TEST CERTIFICATE

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This report details the results of prototype tests carried out on right angle couplers used for connecting steel tubes of 48.3mm outside diameter and of at least 3.2mm nominal wall thickness at a minimum in the construction of working scaffolds and falsework required for the construction, maintenance, repair and demolition of buildings and structures.

Submitted for test by :-

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Description and Marks on couplings.

A hot dip/electro galvanised, drop forged steel right angle coupler, manufactured to drawing number MFL/AP/11001/01-00.

Marks :- CLASS A-B
EN 74
M.F.L.01 A1H53

Basis of Tests.

The couplings have been tested in accordance with the requirements of BS 1139 : Section 2.1 : 1991 – BS EN 74 : 1988. Class B

The couplings submitted for test were selected at random, by the submitter, from a manufactured batch of at least 500.

Manufacturers data for assessment purposes is detailed in appendix 2.

RESULTS

1. The design of the coupling complied with the requirements of the relevant items in clause 5 of the standard. From tests the recommended tightening torque was found to produce a stress equivalent to 56.3% of the Yield Stress of the bolt.

2. The measured dimensions, mass and material characteristics, of the couplings, were all within the tolerances as specified by the manufacturer.

3. The surface protection was found to be as specified

Certified.....

Authorised Signatory
B.R.Ancliff

4. Testing of behaviour under load

Assessment of results using the variables method

Formulae $z(\Delta_1) = \bar{x}(\Delta_1) - k_s.s(\Delta_1)$ and
$z(\Delta_2) = \bar{x}(\Delta_2) - k_s.s(\Delta_2)$

Where $z(\Delta_1)$ = test value of series of measurements of $P\max(\Delta_1)$
$z(\Delta_2)$ = test value of series of measurements of $P\max(\Delta_2)$
$\bar{x}(\Delta_1)$ = mean load in kN for series of measurements of $P\max(\Delta_1)$
$\bar{x}(\Delta_2)$ = mean load in kN for series of measurements of $P\max(\Delta_2)$
k_s = 1.65 for a sample size of 50
$s(\Delta_1)$ = estimate of the standard deviation from a series of measurements for $P\max(\Delta_1)$
$s(\Delta_2)$ = estimate of the standard deviation from a series of measurements for $P\max(\Delta_2)$

From test results :- $\bar{x}(\Delta_1) = 23.43$ kN
$\bar{x}(\Delta_2) = 20.92$ kN
$s(\Delta_1) = 2.70$ kN
$s(\Delta_2) = 3.59$ kN

$\therefore$ $z(\Delta_1) =$ **18.97 kN** and $z(\Delta_2) =$ **15.00 kN**

Acceptance criteria :-

If $z(\Delta_1) \geq L(\Delta_1)$ and $z(\Delta_2) \geq L(\Delta_2)$, the prototype is accepted.
If $z(\Delta_1) < L(\Delta_1)$ and $z(\Delta_2) < L(\Delta_2)$, the prototype is rejected.

Requirements from BS 1139 - EN 74 table 1, columns 5 and 6 for couplers :-

Class B
$L(\Delta_1) = 10$ kN
$L(\Delta_2) = 15$ kN

From the results, the prototype is accepted for Class B for behaviour under load

Measured values and five load-displacement curves (charts 1-10) are detailed in Appendix 1.

5. Determination of the ultimate load

Results of tests :-

Test Number	Maximum Load - kN
1	60.00
2	59.86
3	60.00
4	60.00
5	59.32
6	60.00
7	60.00
8	56.98
9	57.22
10	60.00

Some of the tests were stopped @60.00kN without fracture of the coupler.

Acceptance criteria for minimum bearing load (L)

Class B = 30.0 kN

From the results, the prototype is accepted for Class B for ultimate bearing load.

6. Testing of the torsional rigidity of right angle couplers

Test Number	Torque (Nm) required to rotate an angle of :-	
	1°	2°
1	550	768
2	650	897
3	600	820
4	615	846
5	661	913
6	631	857
7	588	824
8	675	920
9	613	880
10	546	777

The curves showing Φ plotted against the torque (charts 11-20) are detailed in Appendix 1.

Acceptance criteria :- The prototype is rejected if for any one of the tested couplers

- when $\Phi = 1^{\circ}$, $M_{(\Phi=1)} < 210\text{N.m}$

or

- when $\Phi = 2^{\circ}$, $M_{(\Phi=2)} < 400\text{N.m}$

From the results, the prototype is accepted for Class B for torsional rigidity .