Adhesives Research®

Solutions for Wearable Applications

Adhesive solutions that grip innovation

www.adhesivesresearch.com

Wearable Applications

As a global technology leader, Adhesives Research (AR) provides skin adhesion, connectivity, device assembly, and attachment solutions for a wide range of wearable monitoring, rehabilitation, and medical device applications, including ECG (Electrocardiography), skin temperature, respiration, pulse, blood pressure, body kinematics, glucose levels, and insulin dispensing. Our chemists and engineers are passionate about developing innovation-rich products that help our customers overcome challenging applications in meeting the demands of an ever-evolving wearables market.

Device design and assembly

Conductive bonding

Highly conductive transfer and double-coated tapes to solve X, Y, and Z-axis interconnection challenges for biosensors, defibrillators, and other electronics applications within a wearable device.

Device assembly

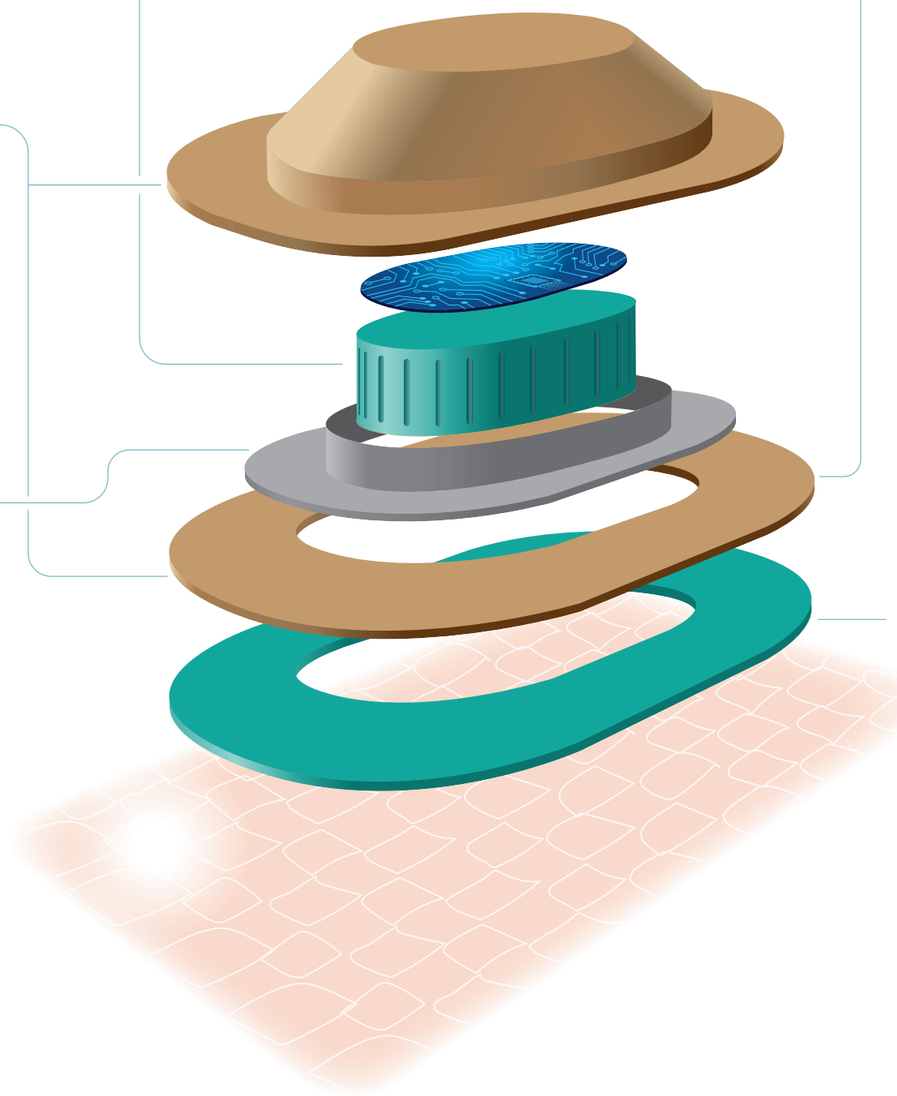
UV-curable liquid adhesives are designed for bonding to a wide variety of plastic, metal, and FR4 substrates. This patented technology minimizes residual monomers post-cure, enhancing biocompatibility and reduces the risk of skin irritation, making it ideal for the rapid assembly of medical sensors and wearable devices.

