

**Fastener – Torque/clamp force testing – Standard Conditions****1 PURPOSE**

This Worldwide Standard provides a test method for determining the torque/clamping force performance of fastener finishes specified in WX100 and used on ISO Metric threaded bolts, screws, studs, and nuts under standard conditions.

Note: This standard is not intended for use in developing an installation torque specification or for bolts and nuts with washer assemblies.

2. REFERENCES

ISO 16047	Fasteners – Torque/clamp force testing
ISO 4014	Hexagon head bolts – Product grades A and B
WA 900	Dimensional Requirements for Hexagon and Flanged Hexagon Bolts and Screws, and Hexagon Screw and Washer Assemblies
WA 950	Material Requirements and Mechanical Properties of Bolts, Screws, Studs and Screw and Washer Assemblies
WX 100	Finish Specifications

3. TEST METHOD

Testing must be performed per *ISO 16047 Fastener – Torque/clamp force testing* except where modified in this standard.

4. TEST-BEARING PLATES OR TEST WASHERS

Comply with ISO 16047 Clause 7.2 with the following specified parameters:

Degreased test plates or washer

Hardness 50 - 60 HRC

Roughness Ra 0.4 maximum

Use 600 grit wet or dry paper

Clearance hole size per Table 1

Table 1 - Test Plates

Nominal Diameter of Test Bolt	Hole Diameter dh		Width (w) Minimum	Thickness (s) Minimum
	Maximum	Minimum		
M3	3.58	3.4	7.9	0.45
M4	4.68	4.5	10.2	0.7
M5	5.68	5.5	11.6	0.9
M6	6.82	6.6	16.4	1.4
M8	9.22	9	19.4	1.4
M10	11.27	11	22.4	1.8
M12	13.77	13.5	29	2.3
M14	15.77	15.5	32.1	2.3
M16	17.77	17.5	35.8	2.7
M18	20.33	20	-	2.7
M20	22.33	22	42.3	2.7
M22	24.33	24	-	2.7
M24	26.33	26	55.2	3.7

Dimensions in millimeters

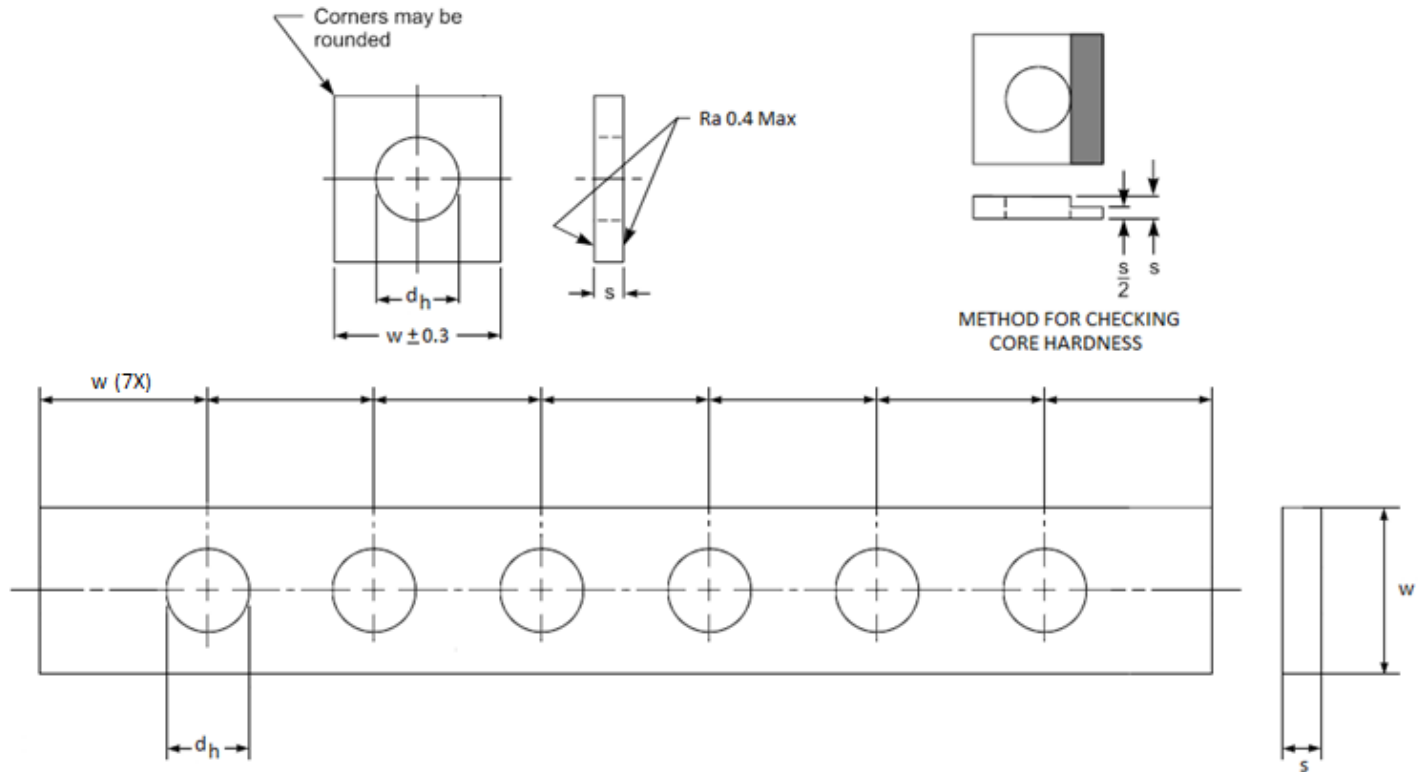


Figure 1 – Test Plates

(RE-) PREPARATION OF THE TEST PLATES OR WASHER

Using 600 "wet or dry" paper remove any scratching and/or surface finish pick up. The required surface roughness is achieved by rubbing the washer face across an unused piece of 600 "wet or dry" paper. A single pass of about 150 to 200mm using firm but not excessive pressure has proved to achieve the required roughness. Surface grinding will be needed occasionally to prevent rounding of the washer face.

5. TEST NUTS FOR TESTING BOLTS, SCREWS AND STUDS

Comply with ISO 16047 Clause 7.3 with the following specified parameters:

Surface coating per –S437

7. TIGHTENING SPEED

Rotational speed shall be 30 ± 3 r/min (revolutions/minute)

8. TESTED PARTS

Surrogate bolt – A surrogate bolt or screw shall be used for validation of new coatings and where part geometry does not permit direct testing of the production bolt or screw.

The bolt shall be M10x1.5, property class 10.9. The bolt dimensions shall conform to the requirements of ISO 4014.

Production bolt or screw – Where part geometry does permit testing, a production bolt or screw may be used to demonstrate on-going production control. In case of a dispute, a surrogate bolt or screw shall be used.