Fact Sheet – AFFINITY™ GA Polyolefin Elastomers

AFFINITY™ GA Polyolefin Elastomers (POEs) are a line of highly versatile polymers developed for hot melt adhesive (HMA) formulations and a range of polymer modification applications. AFFINITY™ GA POEs:

- Were developed using INSITE™ Technology, a proprietary technology from Dow that makes it possible to control molecular design with precision and predictability.
- Are the first products of their kind.
- Are an example of Dow's broad portfolio of highly valued flexible material solutions that deliver performance, productivity, cost advantages, and market differentiation.

About AFFINITY™ GA POEs

- AFFINITY™ GA POEs are characterized by novel chemistry that combines high flow, low crystallinity, and low molecular weight.
- The one-of-a-kind balance of AFFINITY™ GA POEs allows processors and formulators to achieve:
  - HMA formulations that stick better
  - Higher flow in thermoplastic polyolefins (TPOs)
  - Blends that are more flexible and durable

Affinity GA
POLYOLEFIN ELASTOMER

- In HMA formulations, AFFINITY™ GA POEs provide performance, processing, and end-user advantages not previously achievable with conventional formulations, such as those based on ethylene vinyl acetate (EVA) or styrenic block copolymers (SBCs). AFFINITY™ GA polymers are capable of adhering to many substrates over a broad range of temperatures.
- With no oxygen in their backbone, AFFINITY™ GA POEs are more thermally stable for clean-running HMA applications. This allows users of AFFINITY™ GA POEs to reduce the common problems of odor, gelling, and machine wear and tear that are experienced with standard HMA formulations.
- The low density and viscosity of AFFINITY™ GA POEs allow for better processability, attractive cosmetic appearance, and aggressive bonding across many different substrates. Applications include case and carton sealing, multi-wall structure fabrication, nonwoven construction, and food and beverage packaging.

Property Ranges

Dow currently offers commercial quantities of four AFFINITY™ GA Polyolefin Elastomers as shown in Table 1.

Value Benefits

AFFINITY™ GA POEs deliver a number of processing and performance advantages for HMA applications, including:

- More powerful bonds across a wider range of service temperatures for increased versatility
- Virtually no char, discoloration, or odor during application
- Less plugging, clogging, or other oxidation-related equipment problems, resulting in reduced maintenance
- Significantly reduced angel hair and spider webs, precise bead size and placement, and clean cut-off for increased production utilization and less maintenance
- More adhesive and increased coverage per pound (kg) of resin

Table 1: AFFINITY™ GA POE Product Family[1]

Polymer	AFFINITY™ GA 1875	AFFINITY™ GA 1900	AFFINITY™ GA 1950	AFFINITY™ GA 1000R
Density, g/cm³	0.870	0.870	0.874	0.878
Brookfield Viscosity @ 350°F (177°C), cps[2]	6,700	8,200	17,000	13,000
Approximate Melt Index, g/10 min (190°C, 2.16 kg weight)[3]	1,250	1,000	500	660
DSC Melting Point, °F (°C)[4]	158 (70)	154 (68)	158 (70)	154 (68)
Crystallinity, %[4]	22	16	18	20
Glass Transition Temperature, °F (°C)[4]	-71 (-57)	-72 (-58)	-69 (-56)	-72 (-58)

[1] Data per tests conducted by Dow. Test protocols and additional information available upon request. Properties shown are typical, not to be construed as specifications. Users should confirm results by their own tests.
[2] ASTM D1084
[3] Value is approximate; points are outside normal testing range.
[4] Dow Method. Test protocols and additional information available upon request.