Space Management

Double-coated spacer tapes are used in biosensor devices to create channels with tailorable volumes and flow rates, accommodating a variety of substrate chemistries and surface energies. Our advanced manufacturing process, coupled with in-line measurement gauges, ensures precision in tape thickness and adhesive performance, guaranteeing optimal device functionality.

Process aids

Ultra-clean release liners and protective films to withstand extreme process conditions for medical device production with no chemical contamination.



Device attachment and skin bonding

Device attachment

Medical-grade device attachment tapes bond effectively to low surface energy (LSE) substrates like thermoplastic elastomers (TPE) without secondary curing, streamlining production by eliminating complex steps and specialized equipment. This simplicity and versatile application make these tapes an advantageous alternative to methods like heat staking or ultrasonic welding.

Skin bonding

Skin-friendly adhesives are specifically engineered for optimal compatibility with skin, offering adjustable wear times from a few hours up to 30 days. These advanced adhesive technologies are ideal for a range of wearable devices, from medical monitors to fitness trackers, providing comfort and reliability for extended wear.

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Technology Highlights
Device assembly – UV curable liquid adhesive

ARcare® A-5490

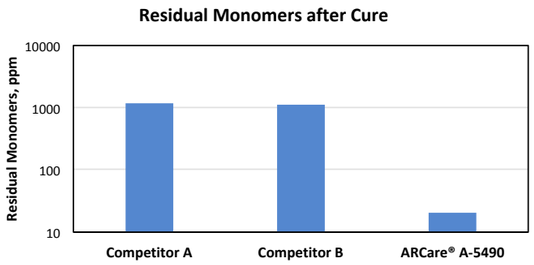
Key features:

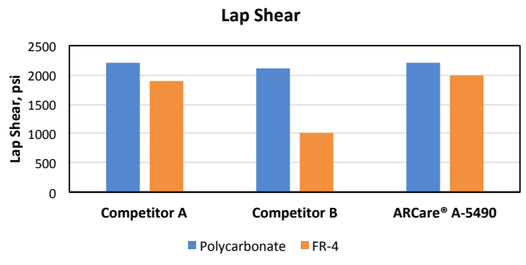
- ✔ Contains no reactive solvents and low outgassing when fully cured
- ✔ Cures effectively under UV-LED and UV-A irradiation (UVA energy higher than 0.369 (J/cm^2)
- ✔ Stable bond strength to polycarbonate
- ✔ Adhesive fluoresces red under UV illumination to aid in visual inspection of the bond area

Uncured properties

Solvent	Appearance	Density, g/ml	Viscosity, cPS	Lap shear to polycarbonate, PSI	Moisture permeability (g-mil/m2-day)
No Reactive Solvents	Light Yellow Liquid-Gel	1.10	5000-8000	~ 2000 ps1	>500

Performance comparison:





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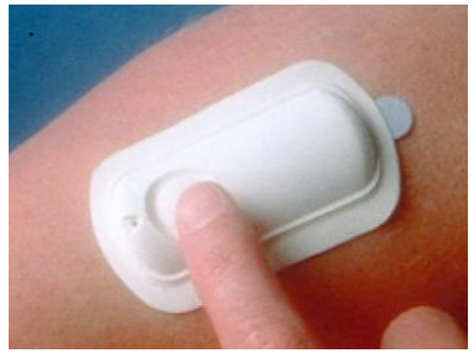
Technology Highlights
Skin bonding – Medium-term wear

ARcare® 94220

Key features:

- ✔ Non-sensitizing adhesive
- ✔ Clean removal without leaving adhesive residue
- ✔ Ultrasonically weldable and heat stakeable nonwoven carrier
- ✔ High moisture vapor transmission rate (MVTR)
- ✔ Excellent adhesion and conformability to skin



Product construction:

Construction	1st Release Liner (Type/ Thickness)	1st Adhesive (Type/ Thickness)	Carrier/ Backing (Color/Type/ Thickness or Basis Weight)	Peel Adhesion to Stainless Steel (ozf/in [N/25.4 mm])	Moisture permeability (g-mil/m2-day)
SCT	Yellow/ paper/81 µm	Acrylic skin/66 µm	Non-woven polyester/279 µm	55/15.3	>500

Technical properties:

