



EFFECTIVE COLLABORATION RESULTS IN **IMPROVED HOT MELT ADHESIVES** FOR HARD-TO-BOND SUBSTRATES

A targeted approach to challenges facing hard-to-bond substrates leads to excellent bonding with maintained performance for adhesives formulators in the market



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Imagine what's next



Bad bonding can often result in packages opening during transportation and storage



Bonding maize and wheat flour bags, which have a coated surface, posed a problem for hot melt adhesives

Strong foundations: identifying the challenge

“Two heads are better than one”, the saying goes, and this was certainly the case when Nortec, a leading industrial adhesives and chemical applications company serving the South African market, sought help with hot melt adhesives (HMA) formulations from Dow Elastomers. Expertise in polymer science from Dow Elastomers combined with Nortec’s formulation capability led to a solution that helps address specific bonding challenges faced by downstream customers.

While already pleased with the performance of formulations based on AFFINITY™ GA Polyolefin Elastomers (POEs) from Dow, Nortec’s customers were experiencing specific adhesion problems with hot melt adhesives on some coated substrates, such as maize meal, wheat and sugar bags, where bonding of dense, highly calendared papers is required.

Existing hot melt adhesives for hard-to-bond substrates are typically based on maleic anhydride (MAH) grafted wax or SIS/SBS formulations that only address a portion of the overall market. With growing popularity of these substrates in line with the call for enhanced functionality and aesthetics for packaging applications, the cost and availability of incumbent solutions is driving the need for alternative formulations.

The challenges with hard-to-bond substrates

- Low surface energy substrates such as Polyethylene (PE) and Polypropylene (PP)
- Low porosity or low surface roughness substrates such as coated papers for functionality or aesthetics
- Substrates with short fiber length due to the high content of recycled material
- Incumbent solutions only meet a portion of the growing demand for hard-to-bond substrates

Filling the void: a solution

After several months of intense collaboration and customer trials, a solution for hard-to-bond substrates was formulated with AFFINITY™ GA 1000R, a new MAH-grafted low molecular weight ethylene-octene copolymer from Dow.

“We saw a remarkable improvement in the adhesion of difficult substrates with AFFINITY™ GA 1000R,” says Jay Naidoo, Technical Executive from Nortec. “Adding five to twenty percent of AFFINITY™ GA 1000R gave improved penetration and fiber tear with various substrates that exhibited poor bonding before.” The new formulation is now available from Nortec in their METABOND™ line of specialty hot melt adhesives for packaging applications as METABOND™ GAH 2000 and 4000.

Extended trials of these new adhesive formulations based on AFFINITY™ GA 1000R at Nortec as well as other customers have shown no discernible variations in how the adhesives run on production lines offering downstream customers a hassle-free, easy-to-implement solution on existing lines.

Additionally, hot melt adhesives based on AFFINITY™ GA 1000R exhibit excellent heat stress enabling the package’s bond to remain secure across a wider range of temperatures and thus reduce the number of rejects and re-packs.

“Collaborative efforts like we see here are a great demonstration of what we can achieve using our technical know-how and dedicated customer support to address challenges evident in the market.”

Pierre Burelli,
EMEA Commercial Director, Dow Elastomers





Both companies committed to innovation: stronger, together

Of course such developments take time to evolve and need commitment from both sides. Jay Naidoo cites the flexibility, availability and commitment of Selim Yalvac, Senior R&D Manager for Dow Elastomers, as a key to the success of the project.

“It makes such a difference when you know your raw material supplier is on your side and truly understands the challenges you face,” he added. “We started working with Dow Elastomers in 2009 and they have been a cooperative and supportive supplier since. Selim’s extensive knowledge and relationship with us has been particularly critical to our success in finding a solution for hard-to-bond substrates.”

“When we heard there were challenges in hard-to-bond substrates, we worked swiftly to identify the problem and then working with Nortec and others, we developed chemistry to help solve the challenge,” explained Selim.

“We’ve been able to develop a product that not only matches the specific performance requirements for these substrates but also enhances an already successful product range.”

Delivering from the very beginning

AFFINITY™ GA 1000R is one of the latest innovations in the family of AFFINITY™ GA Polyolefin Elastomers (POEs) from Dow Elastomers. AFFINITY™ GA POEs were the first products of their kind for hot melt adhesives and were developed using INSITE™ technology, a proprietary catalyst technology from Dow that helps make it possible to control molecular design with precision. Building on this established technical expertise, AFFINITY™ GA 1000R offers a tailored solution for hard-to-bond substrates combined with the demonstrated performance advantages found across the AFFINITY™ GA family of polymers.



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AFFINITY™ GA 1000R features and benefits

Features	Benefits
MAH-grafted polymer	Excellent bonding for hard-to-bond substrates
Formulation flexibility	In combination with other AFFINITY™ GA Polyolefin Elastomers, can achieve excellent bond strength in low application temperature hot melt adhesives
Excellent heat stress	Maintains a secure seal across a range of temperatures for increased package security throughout storage and transportation
Outstanding processability with virtually no smoke or odor	Reduced maintenance and increased productivity on production lines
Drop-in replacement	Easy and efficient implementation



Customer testimonials

Charl Viljoen

Production Manager, Johnson Tiles a Division of Norcros SA (Pty) Ltd

Johnson Tiles previously used METABOND GAH 315 H adhesive in their packaging of ceramic tiles. Since moving to METABOND GAH 4000, which now uses the new MAH-grafted AFFINITY™ GA 1000R polymer, they are seeing significant performance benefits.

“Since we changed to METABOND GAH 4000, we had zero downtime and big smiles on the faces of the production and engineering guys. The product sets very quickly and our lines and nozzles remain very clean. The new product also runs at a lower temperature setting on our machine. We are very impressed with the performance of the METABOND GAH 4000 product.”

Corrie Swart

Packing Manager, Kromdraai Best Milling

Kromdraai Best Milling was looking for an alternative solution for their packaging line of flour bags. After trialing the METABOND GAH 4000 adhesive, they opted to select the packaging-focused METABOND GAH 2000 – a formulation with greater weight percentage of AFFINITY™ GA 1000R – which gave them the excellent bond strength and heat stress they required.

“On 21 February 2012, I gave Gavin Smith, Technical Sales Representative, Nortec, permission to trial METABOND GAH 4000 on the 12.5 kg flour packing line. Initial bonding looked good, but after three weeks I noticed there were some bags opening after three weeks of storage. On 16 May 2012, trials were conducted with METABOND GAH 2000, three pallets were completed and left in storage for approximately four weeks. On 13 June 2012, the pallets were checked and I found no open bags at all. Bonds were very good and I was happy with the product. I then gave Gavin the permission to conduct bulk trials for transportation tests.”



Nortec produces tailor-made adhesive and chemical solutions designed to meet adhesive needs

About Nortec

Nortec (previously known as TAL Industrial Adhesives), a division of Norcros SA (Pty) Ltd, produces tailor-made adhesive, chemical solutions designed to meet adhesive needs. The company also manufactures tiling installation materials for the building and construction sectors. For more information, visit: www.nortec.co.za.

*METABOND™ is a trademark of Norcros SA (Pty) Ltd

About Dow

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Dow Elastomers offers a distinct portfolio of products, allowing participation in a wide range of market segments and applications, including innovative products for adhesives with enhanced processability and improved performance. The business is focused on offering innovative solutions to customers through new applications, differentiated offerings and tailored services and dedicated technical and processing experience on all continents. For more information: www.dowelastomers.com.



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North America	
U.S. & Canada	1-800-441-4369
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Mexico	+1-800-441-4369
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Argentina	+54-11-4319-0100
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