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CEYLON STANDARD 193 : 1973

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ROUND TINS FOR PAINTS, VARNISHES AND ALLIED PRODUCTS (PACKED BY VOLUME) (METRIC UNITS)

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BUREAU OF CEYLON STANDARDS

ROUND TINS FOR PAINTS, VARNISHES AND ALLIED PRODUCTS (PACKED BY VOLUME) (METRIC UNITS)

C.S. 193 : 1973

Gr.6

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Ceylon Standards are subject to periodical revision in order to accommodate the progress made by industry. Suggestions for improvement will be recorded and brought to the notice of the Committees to which the revisions are entrusted.

This Standard does not purport to include all the necessary provisions of a contract.

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CEYLON STANDARD SPECIFICATION FOR ROUND TINS FOR LIQUID PAINTS, VARNISHES AND ALLIED PRODUCTS (PACKED BY VOLUME) (METRIC UNITS)

FOREWORD

This Ceylon Standard Specification was prepared by the Drafting Committee on Round Tins for Liquid Paints, Varnishes and Allied Products (Packed by Volume). It was approved by the Metric Divisional Committee of the Bureau of Ceylon Standards and was authorised for adoption and publication by the Council of the Bureau on 9th July 1973.

The decision to change over to the metric system necessitated the designing of a range of metric containers for paints, varnishes and allied products. This Ceylon Standard Specification fulfils this need.

The capacities of containers given in this Standard Specification are based on 1:2:5 series which is generally used in metric countries. The present most popular can sizes namely, 1 gallon, $\frac{1}{2}$ gallon, $\frac{1}{4}$ gallon and the pint are to be replaced by 5 litre, 2 litre, 1 litre and 500 ml 2 other smaller sizes i.e. 200 ml and 100 ml have also been provided.

A range of metric diameters is specified in this standard so that the manufacturers of round tins could continue to use the dies presently in service. These diameters have also been proposed by the British Tin Box Manufacturers' Federation. The diameters recommended to be used for each of the capacities specified in this standard are given in the Appendix. The Paintmakers' Association of Britain too has proposed these diameters for paint tins. It is expected that the tin manufacturers as well as the paint producers and packers would use this standard specification as a guide.

All Standard dimensions and values given in this Standard Specification are in SI (Metric) units. Inch-pound equivalents are given within brackets. These equivalents have been calculated in accordance with CS 116:1971—"Principles of Conversion".

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 observation shall be rounded off in accordance with CS 102:1971—"Presentation of Numerical Values', The number of figures to be retained in the rounded off value shall be the same as that of the specified value in this Standard.

The assistance derived from the publications of the Indian and British Standards Institutions in preparing this Ceylon Standard Specification is gratefully acknowledged.

1. SCOPE

This Ceylon Standard specifies tin containers suitable for packing of paints and other allied products. It covers the dimensions, the gross lidded volumes of round tins, the construction of the tins and methods of test.

2. TERMINOLOGY

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

2.1 Bale Handle—A hoop-shaped handle of wire or rod or sheet metal pivoting about the two points of attachment to the body, usually permitting the handle to fall or drop when not in use (see Fig. 8).

2.2 Gross Capacity—The volume of a container when it is absolutely full.

2.3 Nominal Capacity—The volume of liquid a container is intended to hold, that is the gross capacity less 'Ullage'.

2.4 Compound Lining—Sealing gasket or film applied to one of the components of a joint prior to the assembly and completion of the joint.

2.5 Countersink—The recess formed in the end(s) of built-up container or in the base of seamless bodies (see Fig. 9)

2.6 Curled-Back Ring—Lever ring the general form of which conforms to the ordinary ring, but having a wider friction face and increased rigidity. The latter is imparted by curling the raw edge (see Fig. 3).

2.7 Doubletite Ring—Lever type closure comprising lever cap and ring of U—section (see Fig. 15).

2.8 Double Seam—A rolled, mechanically formed joint comprising five interlocking faces or thicknesses of the two components

thus joined and being two thicknesses of the one and three thicknesses of the other (see Fig. 9).

2.9 Full Aperture Ring—Lever type closure comprising narrow section curled ring with horizontal 'step' or 'seating' above the orifice and cap of overall diameter approximately equal to that of body.

