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BREAKTHROUGH WITH TWO-PART ELASTOMER, SAYS CHEMTURA

Larger, intricate polyurethane elastomer parts are now much easier to mould

*Report by **Liz White, editor***

A new two-component elastomer system from Chemtura Urethanes will raise the game for polyurethane moulders, offering the ability to mould larger and more complex parts, with much longer pot life than previously possible, less waste, faster demoulding and higher productivity.

"Adiprene Duracast was really developed as an alternative product to some of our conventional and low-free TDI (toluene diisocyanate) products," for hot-cast elastomers, according to Matt Hellstern, vice president of Chemtura's urethanes business.

But the beauty of the new two-part material based on MDI (methylene diphenyl diisocyanate) is that it "allows us an opportunity to work very closely with our customers and focus on growing their business," Hellstern said. "It is not just about replacing one product with another product, it is really about leveraging a new technology that enables them to enter new markets that previously have been off limits to them," he added enthusiastically.

"Before, you were unable to mould or manufacture products out of urethane due to size or complexity," he explained, adding that now users can manufacture such parts and grow their business – "that is really exciting for me going forward," he said.

This will be a real spur to growth in the overall PU elastomer market, he stressed.

Longer pot life, faster demould

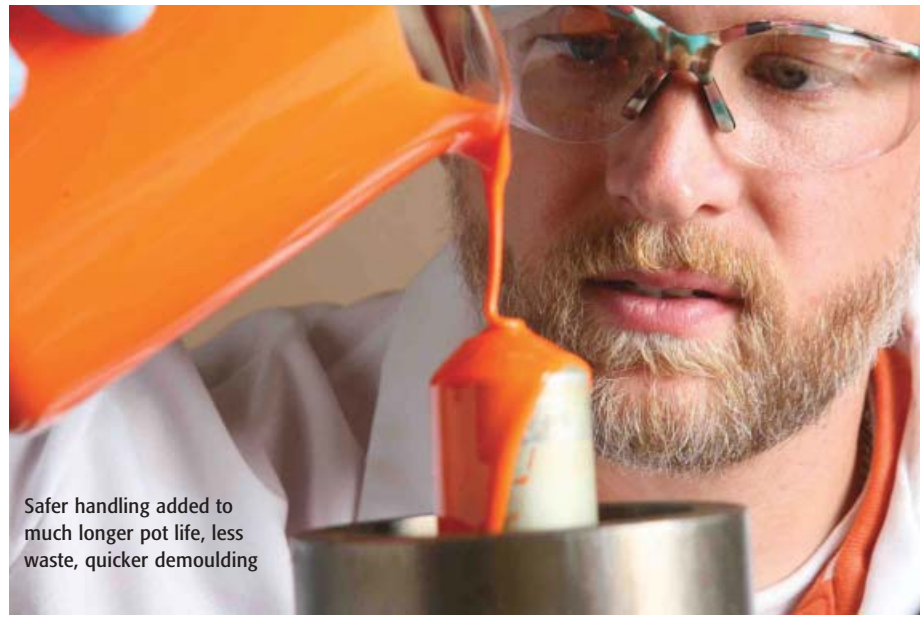
Duracast offers several advantages, including "substantial cost saving to the process in terms of waste reduction and the ability to process with a much, much longer pot life," Hellstern emphasised. This enables processors to make more parts with quicker demoulding, so productivity increases substantially, he added.

Using the proprietary Duracure curative, processors can mix the prepolymer and curative "and actually take their time in pouring the parts – and then you have a much faster demould as well," Hellstern pointed out, in a 19 Aug telephone interview on the new material.

This is in contrast to traditional two-part processes (see box p 31, opposite).

"When you look at the curing time and the demould time together you have a much quicker process," he added.

Chemtura is keeping the details of the curative quiet at present, but, "we can certainly say that it is not MOCA (methylene bis-2-orthochloroaniline) or BDO (butanediol) [conventional elastomer curatives]," said Phani Nagaraj, global marketing manager for Chemtura Urethanes.



Safer handling added to much longer pot life, less waste, quicker demoulding

"There is no question, I would regard it as a breakthrough technology," Hellstern said, listing other advantages of reduced waste and "along with this comes … some EH&S (environmental, health and safety) advantages as well. It is a "much safer handling alternative to the MOCA that many processors use today."

The properties of the finished product are also, "in many cases superior to what processors can achieve today," Hellstern added.

