



Guidance document GD 14

March 2014

GUIDANCE ON FASTENER SPECIFICATION

(This document is currently under review)

INTRODUCTION

The purpose of this guidance note is to provide best practice advice on life expectancies of fasteners.

Fasteners like all other products must be fit for purpose and must be specified accordingly. Fasteners have to accommodate a wide variety of different demands during their functional life and perhaps one of the most arduous demands is the acceptance of different loading conditions and the transfer of those loads into adjoining components and materials.

Metal cladding systems provide efficient, attractive and reliable solutions for a wide variety of external building envelopes. However, as with all construction components, the ability of the cladding to satisfy its functional requirements is dependent on its correct specification and installation and, equally as important, on its interaction with the other elements of the building envelope and structure.

It is the clearly stated position of the MCRMA and its members that the best assurance of compliance with the appropriate standards and performance expectation is to source systems and component products from reputable manufacturers who can demonstrate the pedigree of the materials used and support design requirements with job specific data.

DEFINITION OF A FASTENER

“The term ‘fastener’ is used to describe a mechanical device used to secure any cladding component to a structure or to another component. A ‘fixing’ describes the result achieved by the use of a fastener.

Thus the strength of a fastener denotes certain mechanical properties of the item in isolation, whereas the strength of a fixing must take account of the 'pull-out', 'pull-over', shear, 'washer inversion' and 'strip-out values', which reflect the properties of the member into which the fastener is secured and the sheet or component being restrained." (Source: Technical Guidance TG7, the National Federation of Roofing Contractors (NFRC))

Fasteners are offered either as part of a complete system, or as individual components which should be correctly specified for any given internal or external environment. The specifiers and purchasers of fasteners must make their own decisions about whether a fastener type and life expectancy is suitable for their particular application. All applications are different and guidance from MCRMA fastener members or system provider companies should be sought on design and selection.

As there are no British or EN Standards which clearly define typical life expectancies for the various fastener materials available in the market place this guidance note extends the existing guidance available in MCRMA Technical Paper No 12 and the NFRC Technical Guidance TG7 (copies are available directly from NFRC, telephone 0207 638 7663).

The technology for fasteners used within metal roofing and cladding has evolved over recent years thanks to advances in materials, design and life expectancies. The table overleaf covers current good practice for life expectancies of fasteners, but does not cover guarantee periods as this is a commercial offering from individual manufacturers and/or system providers.

The table may be used as a general guide; however, it would be prudent for the specifier to check with the supplier on each individual project as there may be specific internal or external environmental conditions present which could affect the fasteners' functional life expectancy and its long term structural and non-structural performance.

LIFE EXPECTANCY (see note iii)

| Material | External applications (Note i) | Internal applications (Note ii) |
|---------------------|-----------------------------------|------------------------------------|
| Stainless Steel 316 | Up to 50 years | Up to 60 years |
| Stainless Steel 304 | Up to 40 years | Up to 50 years |
| Carbon Steel | Up to 12 years | Up to 40 years |

In aggressive environments consult with your fastener supplier for guidance! Swimming pool halls, for instance, have been the subject of detailed research studies and specific industry guidance and HSE advice is available.

Note i Life expectancy period for fasteners which are directly exposed to the external environment, including those outside the line of any air/vapour barrier or breather membrane within a ventilated rainscreen system.

Note ii Some high humidity, swimming pools, anaerobic digesters buildings and/or coastal, industrial, commercial or leisure environments may contain corrosive or chemical laden conditions either internally or externally (or both). In these circumstances there is a need to check suitability and compatibility of component parts with the manufacturer or system supplier and obtain specific project guidance.

'Coastal' environments extend a minimum of 1km from the shore or edge of tidal water. This may extend significantly further (up to 5km) depending on the topography and prevailing wind. In these circumstances there is a need to check with the manufacturer or system supplier for specific project guidance.

BS 5427-1:1996 goes some way to define internal and external environments but more specific advice and guidance is being considered by members of the MCRMA. For more information about environmental classifications, see ISO 9223 and BS EN ISO 12944. For coil coated metal see BS EN 10169.

Note that most stainless steel self drilling screws have carbon steel drill points.

Note iii Life expectancy periods shown are for the fastener when subjected to the internal and external environments shown in the table and when used to connect through and into associated materials which are appropriate and expected for the application.

It is the responsibility of the designer to ensure the specification and compatibility of all materials used to create the connection are suitable for the application and its intended environment and that the required life expectancy periods are appropriate for its planned use.

Project specific guidance and advice should always be obtained from the fastener manufacturer, supplier or system provider to ensure that the connection complies with the project specific needs.

THE TOTAL CONNECTION

The connection is the most critical aspect of the fastener. Without exception, the fasteners should be carefully selected to meet the needs of the application for which they are intended for use; providing durability in terms of life expectancy and structural performance to retain what they are fixing to the structure.

