

Case studies about electronics potting get FAST coverage

The July 2013 issue of [FAST magazine](#) hit my desk this morning – another bumper issue chock full of information about fastening & assembly solutions and technology. It is great to see editor Paul Gay devote a full page to some of our successful recent case studies – [Potting compound goes under the sledge hammer at Tough Tracker](#) and [We pot the green for Variohm with custom thermal potting compound](#). Thanks, Paul!

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FAST JULY 2013

FASTCASE STUDY

Compound goes under the hammer

Tough Tracker was established to counter the scrap metal market problem of not knowing where skips are located if they get lost or stolen. Electronic tracking devices are the modern answer for this problem but they need to be both robust and have a good battery life.

The Tough Tracker solution was developed with a casing made from a Formula 1 grade composite material, which is stronger than steel. This was used to house a combination of a GPS satellite positioning system, quad band GSM transmitter with cell location function, anti-jamming technology and a 3-axis accelerometer for ultra-sensitive motion detection. The complete unit then needed to survive extremely aggressive testing exemplified by a two minute battering with a sledge hammer – ably demonstrated on Tough Trackers' website video (www.toughtracker.com/how-it-works/the-smash-test).

Naturally the whole shooting match has to be protected from shock with a potting compound. Originally, a polyester potting



The casing is made from a Formula 1 grade composite material, which is stronger than steel

compound was tried to protect the electronics but its uneven cure lead to exothermic hot spots and shrinkage which caused component damage. Whilst inexpensive, the polyester was hard and not sufficiently shock proof, shattering under impact testing.

Developer James Bryan explained: "Tough Tracker is a new company – just two years old – and had spent the first year in research and development, so we needed a can-do attitude at

reasonable cost. When we started to look for something more resilient for our potting compound we found Intertronics by word of mouth recommendation and they have exactly met our needs."

Intertronics product specialist Simon Gibbs listened to these requirements and suggested IRS 3071, a semi-rigid, room temperature curing polyurethane resin system specifically designed for the cost effective encapsulation

of a variety of low to medium voltage electrical and electronic applications. The system is medium viscosity, flame retardant to UL94 V-0 at 6mm and has excellent adhesion to a wide range of substrates as well as being resistant to UV, water based cleaning chemicals, motor oil, lubricants and most dilute acids and alkalis.

The potting compound is crucial to performance of the Tough Tracker and has been found to be waterproof, impact and thermally resistant, and easy to work with. Importantly, its electrical transmission characteristics allow the tracking signals, whilst its fire retardant specification also helps with equipment fire proofing.

It has also been found that IRS 3071 works well in production, saving wastage of PCBs and enhancing performance in service.

A custom metering, mixing and dispensing machine was also supplied by Intertronics, which ensures production efficiency and the consistency of performance essential to reliability of the Tough Tracker unit. Purchase of the machine allowed Tough Tracker to purchase bulk quantities of the potting compound, which led to material savings.

Application of the Tough Tracker technology has now expanded into security of farm machinery, vehicle trailers and perimeter gate alarms. Recently the company was a finalist in the prestigious EIC Energy and Innovation Awards for Best Asset Security Innovation – a significant tribute to the enthusiasm the company has as well as its use of advanced technologies to solve a simple low technology problem. FAST understands that field experience now calls for ballistic testing which is envisaged with a range of weapons from shotguns to 0.50 calibre rifle – we await the results with interest!

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Potting the green for Variohm

In setting up a new production project for in-house potting of temperature probes the engineers at Variohm considered a number of well-known industry standard potting compounds but

ended up calling in the materials specialists at Intertronics.

Ben Moffat, project engineer at Variohm, was looking for a potting compound that would give them the best thermal conductivity combined with an extended pot life at room temperature. And it needed to be as free flowing as possible to fill the very small cavities in the Variohm M4 to M10 sized thermistor and thermocouple probes. These can typically work at over 100°C and can be called on to work at temperatures of 200 to 300°C – so very high temperature capability was needed as well.

Intertronics sales manager

Kevin Cook suggested Polytec TC 437, a boron nitride filled thermally conductive epoxy which cures at room temperature with a two hour pot life and low viscosity. Moffat commented: "With Polytec, we have about three times the pot life we had before and the bubbles rise to the top so we can pretty much do what we want with it. Kevin and the team at Intertronics provided a selection of dispensing tips and were helpful in guiding us through the trials process, so that now it is quite quick and clean."

"Polytec TC 437 is now our preferred material, especially for the high performance and difficult assemblies," he added.



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