"When you look at the performance attributes of the finished product. the cost advantages for the processors, the processing ease, the EH&S advantages, we believe that overall we have a much better solution to offer processors for many applications," he stresssed.

With the extended pot life, "again you reduce the scrap rate or increase the yield depending how look at it. You don't have to throw out so much prepolymer, but on top of that it really enables you to now pour much more intricate or much, much larger parts than previously any processor had the capability of doing," he claimed.

'A few grams to 10 000 lb'

"You can pour anything from a few grams to something that is 10 000 lb [4.5 tonnes] without any issues of pot life," explained Vimal Sharma, Urethanes Industry & Strategy Leader, Americas, for Chemtura Urethanes. And in contrast to what happens when pouring some parts with short pot lives, where, "you have swirling and

Table 1 Property comparison of Adiprene Duracast E950/Duracure C3

Material	Duracast E950/ Duracure C3	L167/MOCA	B836/BDO
% NCO of prepolymer	5.0	6.3	8.85
Type		TDI/Ether/ MOCA	MDI/Ether/ Butanediol
Pot life (70°C)	Several hours	<20 min	<20 min
Pot life (>70°C)	>10 min (90°C)	6 min (85°C)	5 min (80°C)
Hardness, Shore A	96-97A	95	95A
100% Modulus, psi	1700	1800	1345
300% Modulus, psi	2250	3400	2365
Tensile strength, psi	4200	5000	5460
Elongation at break, %	480	400	460
Tear strength, Split, pli	155	150	15
Bashore rebound, %	55	40	60
Compression set, Method B (2 h, 70°C)	28	40	30

Matt Hellstern: "innovative technology is the way to fuel growth."

well marks – you won't get any of that with this product," Sharma added.

Nagaraj also said that processors will not need expensive hardwear or machines to make products with Duracast.

Chemtura also thinks the MDI-based product may help counteract the "pricing volatility seen in both TDI and MOCA over the past several months … we believe that over the long term we will have much better stability around pricing," Hellstern said.

As well as "greater stability with respect to pricing over the long term for MDI products," Nagaraj said that everyone also recognises that MOCA "is in a situation where right now when the product is in very high demand and product availability from time to time is a question."

Elastomer uses wide open

"One of the main reasons that I am so excited about the Duracast line is that … our customers or potential customers now have a brand new ability to grow their own business," Hellstern commented. In potential uses, he said, "the sky's the limit; you could take a look at any type of elastomer product right now … and make it with this technology."

Comparison of total cost and attributes

Best Better Acceptable

	Adiprene Duracast	TDI / MOCA	MDI / BD
Total cost in use			
Raw material price stability			
Mfg efficiencies			
Processing ease			
Scrap rate			
EH&S			
Part to part consistency			

Nagaraj commented that,"You could use it in every single application that urethanes are used in right now, you could go to belting, tyre and wheel, rollers, you name it, you could use this product in similar applications,"

Chemtura's customers can enter markets they were prevented from going into in the past, "opening new doors and opportunities," said Hellstern, adding that, "we intend to work with our customers on existing and new applications," for this technology.

Duracast's availability is likely to "increase the size of the pie. … Our focus is to fuel the growth of our customers by providing a unique innovative technology … help them elaborate this technology to grow their business, and then we grow as a result of that," he said.

Discussing the general economic situation, Hellstern said "I think the overall elastomer business is very much tied to some of the manufacturers of seals and as such we have seen some softening with respect to the economy. You don't have the robust growth that all of us would like to see in the marketplace." But Chemtura believes innovative technology to fuel growth is "the way to continue to grow moving forward."

BATCH PROCESSING SIMPLE...

Four steps for Adiprene Duracast processing
1 Roll Duracure drum;
2 Blend Duracast/Duracure in tank or hand mix;
3 De-gas until head breaks (29in Hg); and
4 Pour into hot mould and cure .

SEMI CONTINUOUS METHOD

- Mixing occurs in the mixhead
- Prepolymer temperature is higher (ca. 90°C).
- Higher productivity than batch process is possible with machines using Duracure C2.

...TRADITIONAL METHOD

- Melting or warming (degassing) of prepolymer and curatives;
- Metering and mixing, dispensing into the mould, curing, demoulding, post cure and finishing;
- Prepolymer/curative weights must be correct;
- Temperature of prepolymer and curative are important to control pot life;
- Mixing is critical to produce good parts; and
- Moulds must be filled rapidly before gel forms.