

Hardware Specification Document Guidelines for the Selection, Installation and Maintenance of Screws and Fasteners for the Window and Door Industries

6.8 JULY 2004

1. Scope

This guidance document has been prepared by the Technical Committee of the Hardware Manufacturers Group.

It provides information to assist in the correct selection, specification and maintenance of screws and fasteners. The objective of this is to consolidate the various trade standards.

2. General

It is necessary to comply with the relevant British Standards for each of the framing materials that are being considered, BS 7412 for PVC-U windows, BS 4873 for aluminium windows, BS 644 for timber windows and PAS 23 for doors.

All products must comply with the relevant Building Regulations.

With screws, particular care should be taken with regard to head, thread and point design as well as corrosion resistance. Although there is no specified minimum requirement in BS 7412 for corrosion resistance, the Glass and Glazing Federation suggest a minimum of 240 hours, thereby complying with BS EN 1670 Grade 4. For coastal or heavily polluted regions of the country, or where prolonged guarantees are being offered, it is recommended that screws and fixings should withstand a 500 hours salt spray test when tested in accordance with BS 7479. It is recommended that evidence of independent test certificates by a UKAS approved test house be obtained to demonstrate conformity with the above.

It is recommended that a screwdriver speed of 1500 - 2000 rpm be employed, as this will cover the vast majority of screw applications. It is important that the torque of the screwdriver is set in accordance with the framing material being used, to ensure that neither screw heads nor threads nor framing material are damaged. Care should always be taken to insert screws at right angles to the substrate surface. Care should be taken to ensure that the correct screwdriver bit is utilized to avoid damage to the screw heads.

If in doubt consult your supplier for advice.

3. Selection

Consideration should be given to the end application when selecting screws and fasteners.

Care in selection should also be taken where high security fittings are involved, to ensure optimum performance of the hardware is achieved. For guidance on material selection reference should be made to section 6 - materials.

3.1 Rivets

Where it is decided that the use of rivets is appropriate, they will generally be found to be one of FOUR types:

Standard open end
Multi-grip open end
Peel type with either countersunk or dome head
Standard sealed type

The diameter, length and head form are determined by specific application.

Note: certain rivets, after application, leave holes through their centres, which could permit the ingress of water. With PVC-U windows and doors, where moisture penetration would be into an undrained chamber or onto reinforcement, these holes should be sealed by a proprietary method.

See table 1 for rivet types in both unset and set conditions.

3.2 Screws

All screws should be chosen with their application in mind. Where screws are to be replaced, such as in retrofit applications, suitably sized repair screws should be used. It must be appreciated that screws from different manufacturers and countries may have their own individual specifications.

Where organically coated screws are selected, care should be taken by the fabricator to obtain these screws with head recesses which have not been filled with the organic coating.



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See table 2 for details of heads, threads, points and applications.

4. Maintenance

No general maintenance should be required with screws and fasteners, although light oiling will never go amiss. Contact with domestic or industrial ammonia based solvents should be avoided.

5. Fixing

Protectively coated screws and fasteners should not come into contact with wet or damp cement or plaster, or acrylic fillers or their fumes, as these will attack the coating and render it inoperative.

6. Materials

From analysis on the results of independent tests (Salt Spray and Drill Application tests) the following information about material is given to assist the selection of screws and fasteners.

6.1. Carbon Steel

Needs protective coating for 240 hours corrosion resistance.

Can self-drill into aluminium and steel reinforcement.

Not normally recommended for attachment of stainless steel fittings because of the risk of reduced corrosion resistance due to electrolytic reaction between dissimilar metals.

Magnetic.

6.2 Martensitic: - Grade 410 - 100% stainless steel

Cosmetic coating will prevent pitting. Does not require any protective coating for 500 hours corrosion resistance.

Can self-drill into aluminium and steel reinforcements.

Suitable for the attachment of stainless steel fittings.

Magnetic.

6.3 Austenitic: - Grade 302 / 304 - 100% stainless steel

Does not require any protective coating for 500 hours corrosion resistance.

Can self-drill into PVC-U.

Suitable for the attachment of stainless steel fittings.

Non magnetic.

6.4 Bi-metallic: - austenitic stainless steel head and partial thread with a carbon steel drill tip and initial threads to self-drill and self-tap into reinforcement. Only the austenitic portion of the fastener should be in contact with the hardware and reinforcement, to reduce the risk of failure.

If the carbon steel portion is exposed, it requires protective coating for 500 hours

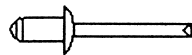
corrosion resistance.

Suitable for the attachment of stainless steel fittings.

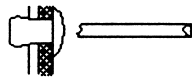
Non magnetic head

If carbon steel fasteners with a suitable protective coating are selected, it should be noted that white corrosion deposits may form on the fastener during its service life. This type of corrosion is not detrimental to the overall performance of the fastener and can be considered acceptable, as it is the protective coating which is corroding, and not the base material of the product.

