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SPECIFICATION FOR
RING SPANNERS

BUREAU OF CEYLON STANDARDS

SPECIFICATION FOR RING SPANNERS

SLS 344:1975

Gr. 5

BUREAU OF CEYLON STANDARDS
53, DHARMAPALA MAWATHA,
Colombo 3.

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

SRI LANKA STANDARD

SPECIFICATION FOR RING SPANNERS

FOREWORD

This Sri Lanka Standard Specification has been prepared by the Drafting Committee on Spanners. It was approved by the Mechanical Engineering Divisional Committee of the Bureau of Ceylon Standards and was authorised for adoption and publication by the Council of the Bureau on 1975-04-02.

Ring spanners, which holds the hexagon on all six sides are commonly used in the automobile industry and in plant and machinery where the torque required for the threaded fasteners is fairly high. The thin section of the ring and provision of twelve slots make them ideal for use in restricted places and on flanges where accessibility is poor.

The dimensions specified in 4 are suitable for use with ISO metric Hexagon Sizes. Two sets of inch dimensions for spanners suitable for use with Unified Hexagon Sizes and Whitworth Hexagon Sizes have also been included in the Appendices. These latter sizes have been included to cater for the demand that will exist as a result of inch sized nuts and bolts which will be in service until the metric system is adopted.

This standard makes reference to the following Ceylon Standards:

CS 122 Vicker's hardness test

CS 145 Method for Rockwell hardness test

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, shall be rounded off in accordance with CS 102 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 Standards Institution and the British Standards Institution in the preparation of this standard is acknowledged.

1 SCOPE

This specification covers the requirements for double-ended bi-hexagonal ring spanners of the cranked and flat types, which are suitable for use with sizes up to 50 M specified in Sri Lanka Standard Specification for hexagon bolts, screws and nuts with ISO metric threads*. Dimensions for ring spanners suitable for use with Unified Hexagon Sizes and Whitworth Hexagon Sizes are also given in the Appendices.

2 MATERIAL

Spanners shall be manufactured from any suitable carbon or alloy steel which ensures that they will satisfy the requirements of this standard.

*Under preparation.

Steels with the following chemical compositions are considered as suitable for the manufacture of spanners.

Carbon steel:		% min	% max.
	Carbon	0.35	0.45
	Manganese	0.60	0.90

Alloy steel:		% min.	% max.
	Carbon	0.38	0.43
	Manganese	0.60	0.80
	Chromium	0.90	1.20
	Silica	0.10	0.35

3 HEAT TREATEMENT AND HARDNESS

The heat treatement and subsequent hardness of the spanners shall be as given below:

3.1 Normalising

All spanners shall be normalized before hardening.

3.2 Treatment and hardness

The spanners shall be quenched from a temperature suited to the particular composition and then tempered so that the hardness measured on the face of the head in accordance with CS 122 and CS 145, is within the limits specified below:

1) Up to and including 32 mm width across falts.
   38 HRC to 43 HRC (370 HV to 430 HV).

2) Over 32 mm width across flats.
   34 HRC to 39 HRC (330 HV to 380 HV).

4 DIMENSIONS

The shapes and dimensions of ring spanners shall be as given in Table 1 for cranked type and Table 2 for flat type.

5 DESIGNATION

The spanners for Metric Hexagon Sizes shall be designated by the nominal width across flats and millimetres.

Example: A double-ended ring spanner, having nominal width across flats S_1 = 19 mm and S_2 = 22 mm shall be designated as:

Ring spanner 19 x 22

6 WORKMANSHIP AND FINISH

The spanners shall be well-forged to shape and finished smooth all over. All sharp corners shall be removed. The spanners shall be free from burrs, cracks, seams or other manufacturing defects. The spanners shall be durably protected against rust by plating with Nickel, Chromium or Zinc or by other suitable process.

7 TORQUE TEST

The spanner to be tested shall be placed over a rigidly held hexagonal test stud which has the same nominal width across flats as the spanner with a tolerance of h9 (see Appendix D) and with a hardness of not less than 55 H.R.C. The spanner shall be fully engaged on the test stud with respect to the thickness.