The internal and external environment and the compatibility between component parts of a system or assembly may have an influence on the structural and corrosion performance of the connection.

Life expectancy refers to the fastener material and not necessarily the total connection (that is, the fastened material and the material fastened into). It is therefore strongly advised that the specifier considers the specification of all components within the connection to ensure they meet the required life expectancy for the connection. It is incumbent on the specifier to determine whether the fastener guarantee/warranty includes the connection or NOT!

GUARANTEE/WARRANTY CHECKLIST

When considering a guarantee/warranty the specifier or purchaser will need to take advice from individual manufacturers and/or system providers on the following points:

- The specifier will need to establish whether the guarantee is supplied by the manufacturer, system provider or the reseller of the fastener.
- CE marked fasteners. The assignment of a CE marking and a Declaration of Performance as detailed in the Construction Products Regulations (CPR) identifies that a product complies with a harmonised European Standard (hEN) or a Common Understanding and Assessment Procedure (CUAP). Wherever possible it should form part of the specification.
- When purchasing from a reseller and not the manufacturer or system provider, check whether there is a manufacturer guarantee/warranty.
- A guarantee/warranty offers comfort to the specifier or client. Performance statements and some 'third party' insurance backed warranties which involve the payment of a premium contain caveats which can be very limited in delivering substance and/or peace of mind.

- In the event of a failure and subsequent claim the specifier will need to check the financial limit of a claim:
 - No greater than the original invoice
 - To simply supply replacement fasteners
 - If there is an excess, the specifier will need to establish whether the subcontractor/installer is liable to pay the excess.
 - Check whether 'making good' is covered by the guarantee/warranty
- Check whether the guarantee/warranty covers corrosion resistance, structural performance and the total connection.
- The specifier will need to check whether the guarantee/warranty can be assigned.
- If the manufacturer, system provider or the reseller has public and product liability insurance, the specifier will need to establish the limitations of such insurance.
- And finally, check all the terms and conditions.

Manufacturers are best placed to offer advice about their particular products and any variation from their published data during the design or construction process could result in the component or system failing prematurely or not complying with the guarantee or warranty conditions. Any uncertainty about the use or application of a product or system should be referred back to the manufacturer for detailed written advice.

Additional project specific advice for demanding or complex constructions may also be obtained from one of the independent roofing and cladding inspectors featured on the MCRMA web site.

For general advice on industry guarantees and warranties refer to the MCRMA Guidance Document GD 02, November 2012

REFERENCES

Page, C. L. and Anchor, R. D.: 'Stress corrosion cracking of stainless steels in swimming pools' The Structural Engineer, 66/24, 20 Dec. 1988

Stainless steel in swimming pool buildings Nickel Development Institute (now Nickel Institute) Publication No.12010, NiDI, 1995

Baddoo, N. R. and Burgan, B. A.: 'Structural design of stainless steel' Steel Construction Institute, p291, 2001 web site:
<http://www.bssa.org.uk/cms/File/SCI%20291%20Structural%20Design%20of%20Stainless%20Steel.pdf>

Mietz, J. and Isecke, B: 'Stainless steels for applications in civil engineering' Stainless Steel World Conference, p334- 339, 2001

Sender, U.: Corrosion and protection in swimming pool buildings Bulletin 106E, Swedish Corrosion Institute, 1998

Oldfield, J. W. and Todd, B.: 'Room temperature SCC of stainless steels in indoor swimming pool buildings' British Corrosion Journal, 26/3, p173, 1991

Erzeugnisse, Verbindungsmittel und Bauteile aus nichtrostenden Stählen, Sonderdruck 862, Informationsstelle Edelstahl Rostfrei Allgemeine bauaufsichtliche Zulassung Z-30.3-6 vom 5 Dezember 2003

BSSA web site: (<http://www.bssa.org.uk>)

NIDI web site: (<http://www.nidi.org>)

Stress corrosion cracking of stainless steels in swimming pool buildings SIM 5/2002/18, 2002 Health and Safety Executive, Field Operations Directorate, Food and Entertainment Sector (also available from the BSSA web site)

DISCLAIMER

Whilst the information contained in this bulletin is believed to be correct at the time of publication, the Metal Cladding and Roofing Manufacturers Association Limited and its member companies cannot be held responsible for any errors or inaccuracies and, in particular, the specification for any application must be checked with the individual manufacturer concerned for a given installation.

Information provided by the MCRMA or contained within publications and articles which are made available in any form (mechanical, electronic, photocopying or otherwise) cannot be used or cited as a means of ensuring that a material, product, system or assembly is compliant with Building Regulations.

©2014 MCRMA 106 Ruskin Avenue, Rogerstone, Newport, South Wales NP10 0BD
Tel: 01633 895633 info@mcrma.co.uk www.mcrma.co.uk