



CHOOSING THE RIGHT FASTENERS FOR THE RIGHT APPLICATION

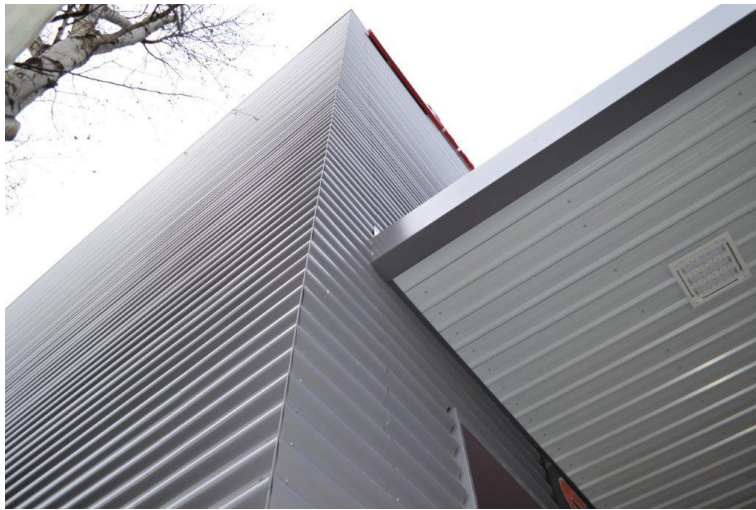
Fasteners like all other products must be fit for purpose and must be specified accordingly. Fasteners have to accommodate a wide variety of different demands during their functional life and one of the most arduous demands is the acceptance of different loading conditions and the transfer of those loads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

It is the clearly stated position of the Metal Cladding and Roofing Manufacturers Association (MCRMA) that the best assurance of compliance with the appropriate standards and performance expectation is to source systems and component products from manufacturers who can demonstrate the pedigree of the materials used and support design requirements with job specific data. And crucially, to employ reputable system installers who take an active part in the construction and installation process and are deliver quality workmanship.

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 the suitability of a specific fastener type and its 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.

The MCRMA has published guidance document GD33 *Fasteners for Metal Roof and Wall Cladding: Design, Detailing and Installation Guide* which gives a comprehensive practical guide on the selection, use and performance of fasteners designed for popular metal roofing and cladding systems used in modern industrial, warehouse and commercial buildings.

All roofing and cladding systems adopting profiled metal as the external surface, usually steel or aluminium, rely upon primary mechanical fasteners to secure the system to the structure and secondary fasteners, which are used to secure junctions and connect with associated components, for example rooflights and vents, and attach flashings and fabrications. The importance of the correct selection of such fasteners may sometime be underestimated by those involved in the various stages of the design and installation process.



The guidance document offers an explanation about each type of fastener used during the construction process and how the various types of fasteners including self-drilling, self-tapping, riveting and grommet variants are used to provide optimum performance. Performance criteria is also explained and functionality is divided into the four main categories covering durability, weathertightness, aesthetics and structural capability.

Material specification is a key factor which must be considered during the design and development process as it has an influence on each of these four categories in particular, durability. A fastener must have a level of durability compatible to the intended functional lifespan required of the selected cladding system in the particular application.

Fasteners are available in a number of materials all of which offer different levels of corrosion resistance and durability when exposed to a variety of conditions, both external and internal.

BS EN ISO 12944-2 *Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Classification of environments* gives guidance on atmospheric environments which are classified into six atmospheric-corrosivity categories and table two in the document provides informative examples of typical environments for each of the categories.

Normally the weathertightness requirement of fasteners relates only to exposed external fasteners. However, the ability of a fastener to maintain a seal is often required on certain internal fasteners where the restriction of air and vapour diffusing into the system is desirable or to meet air permeability requirements within the Building Regulations.

The ability of a fastener to re-seal holes made in the cladding profile depends primarily on the design and performance of a compressible sealing element. The sealing element must be resilient to the mechanical forces to which it is subjected during installation of the fastener, the clamping and service loads in use, as well as the environmental and mechanical conditions encountered during its service life.

The washer compression will also provide a visible indication of the correct installation of the fastener and assist in preventing overdriving (or under driving) the fastener. The key to correct fastener installation and therefore achieving optimum performance lies in the selection and use of tooling appropriate to the fastener type and application.

Guidance on the correct installation speeds, end loads and sockets/drive bits for the differing fastener types is explained and is also available from the manufacturer. It must be noted that Impact drivers should be avoided as they are not suitable for self-drilling or self-tapping fasteners and MCRMA GD32 *Self drilling fastener installation tools* should be referenced for specific guidance on this subject.

In addition to satisfying the durability, weathertightness and aesthetic functional requirements, the fastener also has to be capable of withstanding a wide range of types of loading. Some types of loading apply to virtually all metal cladding fasteners regardless of their application, whereas some loadings are specific to the system in which the fastener is incorporated.

The loadings which apply to most fasteners include:

- Tensile loads - pull-out and pull-over resistance
- Shear loads - shear force resistance
- Installation loads - overdrive resistance
- Clamping loads- firmly securing the material to the support or clamping material to material.

A structural engineer should, at the design stage, advise on the loading condition applicable to each area of the building and in addition individual elements, such as fabrications and groups of fasteners. The loading calculation should form the basis for selecting the type, position and number of fasteners at each location on the building. Further guidance can be found in MCRMA GD15 *Guidance for wind loadings on roof and wall cladding*.

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. In addition, design information can be obtained from any of the independent roofing and cladding inspectors featured on the MCRMA web site.

This guidance document is now available as an online CPD which provides the user with a comprehensive best practice guide on the selection, use and performance of fasteners designed for use with metal roofing and cladding systems. The CPD covers a wide range of topics including fastener types, performance criteria, durability, weathertightness, aesthetics, typical cladding systems, detailing and installation and tooling.

The CPD module can be studied offline and has an online assessment component to verify knowledge. The module represents an anticipated 120 minutes of professional development and following successful completion of the CPD, a certificate is available for immediate download.

Further details can be found at www.mcrma.co.uk/online-cpds/

This article first appeared in Roofing Today magazine July 2020

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