Peel adhesion on stainless steel	Release of polyester liner	Moisture vapor transmission rate	Recommended storage of unconverted product	Shelf life of unconverted product
55 oz/inch 15 n/25mm	70 g/2"	>500 g/m2/day	70°F±20°F 21°C ±11°C 50% ± 20% RH	Not to exceed one year from the date of manufacture

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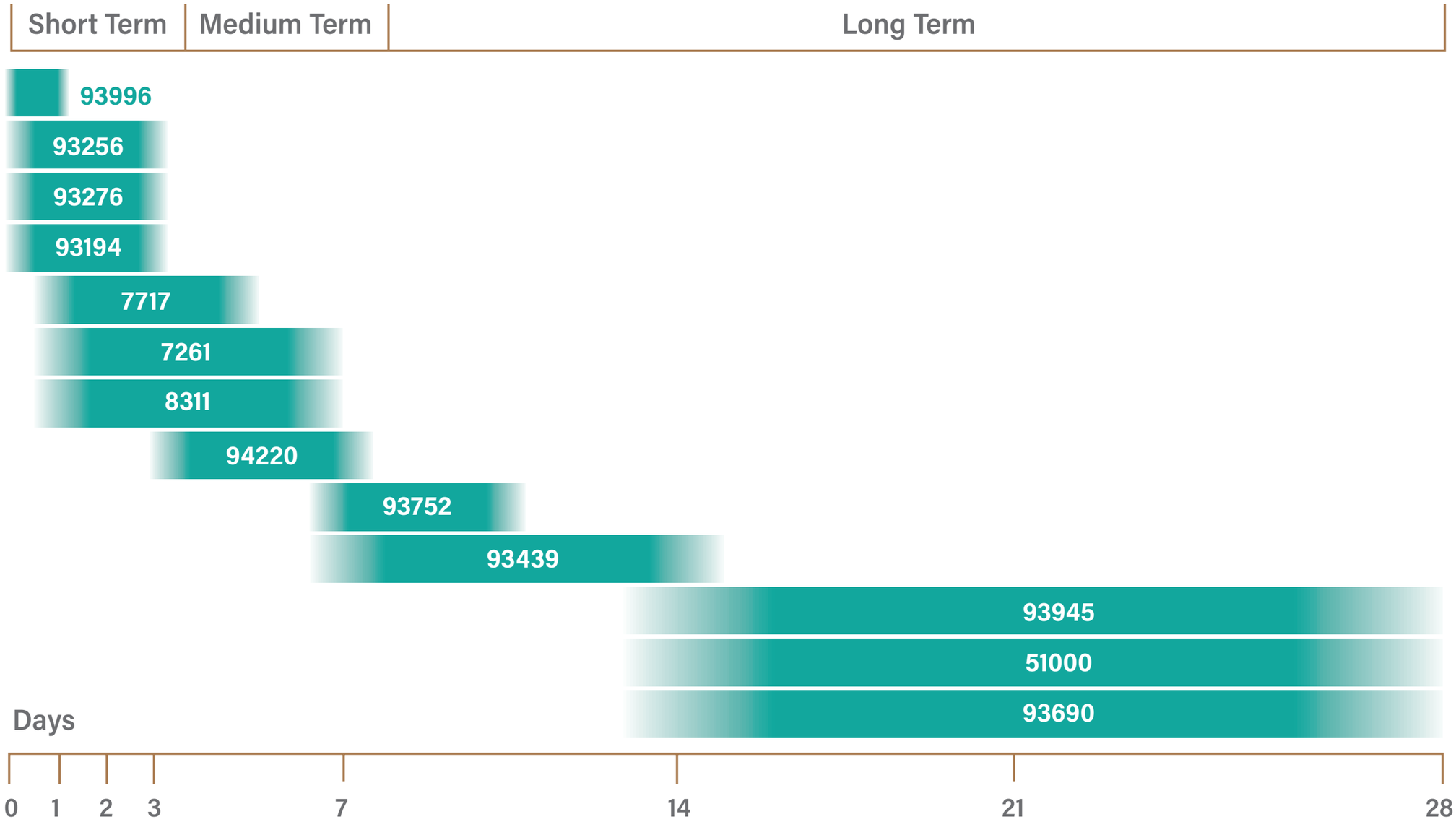
Skin bonding - Wear times

Available in three categories – short, medium, and long-term wear, our skin-friendly adhesives offer an unparalleled selection in both breadth and depth of product. This selection allows you to choose the right adhesive for your application. Our products are designed to maximize performance including the ability to withstand the daily impacts of everyday use and reduced residue around the device.