2.10 Head Space or Ullage—What the filled and closed container lacks of being truly full.

2.11 Lever Ring and Lid—A two-piece closure, the ring component being a pressing secured to the body and having an orifice into which the (inverted) hat-shaped cap is pressed (see Fig. 2).

2.12 Neck—A projection, formed or fitted, through which the container is filled and emptied.

2.13 Raw edge—An edge which has not been curled or beaded.

2.14 Strap Handle—A carrying device formed of strip metal with cranked ends, riveted, soldered or welded to the head of the container.

3. TYPES OF TIN CONTAINERS

The types of tin containers shall be as given in Table 1.

TABLE 1. TYPES OF TIN CONTAINERS

(1) Type	(2) Recommended Nominal Capacities	(3) See Fig.
(*a*) Lever lid with:		
(i) full aperture ring	10 litre, 5 litre, 2 litre	1
(ii) ordinary (raw edge) lever ring	1 litre, 500 ml 200 ml	2
(iii) curled back or safety ring	10 litre, 5 litre 2 litre, 1 litre 500 ml, 200 ml, 100 ml	3
(iv) flanged ring	100 ml	4
(v) cushion ring and burg flush top)	10 litre, 5 litre, 2 litre	5
(vi) doubletite ring	10 litre, 5 litre, 2 litre	15
(*b*) Round drawn top with countersink)	5 litre, 2 litre, 1 litre, 500 ml, 200 ml, 100 ml	6
(*c*) Flat top (round)	5 litre, 2 litre, 1 litre, 500 ml	7

Note: The Necks may be of the seamless type, or of any other suitable type.

4. CAPACITIES

The gross lidded volumes of the tin containers measured by the method given in clause 9, shall be in accordance with Table 2.

TABLE 2. GROSS LIDDED VOLUMES

(1)	(2)	(3)
Nominal Capacity	Gross Lidded Volumes	
	min ml.	max ml.
10 litre (2.2 gal)	10 500	10 750
5 litre (1.1 gal)	5 250	5 375
2 litre (3.5 pint)	2 100	2 150
1 litre (1.8 pint)	1 075	1 100
500 ml (0.880 pint)	550	565
200 ml (0.352 pint)	220	230
100 ml (0.176 pint)	115	120

5. DIMENSIONS

5.1 **Nominal Base Dimensions**—The nominal diameter of the base of round tins shall be selected from those given in Table 3. The diameter shall be measured as shown in Fig. 10.

TABLE 3. NOMINAL BASE DIMENSIONS

(1)		(2)	
mm	(in)	mm	(in)
45	(1.8)	138	(5.4)
52	(2.0)	154	(6.1)
59	(2.3)	176	(6.9)
62	(2.4)	190	(7.5)
69	(2.7)	203	(8.0)
74	(2.9)	219	(8.6)
84	(3.3)	232	(9.1)
89	(3.5)	241	(9.5)
93	(3.7)	255	(10.0)
105	(4.1)	278	(10.9)
113	(4.4)		
127	(5.0)		

The diameters recommended for use with each of the capacities covered by this standard specification are given in Table A of the Appendix. The existing imperial diameters (in inches) which are nearest to the diameters given in Table 3 are given in Table B of the Appendix.

5.2 Nominal Diameters of Neck Type Closures—The nominal diameters of neck type closures shall be as shown in Table 4.

5.3 End Countersink—The end countersink of round tins when measured as shown in Fig. 9 shall not exceed 4 mm (0. 16 in).

TABLE 4. NECK TYPE CLOSURES

Neck Type	Nominal diameter mm (in)			
Screw neck wad and cap (Fig. 11)	19(0.7)	25(0.9)	38(1.5)	76(3.0)
Screw neck integral with drawn top tins (e.g. Fig. 6)	19(0.7)	25(0.9)	38(1.5)	
Seamless neck (lever type) (Fig.12)				76(3.0)
Press neck wad, cap and overseal (Fig. 13)		35(1.4)	50(2.0)	83(3.3)

6. MANUFACTURE

Each component shall be made from a single piece of tin plate. The side seam shall be formed as indicated in Fig. 16 and it may also be soldered if required by the purchaser. The top and the bottom shall each be made in one piece and joined to the body by a double seam as in Fig. 9 and shall be suitably compound-lined or soldered or both with the exception of the 10 litre tin which shall be fully soldered.

