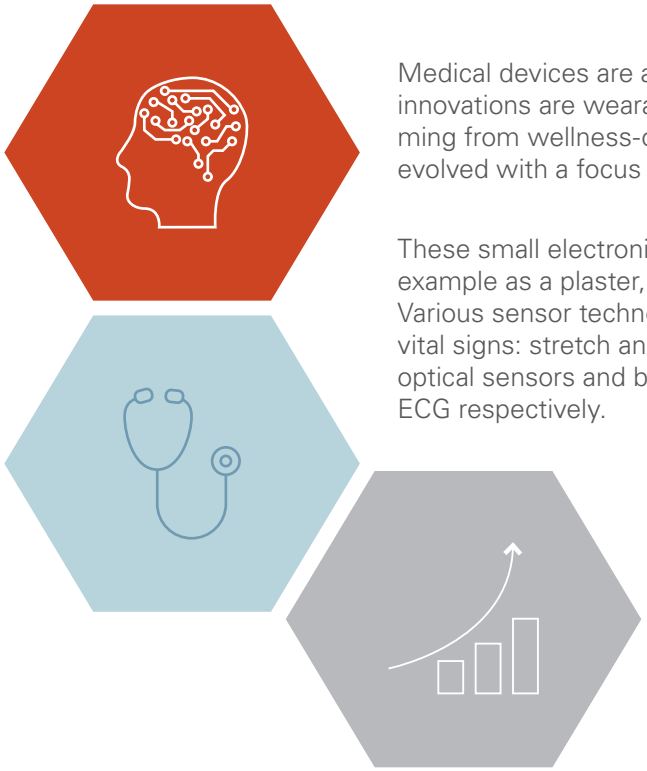
Biesterfeld
Competence in Solutions

Silicone-based skin-adhesives

UV-curable structural adhesives

Solutions for wearable medical devices

Spotlight Wearables



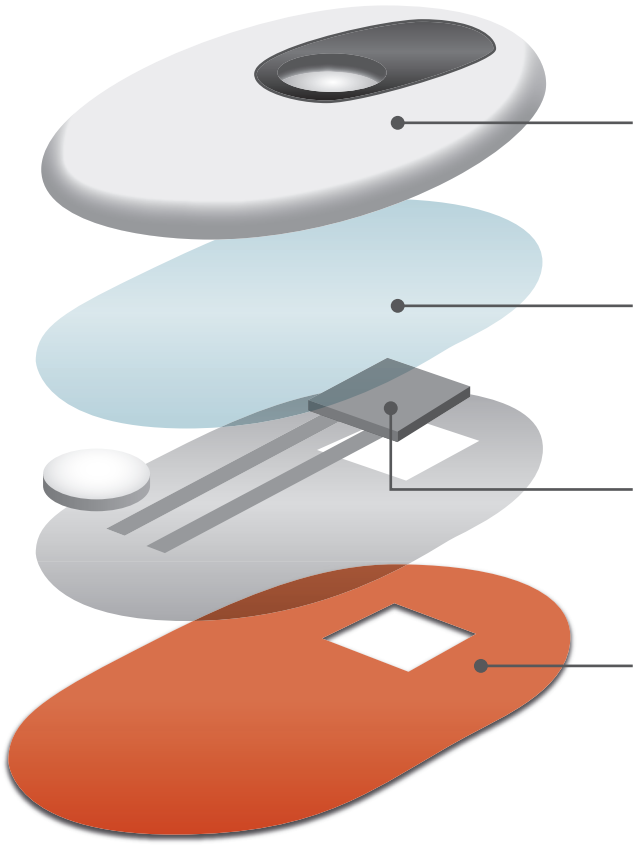
Medical devices are a continuously evolving technology. One of the newest innovations are wearable medical devices (also known as "wearables"). Stemming from wellness-oriented devices such as smart watches, wearables have evolved with a focus on healthcare applications.

These small electronic devices are designed to be worn on the body, for example as a plaster, and to collect health and exercise data from the patient. Various sensor technologies have been developed to track and record different vital signs: stretch and pressure sensors detect muscle contractions while optical sensors and bio-potential sensors monitor blood-sugar levels and EEG/ECG respectively.

The collected health information is then transferred to other devices, such as the patient's smartphone, or a doctor in real time. This technology enables remote outpatient care, long-term patient-provider interactions, testing and diagnosis capabilities, and even therapies.