The chart to the right shows our skin-bonding portfolio with each product family aligned by wear time. Please see the Adhesives Guide section for more technical information.



Wear times are estimated by Adhesives Research internal studies and may not fully reflect the actual end-use performance. Wear times can vary based on factors such as device weight, size, shape, and environmental conditions. It is strongly recommended that customers conduct their own studies using specific medical device design to ensure accurate wear time assessments.

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SKIN BONDING

Product	Description	Construction	1st Release Liner (Type/ Thickness)	1st Adhesive (Type/ Thickness)	Carrier/ Backing (Color/ Type/ Thickness)	2nd Adhesive (Type/ Thickness)	2nd Release Liner (Type/ Thickness)	Peel Adhesion to Stainless Steel (ozf/ in [N/25.4 mm])	Moisture Permeability (g-mil/ m2-day)
ARcare® 93996	Acrylic PSA for short-term wear applications	SCT	Ream siliconized polycoated paper / 87#	Rubber / 51 µm	Embossed polyethylene film / 74 µm	-	-	-	-
ARcare® 93256	Acrylic PSA for short-term wear applications	SCT	Clear polyester / 51 µm	Acrylic / 71 µm	Clear polyurethane / 86 µm	-	-	5 (1.4)	> 160
ARcare® 93276	Acrylic PSA for short-term wear applications	SCT	Clear polyester / 51 µm	Acrylic / 71 µm	White polyester non-woven / 279 µm	-	-	5 (1.4)	-
ARcare® 94579	Acrylic PSA for short-term wear applications	DCT	White polyester / 51 µm	Acrylic / 71 µm	White polyester non-woven / 279 µm	Acrylic device / 51µm	Clear polyester / 51 µm	5 (1.4) / 60 (16.7)	> 480
ARcare® 7717	Acrylic PSA for short-to-medium term wear applications	SCT	White paper / 84# / 160 µm	Acrylic / 61 µm	White cross-linked EVA foam / 4# / 1588 µm	-	-	81 (22.5)	-
ARcare® 7261	Acrylic PSA for short-to-medium term wear applications	SCT	Off-white paper / 55# / 81 µm	Acrylic / 43 µm	White polyester non-woven / 381 µm	-	-	-	-
ARcare® 8311	Acrylic PSA for short-to-medium term wear applications	SCT	Off-white paper / 55# / 81 µm	Acrylic / 15 µm	Clear polyurthane / 25 µm	-	-	18 (5.0)	> 900
ARcare® 94220	Acrylic PSA for medium-term wear applications	SCT	Yellow paper/ White paper/ 53# / 81 µm	Acrylic / 66 µm	White polyester non-woven / 279 µm	-	-	55 (15.3)	> 500
ARcare® 93752	Acrylic PSA for long-term wear applications	SCT	Clear polyester / 51 µm	Acrylic / 74 µm	White polyurethane non-woven / 220 µm	-	-	37 (10.3)	550
ARcare® 93439	Acrylic PSA for long-term wear applications	SCT	Clear polyester / 51 µm	Acrylic / 66 µm	White polyester non-woven / 279 µm	-	-	90 (25.0)	550
ARcare® 93945	Acrylic PSA for long-term wear applications	SCT	Clear polyester / 51 µm	Acrylic / 74 µm	Clear polyure-thane/ 51 µm | supported on White paper / 122 µm	-	-	74 (20.6)	490
ARcare® 51000	Acrylic PSA for long-term wear applications	SCT	Siliconized paper	Acrylic / 76 µm	White polyurethane non-woven / 127 µm	-	-	24 (6.7)	> 675
ARcare® 93690	Acrylic PSA for long-term wear applications	SCT	Clear polyester / 51 µm	Acrylic / 76 µm	White polyurethane non-woven / 127 µm	-	-	24 (6.7)	> 675

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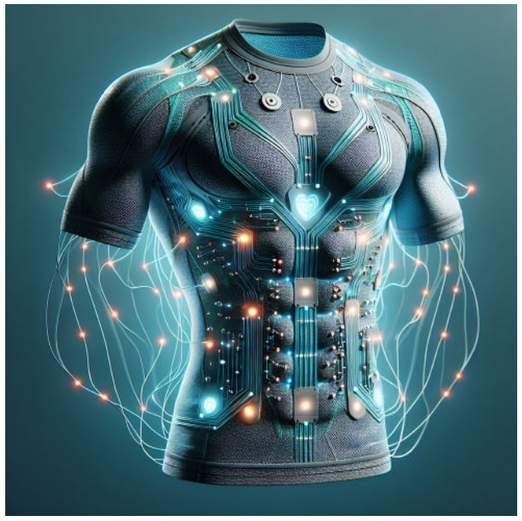
DEVICE ATTACHMENT