®™Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow

About Dow

(NYSE: DOW) combines the power of science and technology to passionately innovate what is essential to human progress. The Company connects chemistry and innovation with the principles of sustainability to help address many of the world's most challenging problems such as the need for clean water, renewable energy generation and conservation, and increasing agricultural productivity. Dow's diversified industry-leading portfolio of specialty chemical, advanced materials, agrosciences and plastics businesses delivers a broad range of technology-based products and solutions to customers in approximately 160 countries and in high growth sectors such as electronics, water, energy, coatings and agriculture. In 2012, Dow had annual sales of $57 billion and employed approximately 54,000 people worldwide. The Company's more than 5,000 products are manufactured at 188 sites in 36 countries across the globe. References to "Dow" or the "Company" mean The Dow Chemical Company and its consolidated subsidiaries unless otherwise expressly noted. More information about Dow can be found at www.dow.com.

For more information about AFFINITY™ GA Polyolefin Elastomers, visit www.stickingtoinnovation.com or call:

North America
U.S. & Canada 1 800 441 4369
1 989 832 1426
Mexico + 1 800 441 4369

Latin America
Argentina + 54 11 4319 0100
Brazil + 55 11 5188 9000
Colombia + 57 1 219 6000
Mexico + 52 55 5201 4700

Europe/Middle East + 800 3694 6367
+ 31 115 672626
Italy + 800 783 825

South Africa + 800 99 5078

Asia Pacific + 800 7776 7776
+ 603 7965 5392

dow.com
dowelastomers.com

The principles of Responsible Care® and Sustainable Development influence the production of printed literature for The Dow Chemical Company ("Dow"). As a contribution towards the protection of our environment, Dow's printed literature is produced in small quantities and on paper containing recovered/post-consumer fiber and using 100 percent soy-based ink whenever possible.

NOTICE: Any photographs of end-use applications in this document represent potential end-use applications but do not necessarily represent current commercial applications, nor do they represent an endorsement by Dow of the actual products. Further, these photographs are for illustration purposes only and do not reflect either an endorsement or sponsorship of any other manufacturer for a specific potential end-use product or application, or for Dow, or for specific products manufactured by Dow.

NOTICE: No freedom from infringement of any patent owned by Dow or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, the Customer is responsible for determining whether products and the information in this document are appropriate for the Customer's use and for ensuring that the Customer's workplace and disposal practices are in compliance with applicable laws and other governmental enactments. Dow assumes no obligation or liability for the information in this document. **NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.**

NOTICE: If products are described as "experimental" or "developmental": (1) product specifications may not be fully determined; (2) analysis of hazards and caution in handling and use are required; (3) there is greater potential for Dow to change specifications and/or discontinue production; and (4) although Dow may from time to time provide samples of such products, Dow is not obligated to supply or otherwise commercialize such products for any use or application whatsoever.

NOTICE REGARDING MEDICAL APPLICATION RESTRICTIONS: Dow will not knowingly sell or sample any product or service ("Product") into any commercial or developmental application that is intended for:
a. long-term or permanent contact with internal bodily fluids or tissues. "Long-term" is contact which exceeds 72 continuous hours;
b. use in cardiac prosthetic devices regardless of the length of time involved ("cardiac prosthetic devices" include, but are not limited to, pacemaker leads and devices, artificial hearts, heart valves, intra-aortic balloons and control systems, and ventricular bypass-assisted devices);
c. use as a critical component in medical devices that support or sustain human life; or
d. use specifically by pregnant women or in applications designed specifically to promote or interfere with human reproduction.

Dow requests that customers considering use of Dow products in medical applications notify Dow so that appropriate assessments may be conducted.

Dow does not endorse or claim suitability of its products for specific medical applications. It is the responsibility of the medical device or pharmaceutical manufacturer to determine that the Dow product is safe, lawful, and technically suitable for the intended use. **DOW MAKES NO WARRANTIES, EXPRESS OR IMPLIED, CONCERNING THE SUITABILITY OF ANY DOW PRODUCT FOR USE IN MEDICAL APPLICATIONS.**

This document is intended for global use.
Published October, 2013.
© 2013 The Dow Chemical Company

®™Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow
®Responsible Care is a service mark of the American Chemistry Council. Dow is a partner in the American Chemistry Council Responsible Care initiative.

Form No. 258-12001-1013 SMG
SMG 12521