Wearables are expected to have exceptional growth potential: it is anticipated that worldwide end-user spending on wearable devices will increase by over 49% by 2022.[1]

Wearables are complex medical devices built of several layers each with unique functionality depending on the application:



	BSC Solution
Wireless electronic Device	Dymax MD® UV-curable structural adhesives and PVB encapsulants
Base/ Cover Film	DuPont™ Liveo™ silicone elastomers or silicone elastomer membrane
Sensor	Individual sensor type according to application e.g. optical sensor or bio-potential sensor
Skin-Patch	DuPont™ Liveo™ silicone skin adhesives

[1] *Meghan Rimol, Gartner Forecasts Global Spending on Wearable Devices to Total $81.5 Billion in 2021 available online from Gartner, Stamford, US, January 12, 2021*

Dymax light-curable MD® adhesives and coating solutions for bonding, coating, and sealing medical electronics used in wearable devices and device applications:

Material ID	Unique material features	Recommended substrates
1181-M	Blue fluorescing adhesive for plastic and metals	ABS, PC, PCTG, PS, SS
1901-M	LED UV-curable coating with secondary heat cure	Flexible PCB, rigid PCB
1184-M-T-R	Red fluorescing adhesive with secondary heat cure	PI, PS, SAN, PCB
1184-M-B	Blue/black coloured, low-gloss conformal coating with secondary heat cure	PI, PS, SAN, PCB

Dymax MD® adhesives are used in a variety of applications including medical electronics, catheter, syringe, and tube set assembly.

- solvent free
- RoHS compliant
- USP Class VI and/or ISO 10993 bio-compatibility standards

DuPont™ Liveo™ silicone-based elastomers and membranes for stretchable and breathable base and cover films for printed electronics:

Material ID	Application area	Unique material features
Liveo™ C6 and Q7 LSR **Liveo™ C6 and Q7 HCR** **Liveo™ 7-4107 Silicone Elastomer Membrane**	› Cover film / base film › Spacer pads › Housing	› Stretchable, breathable film for printed electronics › Resilient silicone elastomer › Insulating silicone elastomer

- USP Class V & VI compliant
- <29-day Implant (exceeds USP Class VI)
- Q7 range meets USP Class VI, 90-day implant

DuPont™ Liveo™ silicone-based skin adhesives. PSAs and SSAs allow skin-friendly, non-sensitizing wearable device attachment with enhanced patient comfort:

Material ID	Application area	Unique material features
Liveo™ MG 7-9800 **Liveo™ MG 7-9850** **Liveo™ MG 7-9900**	Soft skin adhesives for gentle patch/plaster wear	› Gentle adhesion to skin › Atraumatic removal › Biocompatibility (non-irritating and non-sensitizing) › High gas and moisture permeability
Liveo™ MG-2401 **Liveo™ MG-2402** **Liveo™ MG-2502** **Liveo™ MG-2410**	Pressure-sensitive skin adhesives for secure device attachment	› High adhesion and conformity to skin › Adhesion for extended wear time › Biocompatibility (non-irritating and non-sensitizing) › High gas and moisture permeability

- USP Class V & VI compliant
- Cytotoxicity, Skin Irritation & Skin Sensitization in compliance with ISO 10993

Contact

Dr. Anna Geffken
Product Manager Medical Device
phone +49 40 32008-710
a.geffken@biesterfeld.com

Imprint

Published by:
Biesterfeld Spezialchemie GmbH – Healthcare
Ferdinandstrasse 41
20095 Hamburg

Phone: +49 40 32008-0
Fax: +49 40 32008-696
healthcare@biesterfeld.com
www.biesterfeld.com

Registered Office:
Hamburg, Commercial Register: AG Hamburg, HRB 66970, VAT-No. DE 196 930 661

Managing Director:
Peter Wilkes

Our raw material information, data and graphics were obtained from the records of our raw material suppliers.
Local availability of products might differ from country to country.

Biesterfeld
Competence in Solutions

Biesterfeld Spezialchemie GmbH
Ferdinandstrasse 41
20095 Hamburg
Tel.: +49 40 32008-0
Fax: +49 40 32008-696
www.biesterfeld.com
healthcare@biesterfeld.com

Publisher:
Biesterfeld Spezialchemie GmbH – HealthCare, Ferdinandstraße 41,
20095 Hamburg, Germany, Tel.: +49 40 32008-0, www.biesterfeld.com

Disclaimer:
We shall not be liable for the suitability of the goods for the purpose intended by Customer, unless the achievement of a certain outcome of the utilisation was expressly incorporated into the contract. Our advice, information or recommendations regarding application shall be provided to the best of our knowledge. As the actual application is beyond our scope of influence, and as the circumstances of such application are not completely foreseeable, written and verbal indications, suggestions etc. can only be provided on a non-binding basis. They shall in particular not release Customer from the obligation to examine our products and goods for their suitability with regard to the intended processes and purposes.

Mai 2021