Aluminum composite panels used on building exteriors have a plastic core that contains fire-retardant fillers. To make these compounds easier to process, a silicone additive, GENIOPLAST® Pellet S, is added.
It’s a difficult conflict to resolve: although safety is one of our basic human needs, we generally do not want to be made aware of safety precautions. Safety should be a given and, ideally, invisible. Take fire safety, for example: while fire extinguishers, smoke detectors and sprinkler systems convey a sense of security when we see them, they also remind us that the potential danger is real, and taint our sense of security with ambivalence. Fire safety is not the only requirement that needs to be met in building construction – energy, design and economic factors have to be harmonized as well. In modern building construction, aluminum composite panels have become an established component of exterior surface design. Their advantages are obvious: they are easy to transport and process, and can be incorporated into virtually any design through the use of appropriate exterior coatings. They also stand up to inclement weather, and with an insulating layer, they act as a thermal barrier.

**PLASTIC CORE FOR INSULATION**

Yet this is where a particular challenge presents itself: in order to ensure that the aluminum panels do not act as a cold bridge and encourage heat loss, an insulating plastic layer is sandwiched between two aluminum layers. This layer, which is typically made of polyethylenes, thermally separates the two outer panels from one another. Polyethylenes, however, are flammable. To ensure that the panel’s fire-safety characteristics...
Pelletized GENIOPLAST® silicone additive with a silicone content of 70%.

Compounds are used wherever pure plastics do not possess the desired properties.
Plastic compounds comprising polyolefins, fire-retardant additives and GENIOPLAST® Pellet S, used for for example for cable sheathing, release less heat upon combustion than do compounds without a silicone additive.

Ethylenevinyl acetate and polyethylene compound with 60% aluminum trihydroxide added
2% GENIOPLAST® Pellet S
is added to the compound

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An English-language video describing the performance of GENIOPLAST® silicone additives can be found here:
www.wacker.com/genioplast

Calorimetry of Cable Compounds

Development engineer Oliver Fuhrmann observes the discharge of molten compound into the water quench. Thanks to GENIOPLAST® Pellet S, the highly filled material leaves the extruder die without any die drool whatsoever – despite the tremendous pressure and heat applied.

The silicone pellets are poured into a gravimetric dosing station where they are combined with flame-retardant fillers such as aluminum trihydroxide and a thermoplastic polymer such as polyethylene or polypropylene. The materials are compounded to form a homogeneous mass.

The silicone compounds being stoked any further and reduces the formation of hazardous smoke.

ENHANCED FIRE-PREVENTION PROPERTIES
Cone calorimetry – an important test method for fire performance – shows that when a compound containing GENIOPLAST® Pellet S combats, the release of heat is spread out over a longer period of time, the peak value of heat generation drops, the overall heat output is reduced and less smoke is formed. This is due to the ash, which is more compact and less brittle, and which deposits on the burning material as a crust. “The combustion residue of compounds containing GENIOPLAST® Pellet S prevents polymer oxygenation and heat transfer,” Pohmer explains. “Both effects help prevent fires from spreading rapidly.”

GENIOPLAST® Pellet S thus does an excellent job of intensifying the effect of flame-retardant fillers such as aluminum trihydroxide. This, along with its ability to simplify processing, makes GENIOPLAST® Pellet S an ideal additive for highly filled polymers designed to impede the impact of fires. These are two real advantages – one increases efficiency in production, the other can save lives.

What’s more, when integrated into aluminum composite panels used for siding, GENIOPLAST® Pellet S even makes fire protection invisible.