6.1 Internal Finish—The internal surface of the tin may be given a protective coating, if required by the purchaser.

6.2 External Treatment—The outside surface of the tin may be given a protective or decorative coating or both, if required by the purchaser.

6.3 Joints—The joints of the tins shall be in accordance with Tables 5 and 6.

TABLE 5. CONSTRUCTION OF JOINTS

Joint	Type
Top or ring to body	Double seam
Bottom to body	Double seam
Side	(i) Grooved or locked seam or (ii) lapped seam

TABLE 6. TREATMENT OF JOINTS

Seam	Joint	Treatment
Double seam	With Countersink	(*a*) Doped, compound lined or soldered
		(*b*) Untreated
Side seam	(i) Locked seam	Doped, compound lined, cemented or soldered.
	(ii) Lapped seam	Soldered or welded.

6.4 Lid and Ring Engagement for Curled Back Ring Closure—For lever type curled back ring closure, the circumferential contact depth of lid and ring (i e. effective sealing face) shall be not less than the following:

for	2, 5 and 10 litre	:	6 mm (0.2 in)
for	1 litre	:	5 mm (0.20 in)
for	500 ml and less	:	3 mm (0.1 in)

6.5 Tinplate—The components of the tins shall be made from tinplate (cold reduced) the minimum thickness of which shall be as in Table 7.

TABLE 7. MINIMUM THICKNESS OF TINPLATE

Nominal capacity (1)	Body (2) mm (in)	Bottom (3) mm (in)	Ring (4) mm (in)	Lid (5) mm (in)
10 litre	0.28 (0.011)	0.28 (0.011)	0.28 (0.011)	0 28 (0.011)
5 litre	0.24 (0.009)	0.24 (0.009)	0.24 (0.009)	0.24 (0.009)
2 litre	0.24 (0.009)	0.24 (0.009)	0·24 (0.009)	0.24 (0.009)
1 litre	0.24 (0.009)	0.24 (0.009)	0 24 (0 009)	0.24 (0.009)
500 ml	0.24 (0 009)	0.24 (0.009)	0.24 (0.009)	0.24 (0.009)
200 ml	0.24 (0.009)	0.24 (0.009)	0.24 (0.009)	0.24 (0.009)
100 ml	0.24 (0.009)	0.24 (0.009)	0 24 (0.009)	0.24 (0.009)

6.6 Handles

6.6.1 If so required by the purchaser, handles of the following types shall be fitted to 2 litre, 5 litre and 10 litre tins:

Type of Tin	*Handle*
Round, Lever Type or Drawn Top	Bale Handle
Flat Top	Tinplate strap handle

6.6.2 When the handle clip and handle (see Fig. 14) are required, they shall be located in the centre of the top, and the handle clip may be firmly secured to the top by soldering or by spot welding or by projection welding as required by the purchaser. The type and size of the handle shall be as agreed to between the purchaser and the supplier.

7. MARKING

The manufacturer's name, initials or recognized trade-mark, and year of manufacture shall be clearly and indelibly marked or embossed on the tins, if required by the purchaser.

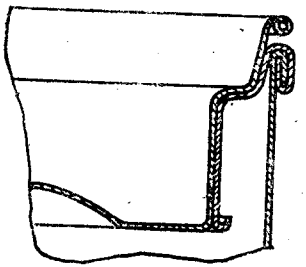


Fig. 1—Lever Lid with Full Aperture Ring.

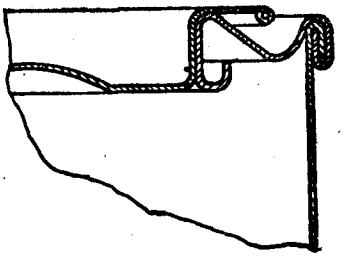


Fig. 3—Lever Lid with Curled Back or Safety Ring.

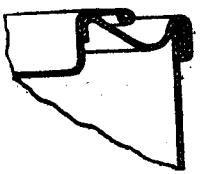


Fig. 2—Lever Lid with Ordinary Lever Ring.

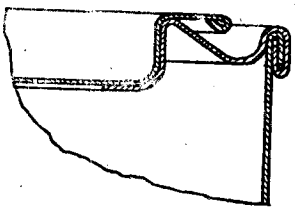


Fig. 4—Lever Lid with Flanged Ring.