A gradually increasing force shall be applied as near as is practicable to the outer end of the shank, until the torque appropriate to the type and size (Tables 1 and 2) of the spanner being tested is reached. The spanner shall not be struck or jerked during the

TABLE 1 - Dimensions for cranked double-ended ring spanners (Metric hexagon sizes)

(See Figure 1)

Unit : Millimetre

Nominal size (Width across flats)	Dimensions across jaw				Head thickness (max)		Head Width (max)		Overall length (L)		Depth of crank (H)		Testing torque (Clause 7)	
	Small end (S_1)		Large end (S_2)										Small end	Large end
	Max.	Min.	Max.	Min.	T_1	T_2	A_1	A_2	Max.	Min.	max.	Min.	N m	N m
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
*5.5 x 7	5.62	5.52	7.15	7.03	6	7	11.0	12.5	185	165	22	18	12	21
(6 x 8)	6.15	6.03	8.15	8.03	6	7	11.0	14.0	185	165	22	18	15	28
*8 x 10	8.15	8.03	10.19	10.04	7	9	14.0	17.0	200	180	24	20	28	51
(9 x 11)	9.15	9.03	11.19	11.04	8	10	15.0	20.0	210	190	24	20	39	65
*10 x 11	10.19	10.04	11.19	11.04	9	10	17.0	20.0	215	190	25	21	51	65
(10 x 12)	10.19	10.04	12.24	12.04	9	10	13.0	21.0	215	190	25	21	51	83
*11 x 13	11.19	11.04	13.24	13.04	10	11	20.0	21.5	235	210	27	23	65	103
*12 x 14	12.24	12.04	14.27	14.05	11	12	21.0	23.0	240	210	27	23	83	127
*13 x 17	13.24	13.04	17.30	17.05	12	13	21.5	27.0	250	220	30	26	103	211
(14 x 17)	14.27	14.05	17.30	17.05	12	13	23.0	27.0	270	240	30	26	127	211
*17 x 19	17.30	17.05	19.36	19.06	13	14	27.0	30.0	295	260	32	28	211	275
*19 x 22	19.36	19.06	22.36	22.06	14	15	30.0	35.0	320	285	34	30	275	392
*22 x 24	22.36	22.06	24.36	24.06	15	16	35.0	38.0	340	305	36	32	392	476
*24 x 27	24.36	24.06	27.48	27.08	15	16	38.0	42.0	355	320	36	32	476	618
*27 x 30	27.48	27.08	30.48	30.08	16	17	42.0	46.0	390	350	38	34	618	775
*30 x 32	30.48	30.08	32.48	32.08	17	18	46.0	49.0	390	350	39	35	775	883
*32 x 36	32.48	32.08	36.60	36.10	18	20	49.0	55.0	450	395	40	36	883	1130
*36 x 41	36.60	36.10	41.60	41.10	20	22	55.0	63.0	490	435	46	40	1130	1520
*41 x 46	41.60	41.10	46.60	46.10	22	24	63.0	71.0	515	460	46	40	1520	2010
*46 x 50	46.60	46.10	50.60	50.10	24	25	71.0	77.0	565	500	45	43	2010	2450

**ISO recommended preferred combinations.*
Combinations in brackets are non-preferred.

TABLE 2 - Dimensions for flat double-ended ring spanners (metric hexagon sizes)

(See Figure 2)

Unit : Millimetre

Nominal size (width across flats)	Dimensions across jaw				Head thickness	Head width (max)		Overall length (L)	Testing torque (Clause 7)	
	Small end (S_1)		Large end (S_2)						Small end	Large end
	max.	min.	max.	min	T (max.)	A_1	A_2	Approx.	N m	N m
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
5.5 x 7	6.62	5.52	7.15	7.03	4	11.0	12.5	100	12	21
8 x 10	8.15	8.03	10.19	10.04	6	14.0	17.0	125	28	51
10 x 11	10.19	10.14	11.19	11.04	6	17.0	20.0	125	51	65
11 x 13	11.19	11.04	13.24	13.04	6	20.0	21.5	140	65	103
12 x 14	12.24	12.04	14.27	14.05	7	21.0	23.0	150	83	127
13 x 17	13.24	13.04	17.30	17.05	7	21.5	27.0	160	103	211
17 x 19	17.30	17.05	19.36	19.06	8	27.0	30.0	170	211	275
19 x 22	19.36	19.06	22.36	22.06	9	30.0	35.0	210	275	392
22 x 24	22.36	22.06	24.36	24.06	10	35.0	38.0	240	392	476
24 x 27	24.36	24.06	27.48	27.08	11	38.0	42.0	285	476	618
27 x 30	27.48	27.08	30.48	30.08	12	42.0	46.0	305	618	775
30 x 32	30.48	30.08	32.48	32.08	12	46.0	49.0	325	775	883
32 x 36	32.48	32.08	36.60	36.10	14	49.0	55.0	350	883	1130
36 x 41	36.60	36.10	41.60	41.10	15	55.0	63.0	400	1130	1520
41 x 46	41.60	41.10	46.60	41.10	16	63.0	71.0	450	1520	2010
46 x 50	46.60	46.10	50.60	50.10	17	71.0	77.0	500	2010	2450

application of the torque and the load shall always be applied at right angles to the longitudinal axis. The torque is calculated as the product of the value of the load and the distance from the point of the application of the load to the centre of the test stud.

