

DuPont™ Zytel® replaces metal for tough and durable roof clip



Stevenage, January 2007. A new roof clip, developed by injection moulders Koves Plastic Industries Ltd. of New Zealand, is made of glass-reinforced DuPont™ Zytel® nylon, which was selected for its strength and durability. An integral part of the 'Dimondek 630' concealed fixed roofing profile from Dimond, the Zytel® clip replicates the strength of its metal predecessor whilst offering numerous additional benefits in terms of ease-of-use and long-term performance. Its use in the 'Dimondek 630' roofing system has facilitated the deployment of much longer lengths of single sheet roofing – in some cases over 60 metres – on commercial buildings in New Zealand. Koves Plastic Industries won the Bronze Award in the Building Category for its development of the Zytel® roof clip at the Plastics New Zealand Design Awards in October 2006.

Using roofing profiles such as the 'Dimondek 630', developed by New Zealand roof manufacturer Dimond, sheets without step joints can be manufactured onsite at record-breaking lengths. The current New Zealand record for a single length of steel roof sheeting, using 'Dimondek 630', stands at 65.5 metres, used on the roof of a fresh-produce distribution facility belonging to Turners & Growers Ltd, Christchurch. Yet as the roofing sheets have lengthened, so have the requirements for a fixing technology that could ensure the strength and durability of the Dimondek 630 system: "When using metal clips with long sheets of 'Dimondek 630', we encountered a number of issues including lateral stretching during installation, interference between the screw heads holding the clips to the roofing structure and the roofing profile during its thermal expansion

and contraction, as well as the potential for significant wear at the point of engagement between the roof and the sharp edges on the metal roof clip,” explains Ian McClew, Innovation Manager at Dimond.

In its quest for a solution, Dimond turned to Koves Plastic Industries Ltd., a plastic injection moulding company offering precision engineering components and non-metallic solutions, in March 2005. Providing extensive knowledge of the DuPont portfolio of high-performance engineering polymers, Koves worked with DuPont in overcoming initial concerns at Dimond regarding the durability and tensile strength of polymer clips versus their metal counterparts, particularly at sub-zero temperatures.

As a result of extensive support from DuPont New Zealand, including material selection and laboratory testing on the material flow in moulded components to assess their strength, Koves was able to produce a clip made of glass-reinforced Zytel® with a load bearing ability of 5.4 kN (kilonewtons), representing a safety factor of four – twice Dimond’s original specification. The clip’s centre wall, side ribs and base are also optimized to achieve maximum tensile strength and avoid lateral movement, at the same time facilitating the thermal expansion and contraction of the roofing profile. A patent covering its design and production has been applied for in New Zealand and Australia.

The use of carbon-black-free Zytel® avoids corrosion issues with the zinc aluminium coated steel roof, while wear on the roof caused by the clips is reduced due to the lack of sharp edges on the plastic clip. Meanwhile the locations where the clips are screwed onto the roof structure are carefully defined to avoid screw-head interference with the steel roofing profile.

In terms of its strength and ability to cater for the ground-breaking sheet lengths made possible by Dimondek 630, the new Zytel® clip system has enjoyed considerable success: “The development of the plastic clip for our Dimondek 630 roof system has enabled us to specify 65 m lengths of metal roofing on several key projects completed to date. We can even recommend the system for roof lengths up to 100m without the concern that the clip will wear away the roof sheet due to thermal expansion and contraction, and without the need to set up a manufacturing process to form a complicated metal clip to deliver the same performance,” summarises Ian McClew.

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EP-EU-2007-01

January 2007