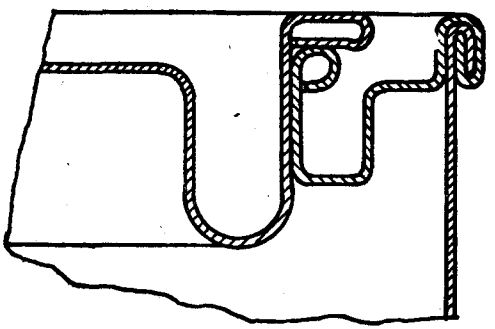


Fig. 5—Lever Lid with Cushion Ring and Bung (Flush Top).

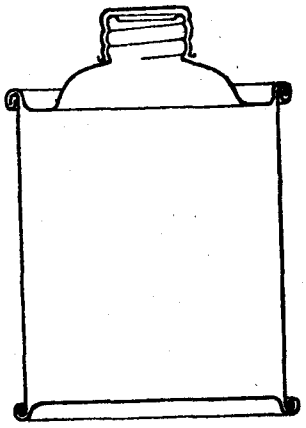
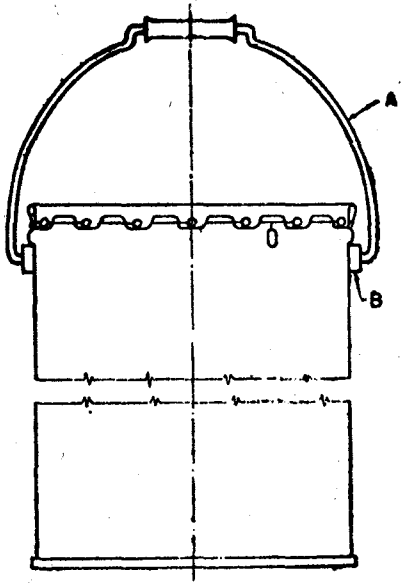


Fig. 6—Round Drawn Top Tin.



A—Bale Handle
B—Ear

Fig. 8—Tin with Bale Handle.

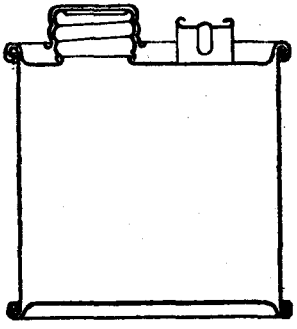
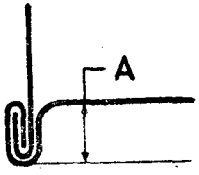


Fig. 7—Flat Top Container with Fittings.



A—End Countersink (measured adjacent to seam)

Fig. 9—Double Seam and Measurement of End Countersink.

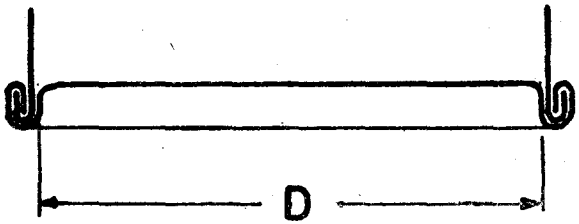


Fig. 10—Measurement of Diameter.

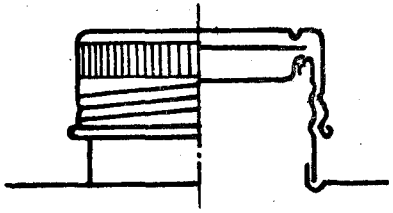


Fig. 11—Screw Neck, Cap, Wad and Inner Seal.

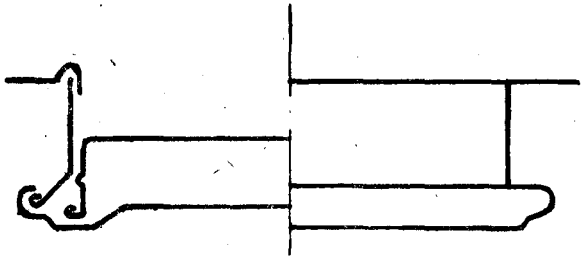


Fig. 12—Seamless Lever Neck, Plug and Capsule.

