Government of **Western Australia**
Department of **Commerce**

Building Commission

Durability of roof tie down connectors (straps)

This technical note provides builders with information on how to comply with the minimum requirements for roof tie down connectors or straps. Recent inspection and testing of steel roof tie down connectors used in masonry construction in the metropolitan area has revealed that the minimum coating mass applied to the connectors did not meet the minimum requirements of the Building Code of Australia.

What are the minimum requirements for roof tie down connectors?

Part 3.3.3 of the Building Code of Australia 2013 states that Performance Requirement P2.1.1 is satisfied for masonry accessories if they are constructed and installed in accordance with either Australian Standard *AS 3700-2011 Masonry structures* or *AS 4773-2010 Masonry in small buildings*, parts 1 and 2.

AS 3700-2011 states that connectors and accessories shall comply with *AS/NZS 2699.2:2000 Built-in components for masonry construction – connectors and accessories* (similar reference is in AS4773.1-2010 clause 3.4.2). The durability requirement for connectors and accessories is stated in Section 3. Durability classification (R) identifies the level of corrosion protection provided to a connector or accessory to meet the performance condition for the design life of a structure (design life is 50 years – refer AS/NZS 2699.2:2000, clause 2.2(b)).

Connectors and accessories manufactured from any material shall be identified using durability classifications R0 to R5 by application of the acceptance criteria in clause 2.4.4 of AS/NZS 2699.2:2000. When choosing built-in components for masonry construction, including (but not limited to) wall ties, masonry anchors, connectors, shelf angles, lintel bars, bed joint mesh, bolts and fixings, they shall have at least the durability class given in Table 5.1 of AS 3700-2011.

When referring to this table, a tie down strap fixed into the internal skin of a clay masonry cavity wall, classified as located in an exterior environment, not subject to wetting, is required to have a durability rating of R1. In Table 1 of AS/NZS 2699.2:2000, connectors and accessories manufactured from steel sheet shall have a coating mass of 300gm^2 on each side. Where the installed tie connector or accessory is manufactured from steel wire or bar (threaded rod) then Table 2 of AS/NZS 2699.2:2000 applies and the galvanised coating mass shall be at least 470 gm^2.

Building Commission investigations and testing of five samples revealed that the coating mass of galvanised steel strapping ranging in size from 25 mm x 1.0 mm up to 32 mm x 1.2 mm did not achieve more than 60 per cent of the required coating mass.

Whose responsibility is it to check the stamps and labels indicating durability?

Manufacturers of connectors and accessories are required to stamp or label their products to indicate their durability classification, along with their name, registered trade name or mark and address of the manufacturer. A sample of galvanised strap taken from a building material supplier was found to have a blue colour code visible on the end of the strap (indicating R4 durability – stainless steel). The material was clearly not stainless steel which indicated that suppliers may be incorrectly colour coding their products.

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Builders need to ensure that the connectors and accessories used in masonry construction comply with the requirements of AS 3700-2011 or AS 4773-2010 and not assume that a galvanised steel product will have the required protective coating. Industry experts have advised the Building Commission that it may be difficult to achieve the required minimum coating mass due to the thickness of commercially produced steel strapping (average 1 mm in thickness).

Exposure environments need to be considered

In determining exposure environments which dictates the class of durability, builders are to refer to section 5 of AS 3700-2011 or section 4 of part 1 of AS 4773.1-2010. Builders are to note that when building in severe marine environments (areas up to 100 m from a non-surf coast and up to 1 km from a surf coast), stainless steel connectors and accessories (durability class R4) must be used to meet the minimum standard.

Further information

Copies of Australian Standards can be purchased from the SaiGlobal website.

For further information on inspection methods contact the Building Commission Technical Services Manager on 1300 489 099.

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