THE BUILDING ENVELOPE IN FOCUS: THE ROOF DRAINAGE SYSTEM

Concluding its review of good site practice, MCRMA focuses on a frequently neglected part of the building envelope: the roof drainage system.

The roof drainage system is an important aspect of the overall roof design but one that is often overlooked because of the perceived simplicity of its function that is, taking rainwater from the roof and disposing of it in the ground. However, serious problems can occur when gutters and down pipes are incorrectly fitted or poorly maintained and therefore particular attention should be paid to all joints and junctions to ensure that they do not leak and cause damage. This is particularly important for internal or valley gutters.

Photo courtesy of Ash & Lacy Building Systems

Historically**,** industrial and commercial buildings incorporated gutters which were manufactured in lengths that could be easily handled on site. These gutters were jointed at each junction along the building during the build process. This approach has stood the test of time and has proven successful providing that the initial joints were assembled and sealed correctly at the time of installation.

Gutters are manufactured from a variety of different materials depending upon the application and expected performance. The following materials are generally used for internal gutters - galvanised mild steel is the most common material used for industrial guttering, G600 to BS EN 10346:2009 quality is recommended and the following gauges are commonly used - 1.6, 2.0 and 3.0mm. Galvanised after manufacture using mild steel substrate to BS 1449 Part 1.1 (1991) and hot dipped zinc coated to BS EN ISO 1461:2009.This is often used so that cut edges that occur during fabrication are also protected. The following gauges are commonly used - 3.0, 4.0 and 6.0mm.

Photo courtesy of Ash & Lacy Building Systems

Aluminium is used because it is lightweight, strong and very durable however, expansion and contraction must be considered early in the design stage. Aluminium is supplied to the following specification: Alloy 1050 A H14 to BS EN 485-1:2008+A1:2009, 515, 573 and the following gauges are commonly used - 1.6, 2.0 and 3.0mm.

Stainless steel is supplied to the following specification: Grade 1.4301 to BS EN 10088-2:2005 in the following gauges - 1.6, 2.0 and 3.0mm. Joggle joints are generally used for connecting internal gutters and these are sealed and bolted with 50mm wide butyl mastic with hexagonal/circular captivated nuts to suit stainless steel M10 hexagonal head bolts and washers.

The bolts should be tightened from the centre of the sole outwards with mastic within the threads of the bolts. The joints must be fully bolted, and tightened as required, on to pristine sealant to ensure that the joints do not create an on-going problem of leakage. Steel galvanised gutters must be coated with a site-applied bitumastic paint or have a factory applied coating on the weather side.

Membrane gutters

In recent years, membrane gutter systems have become more widely adopted for use on both industrial and commercial buildings. This is due to a number of reasons, but primarily the reduction in risk relating to water ingress at or about the gutter position. Thickness of steel substrate must be considered when specifying membrane lined gutters. Whether single skin or insulated, they should be adequately supported structurally to allow for foot traffic, snow loads etc both pre and post construction.

Photo courtesy of Guttercrest Limited

Both MCRMA and MGMA (Metal Gutter Manufacturers Association) therefore recommend that a minimum 1.2mm galvanised steel substrate should be specified as a minimum for walkability, safety and serviceability. Today, most if not all membrane gutters are pre-laminated, eliminating issues with small scrapes, scuffs etc. The thickness of the membrane is critical at this point; the minimum thickness criteria for pre-laminated membrane thickness should be 1.2mm. This specification thickness negates the risk associated due to foot traffic and the resulting abrasion to the membrane.

During the installation and life of the membrane gutter they must be kept clear of loose fasteners and other materials to avoid damage and puncturing of the membrane. Two simple tools are required to perform this task - a soft bristled brush and a plastic shovel to collect the debris. Also during installation the membrane must be fusion welded or chemically bonded as work proceeds to avoid contamination within the joint.

Site work requirements can vary considerably and therefore it is essential that the manufacturer's instructions are followed. Prior to installation, confirm that the method of fixing, including the supporting structure, has been designed to accommodate loadings from wind, snow and maintenance traffic. Attention should also be paid to the required frequency of bracket/fixing pitches, the positioning of the gutter and the allowances required for thermal movement, if applicable.

Photo courtesy of Guttercrest Limited

Metal guttering systems are designed and manufactured to give many years of reliable service and to achieve this, a regular inspection and maintenance programme is required. Detailed installation guidelines can be found on the MCRMA and MGMA web sites and independent advice can be obtained from design and build consultants featured within the consultants section of the MCRMA web site.

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