



# DSM develops a connector material safe for home appliances worldwide

DSM Engineering Plastics continues to lead the way in the plastics industry as we develop a product aimed at making home appliances safer. DSM has recently announced a new material for electrical components, **Akulon® SafeConnect**, which meets universal safety requirements and reduces fire hazards, contributing to safer homes around the world.

The home appliance industry has long exhibited the need for a material utilized in the production of appliance connectors that meet all needs globally. Seeing an opportunity to both simplify production for OEMs and improve safety for consumers, engineers at DSM Engineering Plastics began development on such a product.

After two years in development, DSM recently unveiled a material that exceeds the highest flame-resistance requirements of standards groups worldwide while also exhibiting the various required electrical properties. With specially developed Akulon® SafeConnect PA66 grades and EcoPaXX® PA410 grades, DSM now enables OEMs to meet the EN 60335-1 international standard on home appliance safety, as well as their own internal requirements.

This gives appliance manufacturers producing and selling in global markets the ability to simplify their supply chain by utilizing the same material for all connectors, wherever the appliance is sold.

	Competitor A PA 66	Competitor A PA 66	Competitor B PA 6	Competitor C PA 66	Akulon SafeConnect SC21	Akulon SafeConnect SC22	Akulon SafeConnect SC41	EcoPaxx Q-KS
Filler Content	Unfilled	25%	Unfilled	25%	Unfilled	25%	Unfilled	Unfilled
GWIT (raw material)	825°C (0.45mm)	825°C (0.75mm)	825°C (0.38mm)	850°C (0.7mm)	<b>960°C (0.4mm)</b>	875°C (0.4mm)	<b>960°C (0.4mm)</b>	<b>960°C (0.75mm)</b>
UL V-0 @ mm	0.4mm	0.4mm	<b>V-2 (0.38mm)</b>	v-0@0.7mm v-2@0.4mm	0.4mm	0.4mm	0.4mm	0.4mm
CTI > 400V (IEC60112 compliance)	250V ( <b>UL746*</b> )	400V ( <b>UL746</b> )	300V (IEC60112)	400V ( <b>UL746</b> )	250V (IEC60112)	<b>300 (IEC60112)</b>	450V (IEC60112)	<b>600V (UL746*)</b>
RTI Ele @ 0.4 mm	120°C	130°C	130°C (0.38mm)	130°C (0.5mm)	125°C (0.4mm)	<b>140°C (0.4mm)</b>	Under test	130°C (0.4mm)
Halogen Free Bio Based								<b>X</b>
*CTI UL746 test result is normally 50-100 Volts higher than IEC60112 test								

DSM outperforms competitors in every category

With the growth of the Internet of Things (IoT), consumers are increasingly able to remotely control electrical and electronic devices in their homes from their smartphones and tablets. The 2017 Consumer Electronics Show (CES) in Las Vegas showcased numerous new smart appliances that will soon be a part of the connected home.

Consumers may have virtual connections to their smart appliances, but the appliances themselves still need actual electrical and electronic connectors. If designed poorly, these connectors can increase the risk of electrical failure, with potentially serious consequences.

According to the U.S. Product Safety Commission (CPSC), more than 15 million appliances have been recalled in the past five years due to fire hazards. From 2006 to 2008, the CPSC added, appliances were responsible for more than 150,000 residential fires each year, resulting in 3,670 injuries, 150 deaths, and \$547 million in property damage.

Although performance requirements for appliance connectors are universally getting stricter, regional differences create varying standards. As a result, connectors fitted to equipment sold in one regional market are often made from a different material than those on equipment sold in another market. Thus, a need emerged for a material capable of meeting all global regulations.

Because DSM has been committed to developing plastics for use in appliances for decades, and its materials are already widely used in the sector, they were prepared for the challenge.

In close cooperation with leading OEMs and connector manufacturers, DSM's innovative focus has led to the development of several materials that achieve the highest UL 94 flammability rating, V-0, at a thickness of just 0.4mm. This enables end products to pass the IEC 60695-11-10 glow wire test (GWT) without igniting at 850° C. The products also have a high Comparative Tracking Index (CTI) up to 450V.

## Connector CTI

### 250V

- housing unit required
- increased tracking distance
- higher production cost



### ≥ 400V

- housing unit not required
- decreased tracking distance
- lower production cost



A material with a higher CTI results in increased tracking resistance in the presence of moisture and particles, eliminating the need for a protective housing unit. A higher CTI also allows for minimized terminal spacing, permitting increased functionality in a smaller space. This design solution offers optimal safety while lowering production costs for manufacturers.

DSM is already offering three grades of Akulon SafeConnect that meet the universal requirements, with varying customer specifications. A halogen-free EcoPaXX PA410 is also available, and a further grade of Akulon SafeConnect is currently under development and evaluation.

In an age where phones, appliances and homes are getting smarter, DSM Engineering Plastics is continually researching, developing, and testing products to stay one step ahead. Wherever your business is heading, DSM can take you there.

### Contact us:

Want to learn about other connector applications that DSM offers? Or, do you want to share your challenge with us? Contact your local DSM office.

USA & Canada: michael.pilarski@dsm.com  
EU: leonardo.bertone@dsm.com  
Korea: daniel.lee@dsm.com

Japan: masaru.ueno@dsm.com  
Great China: lennon.chu@dsm.com  
SEA: siang-hock.quah@dsm.com

### DSM – Bright Science. Brighter Living.™

Royal DSM is a global science-based company active in health, nutrition and materials. By connecting its unique competences in life sciences and materials sciences, DSM is simultaneously driving economic prosperity, environmental progress and social advances to create sustainable value for all stakeholders. DSM delivers innovative solutions that nourish, protect and improve performance in global markets, such as food and dietary supplements, personal care, feed, medical devices, automotive, paints, electrical and electronics, life protection, alternative energy and bio-based materials. DSM and its associated companies deliver annual net sales of about €10 billion with approximately 25,000 employees. The company is listed on Euronext Amsterdam. More information can be found at or [www.dsm.com](http://www.dsm.com).