

bigHead vs Competitor product

Tensile Load Performance, Weld Quality & Dimensional Accuracy Evaluation



Purpose of test: **To determine the tensile load-to-failure performance values, weld quality and general product integrity**

Test Type: **Tensile (Pull test)**

Test configuration: **Axial "straight pull". Fastener gripped by M6 thread & pulled through 11mm diameter aperture**

Test Rig utilised: **TENS-01** Load Cell Calibration Expiry Date: **31.07.10** Date of test: **18.11.09**

bigHead Test sample designation: **M1/B23-M6X20 (Carbon steel with standard zinc plate & clear tri-passivate coating) - projection welded assembly - Qty: 4**

Competitor Test sample designation: **Physical copy of above (Carbon steel with zinc & yellow passivation coating) - assembly welding method: UNKNOWN - Qty: 4**

General comments:

All parts were tested under identical set up and applied loading configurations utilising a calibrated, semi-automatic tensile load test facility. Results stated are as recorded by the integral 'peak value' load cell.

Test Sample	Test Type	Test Equipment	Description of Test	LOAD TEST RESULT (in KN)	Failure Mode	Comments
COMPETITOR Test Sample 1	Tensile	Hydraulic test rig (Semi-automated)	Vertical pull, sample constrained in planes 'X' & 'Y' . Component loaded (inverted) into pull-tester, with stud passing through a predefined aperture. Part gripped from underside and pulled vertically downwards. Test loading applied axially, through centreline of fastener.	1.22	100% WELD FAILURE	Fusion of parent metals within weld zone less than 20%. Poor heat penetration during weld cycle. Fusion temperature not achieved, resulting in molecular union only at the surface of the welded joint (stuck weld). Stud pulled from head (disc) at very low load condition, indicating weld quality well below acceptable limit of performance for product type
COMPETITOR Test Sample 2	Tensile	Hydraulic test rig (Semi-automated)		2.90	100% WELD FAILURE	
COMPETITOR Test Sample 3	Tensile	Hydraulic test rig (Semi-automated)		1.23	100% WELD FAILURE	
Test Sample 1	Tensile	Hydraulic test rig (Semi-automated)		5.42	NO VISIBLE FAILURE OF WELD. DISC "CROWNED" AND PULLED THROUGH APERTURE.	100% fusion of parent metals achieved. Welded joint of head to stud remained intact throughout test, with no visible separation seen. Part welded to acceptable standards of performance.
Test Sample 2	Tensile	Hydraulic test rig (Semi-automated)		5.54	NO VISIBLE FAILURE OF WELD. DISC "CROWNED" AND PULLED THROUGH APERTURE.	
Test Sample 3	Tensile	Hydraulic test rig (Semi-automated)		5.08	NO VISIBLE FAILURE OF WELD. DISC "CROWNED" AND PULLED THROUGH APERTURE.	

Conclusions:

Of the 4 Competitor test samples selected:

3 were load-tested; none reached minimum acceptable performance limits for product material/type.

All 4 were checked for dimensional conformance. For 1 part, the thread form was found to be outside acceptable limits (thread was oversize to calibrated "GO" Ring gauge). Other 3 parts were within acceptable manufacturing limits.

Of the 4 bigHead test samples selected:

3 were load-tested; all reaching acceptable performance limits for product material/type.

All 4 were checked for dimensional conformance and found to be within acceptable manufacturing limits.

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Test Equipment and loading configuration:



Loading fastener to test rig - Step 1



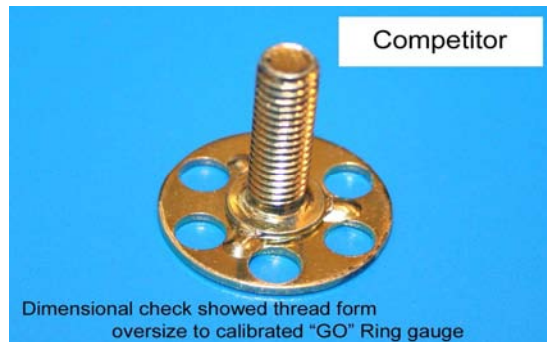
Loading fastener to test rig - Step 2



Loading fastener to test rig - Step 3

TEST RESULTS:

Competitor's Test samples



bigHead Test samples

