



## **Typhoon Bolt Cap Technical Advisory Note**

### **Introduction**

Bolted connections are critical when designing steel frame building. The fire behaviour of joints has direct influence on the overall structural stability of a steel frame building, and therefore it is important to provide proper fire protection treatment to these elements. According to AS4100 clause 12.10.1, the current treatment for connections is to apply the maximum fire protection material for the adjacent members onto all the connections components including bolt heads, welds and splice plates. This application enables the connections to be encased by passive fire protection, which slows down its heating rate and therefore enables it to maintain its structural adequacy throughout the designed fire period.

### **Overview**

In steel framing building, occasionally steel joints might be exposed to fulfil the functionalities or building requirements. Under such condition the appearance of the fire protected elements could be crucial as it has direct impacts to the overall value of the building. For thin coat fire protection materials such as intumescent paint, ideally the product would be applied to the steel substrate with a uniform thickness across the surfaces. However, due to the profile of the connections it is extremely common for application of intumescent materials to result in inconsistent coating thickness and hence lead to a poor visual appearance, in particular for the higher fire rating level scenarios where thicker fire protection material is required. On the other hand, being too cautious about the appearance during the application could lead to insufficient coating thickness being applied and thus fail to maintain the structure throughout the designed fire period. With the above requisites, sometimes it is difficult to fulfil all the requirements with a single spray application intumescent product.

The Typhoon Bolt Cap is a fire rated cap specifically designed for structural steel connections. This injection moulded product enables a consistent appearance across all the bolted connections whilst providing sufficient insulation to the bolts. This also allows for simple application to ensure the task can be completed with a significant time saving compared to conventional spray application. It has been assessed by an accredited testing laboratory in accordance to the Australian Standard. The report states that the Typhoon Bolt Caps are capable to maintain the bolt temperature below but not limited to 550°C under the AS1530.4 standard fire condition for a 120 minutes duration.

### **Product Compliance**

As demonstrated earlier in the document, it is important to note that at this stage there is no recognised fire testing standard specifically for bolted connections or associated components. Nevertheless, Permax and Typhoon Performance Products Limited are able to provide a report issued by an accredited testing laboratory which satisfies the evidence of suitability requirements of the NCC/BCA 2019. This reinforces the credibility of the product and enables client to determine the product suitability to their project.

### **Important information for Bolt Cap Sizing**

According to AS4100 clause 9.3 there are multiple categories for the design of bolts. Each category has unique requirements on the bolt characteristic including size and minimum tensile strength. While the Typhoon Bolt Caps are designed for the nominal outer diameter of the screw thread and there are significant differences in dimensions for each category, it is extremely important to address the bolt



size and standard required on the project. The relevant Australian bolt standard must be referenced when ordering the system (Eg. AS12521.1 or AS1111.1) so that the correct products can be arranged.

### Conclusion

Fire protecting components with complex profiles is always a challenge and sometimes a “one-for-all” approach is unlikely to be the most effective solution. The Typhoon Bolt Cap certainly provides the project design team an alternative path to counteract these issues and therefore allow greater flexibility for the construction sequencing.

For any further information please contact the Permax technical support team.