Each spanner shall be loaded once in each direction during the test. Double-ended spanners shall be treated as single-ended and shall be tested separately for each end.

At the completion of the test the spanner shall not show any sign of damage or permanent deformation.

8 SAMPLING

Unless otherwise agreed upon between the purchaser and the supplier, the sampling plan as given in Appendix A shall be followed.

9 MARKING

Each spanner shall be legibly and indelibly marked with the nominal widths across flats and the manufacturer's name or trade mark on the shank.

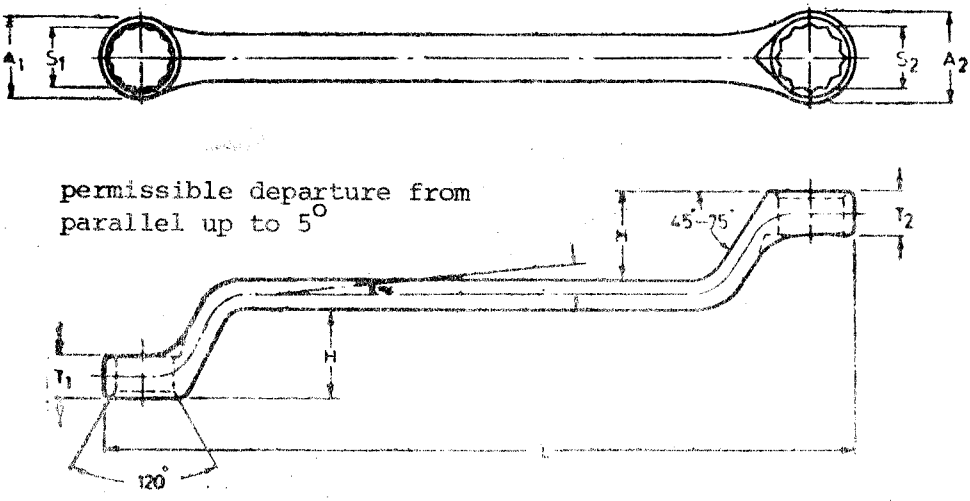

Fig. 1 - Ring Spanner - Cranked Type

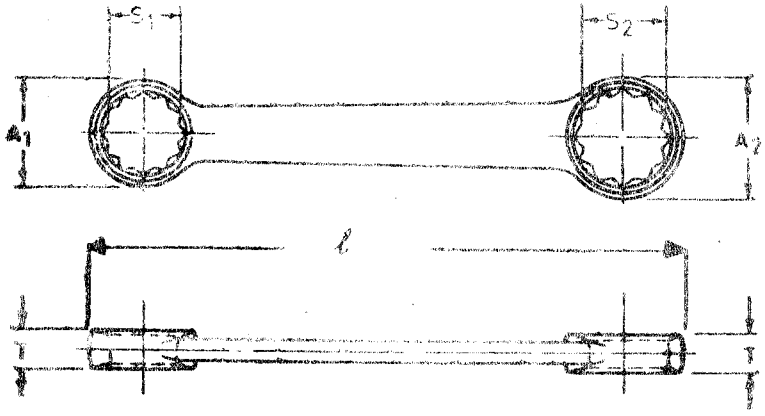

Fig. 2 - Ring Spanner - Flat Type

TABLE 3 - Scale of sampling and permissible number of defectives

Lot size *N* (1)	For hardness, dimensions Workmanship and finish		For Torque test	
	Sample size *n* (2)	Permissible No. of defectives (3)	Sub-sample size (4)	Permissible No. of defectives (5)
Up to 25	5	0	2	0
26 to 50	7	0	3	0
51 to 100	10	1	5	0
101 to 300	15	1	7	0
301 to 500	25	2	10	1
501 to 800	35	3	15	1
801 to 1300	50	4	25	2
1301 and above	75	6	35	3

APPENDIX A
(Clause 7)

SCALE OF SAMPLING AND CRITERIA FOR CONFORMITY

A.1 SCALE OF SAMPLING

A.1.1 lot: In any consignment, all the spanners of the same type and designation and manufactured from the same material shall constitute a lot.

A.1.2 For ascertaining the conformity of the lot to the requirements of the specification, tests shall be carried out for each lot separately. The number of spanners to be selected at random for this purpose shall be in accordance with Columns 1 and 2 of Table 3.

