



WORLDWIDE STANDARD

WA 961

DATE: 1996 JULY

Material, Physical Properties and Performance of Pierce Studs

1. SCOPE.

This standard covers the material, physical properties and performance requirements of self piercing studs in the range M5 to M10 inclusive.

1.1 REFERENCE.

ISO 3573 - Hot-rolled carbon steel sheet of commercial and drawing qualities.

ISO 3574 - Cold-reduced carbon steel sheet of commercial and drawing qualities.

2. MATERIAL AND PHYSICAL PROPERTIES.

The material and physical properties for pierce studs shall be in accordance with WA950 Property Class 8.8.

3. GENERAL.

Studs shall be capable of piercing their own hole in a test plate as described in Clause 5.

After assembly parts shall be perpendicular to the test plate within 1 degree.

Stress cracks radially orientated on the coined barrel of the stud after assembly are permissible provided the assembled stud meets all other requirements of the specification.

4. PERFORMANCE.

NOTE: In all tests, damage pertains to stud loosening, panel distortion is allowable.

4.1 PUSH-OUT.

After assembly in a steel sheet panel of the thickness specified in Table 1 the assembly must be placed on a test rig as shown in Figure 1 and a load applied in the direction shown. The assembly must withstand the push-out load specified in Table 1 without loosening in the panel, or showing evidence of damage when examined at 10x magnification.

4.2 PULL-OUT.

After assembly in a steel sheet panel of the thickness specified in Table 1 the assembly must be placed in a test rig as shown in Figure 2 and a load applied in the direction shown. The assembly must withstand the pull-out load specified in Table 1 without loosening in the panel, or showing evidence of damage when examined at 10x magnification.

NOTE: For non-destructive testing of production parts, only pull-out test is required.

4.3 TORQUE-TO-TURN.

After assembly in a steel sheet panel of the thickness specified in Table 1 the assembly must be placed in a test rig as shown in Figure 3 and a torque applied in the direction shown. The assembly must withstand the torque-to-turn load specified in Table 1 without turning or loosening in the panel.

4.4 IN-PLACE DIMENSIONS.

Figure 4 and Table 2 show the in-place dimensions.



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5. TEST PLATE.

The test plate shall be 0.2% maximum carbon steel to ISO 3573 or ISO 3574 and thickness as specified in Table 1.

Table 1.

Nominal Size	Test Plate Thickness t^*	Minimum Push-Out kN	Minimum Pull-Out kN	Minimum Torque-to-Turn m
M5	1 +/- 0.08	1.0	1.0	7.4
M6	1 +/- 0.08	1.0	1.0	12.4
M8	1 +/- 0.08	1.0	1.0	30.0
M10	1 +/- 0.08	1.0	1.0	60.0

* NOTE: For production testing, use actual production parts.

Figure 1.

