N

sodium hydroxide solution dropwise to produce the first faint permanent violet colour of the indicator. Gently drop into the hot neutralized ethanol or methylated spirit the previously weighed sample of polish, replace in the hot water bath and bring just to boil, with constant swirling. Titrate as rapidly as practicable against 0.1 N sodium hydroxide solution to the first faint permanent violet colour.

#### A-9.2 Calculation

$$\text{Fatty acid (as Oleic), percent by mass} = \frac{28.2 \times v \times N}{W}$$

where

$v$  = volume, in ml, of sodium hydroxide solution required;

$N$  = normality of the sodium hydroxide solution; and

$W$  = mass, in g, of the sample taken for the test.

## ANNEX B

( Clause 6.1 )

### SAMPLING OF METAL POLISH, LIQUID

#### B-1 GENERAL REQUIREMENTS FOR SAMPLING

**B-1.0** In drawing, preparing, storing and handling test samples, the following precautions and directions shall be observed.

**B-1.1** Samples shall be taken in a protected place not exposed to damp air, dust or soot.

**B-1.2** The sampling instrument shall be clean and dry when used.

**B-1.3** Precautions shall be taken to protect the samples, the material being sampled, the sampling instrument and the containers for samples from adventitious contamination.

**B-1.4** The samples shall be placed in clean, dry and airtight glass containers or other suitable containers on which the material has no action.

**B-1.5** The sample containers shall be of such a size that they are almost completely filled by the sample.

**B-1.6** Each sample container shall be sealed airtight after filling and marked with full details of sampling, the date of sampling and the year of manufacture of the material.

**B-1.7** Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature.

#### B-2 SCALE OF SAMPLING

**B-2.0** To determine conformity of a consignment of metal polish to this specification, samples shall be selected so as to be representative of the whole consignment. In the absence of any prior agreement between the purchaser and the supplier on the mode of sampling and determining the criteria of conformity, the following sampling scheme is recommended to serve as a guide.

##### B-2.1 Lot

All the containers in a single consignment of the material drawn from the same batch of manufacture and the same size shall constitute a lot. If a consignment is declared or known to consist of different batches of manufacture or of different sizes of containers, the containers belonging to the same batch and size shall be grouped together and each such group shall constitute a separate lot.

**B-2.1.1** Samples shall be tested for each lot for ascertaining the conformity of the material to the requirements of this specification.

**B-2.2** The number of containers ( $n$ ) to be chosen from a lot shall depend upon the size of the lot ( $N$ ) and shall be in accordance with Table 2.

**Table 2 Number of Containers to be Selected**  
( Clause B-2.2 )

Lot Size	No. of Containers to be Selected
<i>N</i>	<i>n</i>
(1)	(2)
Up to 500	10
501 to 1 000	15
Above 1 000	20

**B-2.3** These containers shall be chosen at random from the lot. In order, to ensure the randomness of selection, some random number table as agreed to between the purchaser and the supplier shall be used. In case such a table is not available, the following procedure shall be adopted:

Arrange all the containers in the lot in a systematic manner and starting from any container, count them as 1, 2, 3, .. ..... up to *r* and so on where *r* is the integral part of  $N/n$ . Every *r*th container thus counted shall be withdrawn to give sample for test.

### **B-3 PREPARATION OF COMPOSITE SAMPLE**

**B-3.1** Shake well each of the containers selected as in B-2.3 and test for consistency. Pour out a quantity of polish in a stoppered cylinder or flask ( so as to prevent loss of ammonia ) such that the total quantity obtained from all the containers provided material sufficient for all the tests ( about 500 g ). Insert the stopper thoroughly mix the material drawn from all the selected containers so as to form the composite sample.

### **B-4 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY**

**B-4.1** Tests for consistency shall be done on the original containers from which no sample has been drawn.

**B-4.2** Tests for other characteristics shall be done on the composite sample.

**B-4.3** The lot shall be declared as conforming to this specification if the test results satisfy the corresponding requirements.

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