A.1.3 The spanners shall be selected at random, and to ensure the randomness of selection, the following procedure is recommended for use:

Starting from any spanner in a lot, count them in one order as 1,2,3,....., up to r and so on where r is the integral part of N/n, (N being the lot size, and n the sample size indicated in Column 2 of Table 3). Every rth spanner thus counted shall be selected to constitute the sample.

A.2 NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

A.2.1 The spanners selected according to A.1.3 shall be examined for hardness, dimensions, workmanship and finish as specified in 3, 4 and 6. Any spanner failing to meet the requirements of hardness or dimensions or both shall be considered as defective.

A.2.1.1 If the numbr of defective spanners found in the sample is less than or equal to the corresponding

permissible number of defectives given in Column 3 of Table 3, then the lot shall be declared as conforming to the requirements of hardness and dimensions.

A.2.2 From these lots which are found satisfactory in accordance with A.2.1.1, a sub-sample of the size indicated in Column 4 of Table 3 shall be subjected to torque test (see Clause 7).

A.2.2.1 If the number of spanners failing in the torque test is less than or equal to the corresponding permissible number of defectives given in Column 5 of Table 3, then the lot shall be declared as conforming to the requirements of the specification.

APPENDIX B

DOUBLE-ENDED RING SPANNERS FOR UNIFIED HEXAGON SIZES

B.1 DIMENSIONS

The dimensions of ring spanners for use with unified Hexagon sizes shall be as given in Tables 4 and 5.

B.2 DESIGNATION AND MARKING

These spanners shall be designated as follows:

The nominal width across flats expressed as a fraction in inches followed by the sign A/F.

The spanners shall be legibly and indelibly marked with the nominal width across flats followed by the letters A/F and the manufacturer's name or trade mark.

B.3 TORQUE TEST

When tested by the method given in 7, applying the appropriate torque given in Table 4, the spanner shall not show any sign of damage or permanent deformation.

APPENDIX C

DOUBLE-ENDED RING SPANNERS FOR WHITWORTH (BS) HEXAGON SIZES

C.1 DIMENSIONS

The dimensions of spanners for use with Whitworth Hexagon Sizes specified in CS 97 shall be as given in Tables 6 and 7.*(Please see page 18 for Table 6)*

C.2 DESIGNATION AND MARKING

These spanners shall be designated as follows:

The nominal diameter of the bolt, expressed as a fraction, having the head dimensions in accordance with CS 97 followed by the letter W.

The spanners shall be legibly and indelibly marked with the nominal diameter of the bolt followed by the letter W.

C.3 TORQUE TEST

When tested by the method given in Clause 7 applying the appropriate torque given in Table 6 the spanner shall not show any sign of damage or permanent deformation.

TABLE 4 - Dimensions for double-ended ring spanners cranked type (Unified hexagon sizes)

(See Figure 1)

Unit : Inch

Nominal size (Width across flat, actual)	Dimensions across jaw				Head thickness (max)		Head width (Max)		Depth of crank (H)		Overall length (L)		Testing torque(Clause	
	Small end (S_1)		Large end (S_2)										Small end	Large end
	Max.	Min.	Max.	Min.	T_1	T_2	A_1	A_2	Min.	Max.	Min.	Max.	N m	N m
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1/4 x 5/16	0.256	0.251	0.319	0.314	0.350	0.377	0.430	0.524	0.317	0.539	4.750	5.500	15	28
3/8 x 7/16	0.381	0.376	0.445	0.439	0.402	0.428	0.612	0.702	0.444	0.646	5.875	6.375	44	65
1/2 x 9/16	0.509	0.502	0.573	0.564	0.453	0.478	0.791	0.878	0.570	0.864	7.000	7.750	98	127
5/8 x 11/16	0.636	0.627	0.699	0.689	0.504	0.529	0.969	1.056	0.697	1.079	8.125	9.125	152	211
11/16 x 3/4	0.699	0.689	0.764	0.752	0.529	0.554	1.056	1.144	0.760	1.185	8.625	9.875	211	275
3/4 x 7/8	0.764	0.752	0.889	0.877	0.554	0.604	1.144	1.319	0.885	1.292	9.750	10.625	275	392
13/16 x 7/8	0.827	0.815	0.889	0.877	0.579	0.604	1.231	1.319	0.885	1.397	9.750	11.250	314	392
7/8 x 1 1/16	0.889	0.877	1.081	1.066	0.604	1.680	1.319	1.586	1.076	1.504	11.500	12.000	392	618
15/16 x 1 1/8	0.952	0.940	1.114	1.128	0.630	0.706	1.409	1.675	1.139	1.613	12.125	12.625	476	686
1 x 1 1/16	1.014	1.022	1.081	1.066	0.655	0.680	1.497	1.586	1.139	1.613	12.125	13.375	539	618
1 1/4 x 1 7/16	1.269	1.253	1.461	1.441	0.756	0.832	1.852	2.117	1.455	2.152	15.000	16.125	880	1130
1 5/16 x 1 1/2	1.399	1.379	1.524	1.504	0.782	0.857	1.942	2.205	1.518	2.261	15.500	16.875	960	1250
1 5/8 x 1 13/16	1.649	1.629	1.836	1.816	0.912	0.984	2.383	2.648	1.534	2.796	18.375	20.250	1520	2010

