

APPENDIX 5

Quality and Operations Assessment Schedule for Welded Steel Mesh for the Reinforcement of Concrete Including Inspection and Testing Requirements

1 Scope

This Schedule describes the minimum quality and operational control requirements for the manufacture of welded steel reinforcing mesh conforming to the requirements of AS/NZS 4671 Grades 500N and 500L, and is additional to the quality management, operational and general requirements contained in Appendix 1.

It covers the manufacture of welded steel reinforcing mesh from hot rolled or cold worked reinforcing steel commencing with the supply of raw materials from ACRS certified or approved sources, to final despatch of product to the purchaser.

2 Steel Supply

- a Where input steel of the required specification is sourced from external suppliers, the requirements of Appendix 1 shall apply to feed steel.
- b Where input steel of the required specification is manufactured in house by the manufacturer, the requirements of Appendix 4 shall apply to feed steel.

3 Processing

There shall be documented procedures for the operation and control of mesh making equipment that ensure consistency of product, and that the finished product conforms to the relevant specification and customer requirements. These shall include, as a minimum requirement:

- a The control of dimension and shape properties including size, wire spacing, mesh flatness and out of square.
- b The control of mesh weld shear strength

4 Batch Identification & Traceability

- 1. The supplier's heat or batch identity shall be maintained on all feedstock awaiting initial processing. It shall be possible to cross-reference all feedstock with the supplier's test certificates and delivery documentation (in the case where feedstock is sourced externally) or with the production batch identity and associated production and test records (where the feedstock is manufactured in house by the mesh manufacturer).
- 2. The batch identity of each coil of feedstock shall be maintained up to the point of entry to the mesh-making machine or wire straightener.
- 3. Production of batches and the size of batches shall be as defined in AS/NZS 4671 for the manufacture of reinforcing mesh. The identity of mesh production batches (which

APPENDIX 5	Approved By:	Position:	Date of Issue:	Page:
	Philip Sanders	Executive Director	7/12/06	1 of 4

- may contain more than one feedstock heat or batch number) shall be maintained up to despatch to the customer.
4. Steel chemistry of finished product shall be identified by supplier's heat numbers or by statistical analysis of the range of possible suppliers' steel chemistry tests.
 5. All items, bundles or coils of finished product shall carry durable identification that enables the production batch from which it originated to be determined.

5 Product Testing

5.1 Testing by the Manufacturer

The chemical, mechanical, dimensional properties of the welded reinforcing mesh shall conform to the requirements of AS/NZS 4671 and customer specification. Long-term quality testing shall be continuous and as laid down in AS/NZS 4671, but not less than the last 200 consecutive tests or three months' consecutive results, whichever is the greater. It is the intent of the Scheme that the full continuum of tests, with no omissions be recorded and assessed by ACRS. Where the feed material is supplied from an ACRS accredited source the suppliers chemical test results may be used.

Long-term quality levels shall be determined for each size/grade combination in the manner specified in AS/NZS 4671 or the customer's standard as appropriate. The test results for the manufacturer's long-term quality level analysis shall be submitted to ACRS at three monthly intervals. These shall be analysed at ACRS and will form part of subsequent surveillance inspections.

5.2 Testing by ACRS

a Test Program

For each size and grade of mesh the test program for the Initial Assessment and subsequent Surveillance Inspections shall be as described in Table 1. Testing shall be in accordance with AS/NZS 4671. At the time of initial testing at least three batches of steel of each type shall be available for the selection of the test pieces.

Table 1

Inspection	Mesh Size	Frequency
Initial Assessment	3 types of mesh to represent the smallest, intermediate and largest bar size for each steel grade produced for stock	1 batch per mesh type
Surveillance Inspection	One type of mesh for each steel grade	1 batch per mesh type

From one or more sheets of mesh from each batch for each size/grade combination selected for test, ten samples shall be selected, each representing a different wire. For meshes containing more than one wire size, but excluding designated trench meshes, ten samples as above shall be selected from each wire size. Where meshes contain the same size wires in both directions, five of the samples shall be from the transverse wires.

Test samples shall be taken across a single sheet of mesh to test the weld characteristics of different weld heads.

For designated trench meshes and other mesh products where cross wires are “non-structural” only the longitudinal wires shall be sampled

These samples shall be subject to testing at the frequency described in Table 2. Testing shall be carried out to the satisfaction of ACRS and ACRS Assessors shall witness not less than 30% of the testing.

Table 2

Property	Number of tests per batch for wire-size/grade combination
R_m	10
R_e	10
R_m/R_e	10
A_{gt}	10
Weld Shear Strength	3
?	
CSA and Mass	3
Sheet length & width and bar count & spacing	1
Rib Geometry	1
Chemistry	1
Macro (where applicable)	1

Each tensile test piece shall contain at least one weld.

b Aging

All mechanical test samples shall be artificially aged prior to testing as specified in clause 3.1 of AS/NZS 4671.

c Duplicate Samples

For each test sample described above, a duplicate sample shall be taken to be tested by an independent NATA approved test house. The tests may be increased in the event of any anomalies or difficulties.

d Evaluation of Test Results

A statistical comparison of product release test results, test results on duplicate samples, and test results from independent test houses, shall be undertaken for each test program.

The samples shall be deemed to comply with the requirements for yield strength (R_e) if for each batch sampled–

- i No result falls below 95% of the specified minimum characteristic value; and
- ii No result exceeds 105% of the specified maximum characteristic value; and
- iii Not more than one result falls below the specified minimum characteristic value or above the specified maximum characteristic value; and
- iv the mean of the results for each cast lies between 1.02 times specified minimum characteristic value and 0.98 times specified maximum characteristic value, or all results for each cast lie within the specified range.

The samples shall be deemed to comply with the requirements for Elongation (A_{gt}) and Ratio (R_m/R_e) if the mean of the results for each cast exceeds the specified characteristic value.

All weld shear strength samples shall show a breaking force (kN) not less than 250 x nominal cross-sectional area (mm^2) of the largest wire in the joint.

e Bond Performance (AS/NZS 4671 Grade 500)

- i Performance by Measurement

Where rib configurations of deformed bars are shown to conform, by measurement of the projected rib area, to the requirements of AS/NZS4671 or where the cross-weld shear strength is deemed to provide the bond in concrete, then a Bond Test need not be carried out. The testing frequency shall be as described in Tables 1 and 2 –Rib Geometry.

ii Performance by Bond Test

Bond tests as described in AS/NZS4671, may be carried out on those deformed bars whose projected rib areas do not conform to the requirements of that standard. The bond test frequency required to establish the bond performance is six test pieces from each size within the approved size range of the manufacturer

An independent, NATA approved test house shall carry out the bond Tests.

Where bond testing is used to confirm bond performance the minimum rib dimensions under test shall be recorded and will form part of the manufacturer's production and inspection procedures. Compliance with these shall form part of subsequent ACRS inspections.

f Sample Selection

ACRS assessors shall select all samples for the above test programs.

APPENDIX 5	Approved By:	Position:	Date of Issue:	Page:
	Philip Sanders	Executive Director	7/12/06	4 of 4