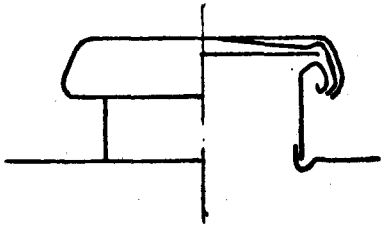
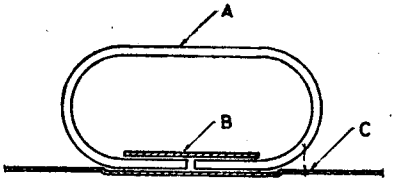


Fig. 13—Press Neck, Cap, Wad and Overseal.



A—Wire Handle
B—Clip
C—Top End

Fig. 14—Wire Handle with Clip.

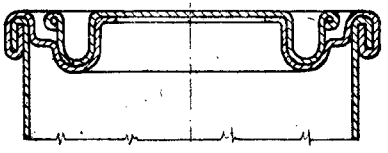


Fig. 15—Lever Lid with Doubletite Ring.

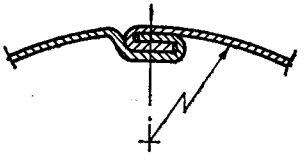


Fig. 16—Side Seam.

Fig. 17—Lapped Seam.

Fig. 18—Locked Seam.

8. RESISTANCE OF TINS TO LEAKAGE

Each tin (without its loose closure components), when tested in accordance with the method laid down in Clause 9.2, shall be capable of withstanding, without leakage, an internal air pressure of 15 kPa* (2.2 psi) under water for 15 seconds.

9. METHODS OF TEST

9.1 Method of measurement of gross lidded volume– The gross lidded volume of tins is ascertained as follows:–

(1) Drill two 8 mm diameter holes in the bottom of the tin adjacent one to the other. Remove the burrs.

(2) Fit all the closure components (just as though the tin had been filled), being careful to ensure that none is omitted, e.g. inner seal in screw neck or plug in seamless neck Ensure that any level lid is correctly driven home.

(3) Find mass of (empty) tin in grammes (M_1)

(4) Then, with the closed tin inclined at an angle to the vertical, fill it through one of the holes with water at room temperature 25°C to 29°C from a narrow jet. When water first runs out of the second hole, complete filling is ensured by closing the holes with the fingers gently shaking the can and completing the filling. Carefully remove all surface water

Note: An alternative method of filling the closed tin is as follows. Drill two 8 mm diameter holes in the bottom of the tin, diametrically opposite one another and each as close as possible to the circumference of the bottom. Immerse the tin, bottom upwards, in a bucket or tank of clean water at room temperature 25–29°C. Tilt slightly to dispel any residual air pocket. Withdraw the tin vertically and carefully remove all surface water.

(5) Find the mass of filled tin in grammes (M_2)

(6) The difference between the masses M_1 and M_2 is numerically equal to the capacity of the container in millilitres.

9.2 Leakage Test– The internal air pressure test for leakage is carried out as follows:

(1) Take the tin without the lid.

*1 kPa = 1kN/m².

(2) Fix over the open end of the tin a rubber-faced sealing plate equipped with a means of introducing air into the tin and a pressure gauge capable of readily indicating 15 kPa.

(3) Pump air into the tin until the guage reads 14 kPa.

(4) Immerse the tin in water until it is just below the surface of the liquid.

(5) Leave the tin in the water for 15 seconds.

Leaks are indicated by a steady stream of bubbles from any one point.

10. SAMPLING

10.1 Lot—In any consignment presented for inspection tin containers of the same type and capacity shall be grouped as a lot.

10.2 Scale of Sampling—The sample containers shall be selected and examined separately for each lot for ascertaining their conformity to the requirements of the relevant specification. The number of metal containers to be selected from a lot shall depend upon the size of the lot and shall be in accordance with Table 8.

10.3 Method for selecting Tin Containers

10.3.1 The containers to be selected from the lot shall be chosen at random. In order to ensure the randomness of selection, a random number table as agreed to between the purchaser and the supplier shall be followed.

10.3.2 In case a random number table is not available, the containers may be selected from the lot in the following manner:

Starting from any container in a lot, the containers shall be counted as 1, 2 ..... r and so on in one order. Every rth container thus counted shall be withdrawn to constitute the sample, where r is the integral part N/n (N and n being the lot size and corresponding sample size respectively). This procedure shall be stopped as soon as the required number of containers is obtained.