TABLE 5 - Dimensions for double-ended ring spanners - flat type(Unified hexagon sizes)
(See Figure 2)

(Dimensions and Torque-test values, not specified in this table shall be as given in Table 4 - for cranked type)

Nominal size (width across flat, actual)	Head thickness (max) (T)	Overall length (max) (L)
1/4 x 5/16	0.377	4.750
3/8 x 7/16	0.428	5.000
1/2 x 9/16	0.478	5.625
5/8 x 11/16	0.529	7.000
11/16 x 3/4	0.554	7.875
3/4 x 7/8	0.604	8.375
13/16 x 7/8	0.604	9.125
7/8 x 1 1/16	0.680	9.750
15/16 x 1 1/8	0.706	10.250
1 x 1 1/16	0.680	11.250
1 1/4 x 1 7/16	0.832	13.250
1 5/16 x 1 1/2	0.857	13.750
1 5/8 x 1 13/16	0.984	16.625

TABLE 7 - Dimensions for double-ended ring spanners flat type(Whitworth hexagon sizes)

(See Figure 2)

(Dimensions and Torque test values not specified in this table shall be as given in Table 6)

Nominal size of spanner (Bolt diameter)	Head thickness (max) T	Overall length (max) L
1/4 x 5/16	0.463	5.000
3/8 x 7/16	0.538	6.750
1/2 x 9/16	0.623	9.125
5/8 x 11/16	0.696	10.250
3/4 x 7/8	0.776	11.250
1 x 1 1/8	0.926	13.250
1 1/4 x 1 3/8	1.080	16.625

TABLE 6 - Dimensions for double-ended ring spanners - Cranked type(Whitworth hexagon sizes)

(See Figure 1)

Nominal size of spanners (Bolt diameter)	Dimensions across jaw				Head thickness (max)		Head Width (max)		Depth of crank (H)		Overall length (L)		Torque test(Clause C-3)	
	Small end (S_1)		Large end (S_2)										Small end	Large end
	max.	min.	max.	min.	T_1	T_2	A_1	A_2	min.	max.	min.	max.	N m	N m
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1/4 x 5/16	0.451	0.448	0.533	0.529	0.430	0.771	0.771	0.826	0.533	0.767	6.625	7.125	68	98
3/8 x 7/16	0.608	0.604	0.720	0.715	0.493	0.538	0.931	1.088	0.720	1.034	8.250	8.875	152	211
1/2 x 9/16	0.830	0.825	0.932	0.926	0.582	0.623	1.242	1.385	0.932	1.411	10.250	11.375	314	476
5/8 x 11/16	1.022	1.016	1.114	1.107	0.659	0.696	1.511	1.640	1.114	1.737	11.875	13.500	539	618
3/4 x 7/8	1.214	1.207	1.316	1.308	0.736	0.776	1.780	1.922	1.316	2.064	13.625	15.500	983	961
1 x 1 1/8	1.498	1.489	1.690	1.680	0.849	0.926	2.177	2.446	1.690	2.547	16.000	18.625	1130	1250
1 1/4 x 1 3/8	1.882	1.871	2.074	2.062	1.003	1.080	2.715	2.984	2.074	3.199	20.375	22.750	2010	2450

APPENDIX D

TOLERANCES ON DIMENSIONS OF TEST BOLT

(See Clause 7)

D.1 These tolerances are the h9 series of tolerances of the ISO system of "Limits and Fits".

Nominal size		Tolerance (h9) in 0.001 mm
Over	To	
-	3	0 -25
3	6	0 -30
6	10	0 -36
10	18	0 -43
18	30	0 -52
30	40	0 -62
40	50	
50	65	0 -74
65	80	
80	100	0 -87
100	120	
120	140	0 -100
140	160	
160	180	
180	200	0 -115
200	225	
225	250	
250	280	0 -130
280	315	
315	355	0 -140
355	400	
400	450	0 -155
450	500	

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