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ASTM F543 METTALIC MEDICAL BONE SCREW TORSION TEST FIXTURE

ASTM F543 include four different test method for bone screw torsion tests. These test methods are torsion (unaxial) and axial torsion (biaxial) tests. According to standard the test procedures that is recommended are follow:

- Static torsion test for bone screws
- Determination of the driving torque of bone screws
- Pull-out test
- Determination of the self-tapping performance of self-tapping bone screws

1. Test Method for Determining the Torsional Properties of Metallic Bone Screws

This test method is applied for measurement of the torsional strength of the bone screws. Test speed of torsion test is 1 to 5 RPM. During this rotation, the torque value of bone screw is measured and saved continuously.

The purpose of application of ASTM F543 tests is getting following test results:

Maximum torque of bone screws, breaking angle, the torsional yield strength, torque versus angle curve, maximum angle at maximum torque.

1.1 ASTM F543 Torsion Test Fixtures

- **Torsional chuck grips** are reccomended.
- Split collect holders and split collets are reccomended.
- High accuracy torque sensors reccomended.

2. Test Method for Driving Torque of Medical Bone Screws

This test applied for determination of the driving torque of bone screws. Test procedure is measures of insertion and removal torque of the bone screw.

Test block and screwdriver is used for the tests. The screw rotate four tours and the maximum toque is found. The removal torque is measured by reversing the direction of insertion and again the maximum toque is found.

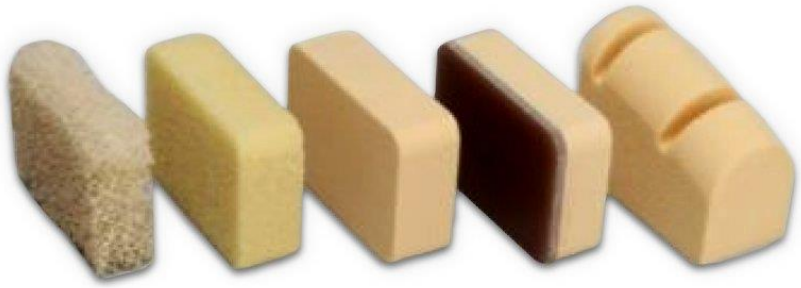
Max. 1.14-kgf (11.18 N) axial load should be used to adjust the screwdriver bit in the screw head during both the insertion and removal procedures.

1.1 Recommended Accesories

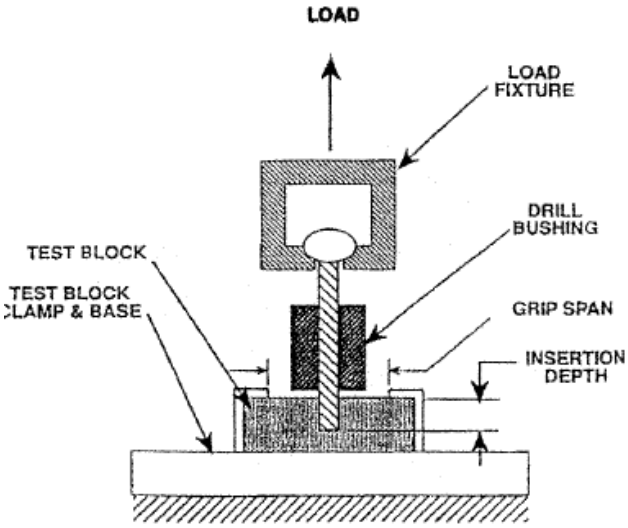
ASTM F543 Test Blocks: ASTM F543 Polyurethane test foams (PU blocks) are supplied by Retrofitmach. The block shall be comply with ASTM F1839. The density of foam shall be determined by the manufacturer of the bone screw, according to application.

The PU test block surface are shall be 10 times greater than tested screw. The buttom and top of the blocks shall be smooth and parallel (within +/-0.4 mm).

To get an inquiry for ASTM F543 PU test foams with required densities and machined with suitable tolerances for required dimensions, please contact us.



3. Test Method for Determining the Axial Pullout Strength of Medical Bone Screws



ASTM F543 pull out test method is used to measure the axial tensile force required to fail or remove a bone screw from PU test block.

The required test setup is providing by Retrofitmach with suitable axial torsion test apparatus.

A3. ASTM F543 Test Procedure: The bone screw shall be insert 20 mm with insertion test method that has mentioned at ASTM F543 Annex A by 3 RPM test rate. After that tensile load shall be applied to the test specimen at a rate of 5 mm/min until the screw fails or releases from the test block (PU foam).

4. Test Method for Determining the Self-Tapping Performance of Self-Tapping Medical Bone Screws

Self-tapping test of bone screws, is used to determine the axial compression force that required for self-tapping feature of the screws.

During carried out this tests, it is required that both of torque and force is measured. Required **tests speeds** are 30 RPM for torsional directed loading and 2 N/s for axial directed compression loading.

Please send your inquiries for ASTM F543 test accessories and supplies. Click here to contact us and to get detailed information from our engineers.

ASTM F543 Test Specimen

For testing according to ASTM F543, the test specimen shall be a completely fabricated and finished bone screw.