10.3.3 When the containers in a lot are packed in different boxes, a suitable number of boxes (not less than 10 percent of the total number in the lot, subject to a mini-

mum of 2) shall first be chosen, at random. From each of the boxes so chosen, an approximately equal number of containers shall be picked up from its different parts or layers to obtain the required number of containers.

For example, if a lot consists of 2000 containers packed in 100 boxes, each containing 20 containers, not less than 10 boxes shall be chosen at random. If it is decided to open 10 boxes, 10 containers shall be picked up from different parts of each of the 10 boxes so as to give a total of 100 containers for the examination of visual characteristics as specified in Table 8. In case the number of containers obtained in the sample is less than the corresponding sample size in Table 8, additional containers may be selected for test from the other boxes.

10.4 Criteria for conformity

10.4.1 Visual characteristics and leakage test— All the containers drawn according to Table 8 shall be first examined for visual characteristics like appearance, workmanship and finish. Any container failing in one or more of the visual characteristics shall be considered as defective. If in the first sample the number of defective containers is less than or equal to the first acceptance number, the lot shall be declared as conforming to the requirements of the visual characteristics. If the number of defectives is greater than or equal to the first rejection number, the lot shall be deemed as not meeting the requirements for the visual characteristics. If the number of defectives is greater than the first acceptance number but less than the first rejection number, a second sample of the size equal to that of the first shall be taken to determine the conformity or otherwise of the lot. The number of defectives found in the first and second samples shall be combined and, if the combined number of defectives is less than or equal to the second acceptance number, the lot shall be declared as conforming to the requirements of visual characteristics, otherwise not.

10.4.1.1 The sample containers, which have been used for ascertaining the conformity of the lot to the requirements of visual characteristics, shall then be used for ascertaining the conformity to

leakage test in the same manner as prescribed in 10.4.1 (using Table 8).

TABLE 8—SCALE OF SAMPLING

No. of items in the lot	Sample	Sample size	Cumulative sample size	Acceptance number	Rejection number
up to 3000	1st	50	50	0	2
	2nd	50	100	1	2
3001 to 10000	1st	80	80	0	3
	2nd	80	160	3	4
10001 to 35000	1st	125	125	1	4
	2nd	125	250	4	5
above 35000	1st	200	200	2	5
	2nd	200	400	6	7

10.4.1.2 In the case of lots, which have been found unsatisfactory according to 10.4.1 and 10.4.1.1 all the items may, depending upon the agreement between the purchaser and the supplier, be inspected for visual characteristics and leakage test and the defective ones removed.

10.4.2 Dimensional Characteristics—From the sample of metal containers drawn for an examination of visual characteristics and leakage test, 10 containers shall be checked for dimensional requirements like diameter, and countersink. From the measurements obtained for each of such characteristics, the average and the range shall be calculated. In case the value of the expression 'average ± 0.5 range' lies within the relevant requirements, the lot shall be considered as satisfactory, otherwise not.

10.4.3 Capacity—Five containers shall be selected from those already found satisfactory for visual and dimensional requirements and tested for capacity with the closures on. The average and the range of the test results shall then be calculated. In case the value of the expression 'average ± 0.6 range' lies within the relevant requirement, the lot shall be deemed to as having satisfied the capacity requirement, otherwise not.

APPENDIX

A.1 The diameters given in Table A are recommended to be chosen for the capacities specified.

TABLE A—RECOMMENDED BASE DIMENSIONS

(1) Nominal Capacity	(2) Nominal Diameter mm
10 litre	219
5 litre	176
2 litre	138
1 litre	113
500 ml	89
200 ml	74
100 ml	59

B.1 The existing imperial diameters which are the nearest to the diameters given in Table 3 are as follows:

TABLE B

Diameter		Diameter	
Proposed	Existing	Proposed	Existing
mm	inch	mm	inch
45	1¾	113	4½
52	2 1/16	127	5
59	2 5/16	138	5½
62	2½	154	6
69	2¾	—	6¼
74	3	176	7
84	3¼	190	7½
89	3½	203	8
93	3 5/8	219	8 9/16
—	3¾	232	9¼
—	4	241	9½
105	4¼	255	10
		278	

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