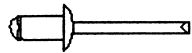
TABLE I - RIVET SELECTION



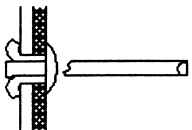
A typical standard open-ended rivet in unset condition.



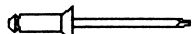
A typical standard open-ended rivet in set condition.



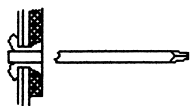
A typical dome headed peel type rivet in unset condition.



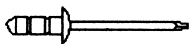
A typical dome headed type peel rivet in set condition.



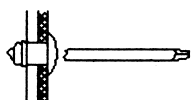
A typical countersunk peel type rivet in unset condition.



A typical countersunk peel type rivet in set condition.



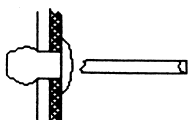
A typical multi-grip open-ended peel rivet in unset condition.



A typical multi-grip open-ended rivet in set condition.



A typical standard sealed rivet in unset condition.



A typical standard sealed rivet in set condition.

TABLE 2 - SCREW SELECTION



A typical countersunk woodscrew. The diameter and length are determined by the specific application.



A typical pan headed woodscrew. The diameter and length are determined by the specific application.



A typical pan headed, self-tapping screw for use in the steel or aluminium window and door industries. The diameter and length are determined by the specific application.



A typical countersunk machine screw that has uses in PVC-U, steel, timber and aluminium window and door industries. The diameter and length are determined by the specific application.



A typical facet headed, metric threaded, self-drilling screw for the retention of galvanised steel reinforcements to PVC-U profiles. The diameter and length are determined by the specific application.



A ribbed headed, self-tapping threaded, self-drilling screw for the retention of aluminium or galvanised steel reinforcements to PVC-U profiles. The diameter and length are determined by the specific application.



A typical single high threaded, countersunk screw with gimlet point, for the retention of hardware to unreinforced PVC-U profile. The diameter and length are determined by the specific application.



A typical high / low threaded countersunk screw with gimlet point, for the retention of hardware to unreinforced PVC-U profile. The diameter and length are determined by the specific application.



A typical metric threaded countersunk screw with self-drilling point, for the retention of hardware to steel windows and doors, galvanised steel reinforced PVC-U profile. The diameter and length are determined by the specific application.



A typical self-tapping threaded countersunk screw with a self drilling point, for the retention of hardware to aluminium windows and doors, or aluminium or galvanised steel reinforced PVC-U profile. May not be suitable for multi-wall applications. The diameter and length are determined by the specific application.



A typical pan headed, self-tapping threaded screw with self-drilling point suitable for the retention of hardware to aluminium windows and doors, or aluminium or galvanised steel reinforced PVC-U profile. The diameter and length are determined by the specific application.



A typical shallow pan headed, single high threaded screw with gimlet point, suitable for the retention of friction stays to unreinforced PVC-U windows or timber windows. The diameter and length are determined by the specific application.



A typical shallow pan headed, high / low threaded screw with gimlet point, suitable for the retention of friction stays to unreinforced PVC-U windows. The diameter and length are determined by the specific application.



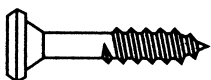
A typical shallow pan headed, high / low threaded screw with spoon point, suitable for the retention of friction stays to unreinforced PVC-U windows. The diameter and length are determined by the specific application.



A typical shallow pan headed, self-tapping threaded, and self-drill pointed screw for the retention of friction stays to steel and aluminium windows, aluminium or galvanised steel reinforced PVC-U windows. The diameter and length are determined by the specific application.



A typical shallow headed, twin high threaded, self drill pointed screw for the retention of friction stays to steel or aluminium windows, or aluminium or galvanised steel reinforced PVC-U windows, or unreinforced PVC-U windows. This style of screw usually has a thread diameter in the region of 4.8mm, and is frequently used as repair screw, as well as original equipment. The diameter and length are determined by the specific application.



A typical screw used for the mechanical jointing of all types of windows and doors. The diameter and length are determined by the specific application.

7. References.

British Standards

BS 7412: 2002 Plastics windows made from unplasticized polyvinyl chloride (PVC-U) extruded hollow profiles. Specification.

BS 4873: 1986 Specification for aluminium alloy windows.

BS 644: 2003 Timber windows. Factory assembled windows of various types. Specification.

BS EN 1670: 1998 Building hardware corrosion resistance requirements and test methods.

BS 7479: 1991, ISO 9227: 1990 Method for salt spray corrosion tests in artificial atmospheres.

Product Approval Specifications

PAS 23-1: 1999 General performance requirements for door assemblies. Single leaf, external door assemblies to dwellings.

GGF Data Sheets

Data Sheet 6.7: 2004 Guidance for the selection, installation and maintenance of hardware for the window and door industries.