Product	Description	Construction	1st Release Liner (Type/ Thickness)	1st Adhesive (Type/ Thickness)	Carrier/ Backing (Color/ Type/ Thickness)	2nd Adhesive (Type/ Thickness)	2nd Release Liner (Type/ Thickness)	1st Adhesive Peel Adhesion to Stainless Steel (ozf/ in [N/25.4 mm])	2nd Adhesive Peel Adhesion to Stainless Steel (ozf/ in [N/25.4 mm])	Moisture permeability (g-mil/ m2-day)
ARcare® 93691	Acrylic PSA for adhering medical devices to skin tapes	DCT	White polyester / 51 µm	Acrylic (skin) / 41 µm	White non-woven scrim	Acrylic (device) / 33 µm	Clear polyester / 76 µm	78 (21.7)	90 (25.0)	200
ARcare® 94180		DCT	White polyester / 51 µm	Acrylic (skin) / 64 µm	White non-woven scrim	Acrylic (skin) / 64 µm	Clear polyester / 51 µm	49 (13.6)	77 (21.4)	220
ARcare® 93551	Acrylic PSA for adhering medical devices to low surface materials	TT	Clear poly-ester, easy release / 51 µm	Acrylic (skin) / 28 µm	-	-	Clear polyester, medium release / 51 µm	65 (18.1)	-	-

DEVICE ASSEMBLY

Product	Description	Construction	Viscosity, cPs	Lap sheer	Refractive index
ARcare® A-5490	UV curable liquid adhesive for bonding medical devices with multiple-substrates	UV curable liquid adhesive	5000-8000	~2000	1.51



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SPACE MANAGEMENT

Product	Description	Construction	1st Release Liner (Type/Thickness)	1st Adhesive (Type/Thickness)	Carrier/ Backing (Color/Type/ Thickness)	2nd Adhesive (Type/ Thickness)	2nd Release Liner (Type/Thickness)	Peel Adhesion to Stainless Steel (ozf/in [N/25.4 mm])	2nd Adhesive Peel Adhesion to Stainless Steel (ozf/ in [N/25.4 mm])
ARcare® 7840	Acrylic PSA for bonding, laminating and assembly of medical devices	DCT	Clear polyester / 51 µm	Acrylic / 20 µm	White polyester / 51 µm	Acrylic / 20 µm	Clear polyester / 51 µm	70 (19.5)	-
ARcare® 8252		DCT	Clear polyester / 51 µm	Acrylic / 41.9 µm	Clear polyester / 25 µm	Acrylic / 41.9 µm	Clear polyester / 51 µm	70 (19.5)	-
ARcare® 8939		DCT	Clear polyester / 51 µm	Acrylic / 25 µm	White polyester / 76 µm	Acrylic / 25 µm	Clear polyester / 51 µm	50 (13.9)	-
ARcare® 90445Q		DCT	Clear polyester / 51 µm	Acrylic / 28 µm	Clear polyester / 25 µm	Acrylic / 28 µm	Clear polyester / 51 µm	70 (19.5)	-
ARcare® 92363	Differential tape for bonding, laminating and assembly of medical devices with varying surface energies	DCT	Clear polyester / 51 µm	Acrylic / 25 µm	White polyester / 76 µm	Rubber / 33 µm	Clear polyester / 51 µm	150 (41.7)	84 (23.4)
ARcare® 8914-6970	Acid-free, ultra-low outgassing acrylic PSA for use in medical applications	DCT	Clear polyester / 51 µm	AS-139 acrylic / 38 µm	White polyester / 51 µm	Acrylic / 38 µm	Clear polyester / 51 µm	65 (18.1)	-
ARcare® 8915-6970		DCT	Clear polyester / 51 µm	Acrylic / 38 µm	Clear polyester / 76 µm	Acrylic / 38 µm	Clear polyester / 51 µm	60 (16.7)	-
ARcare® 8915W-6970		DCT	Clear polyester / 51 µm	Acrylic / 38 µm	White polyester / 76 µm	Acrylic /38 µm	Clear polyester / 51 µm	60 (16.7)	-
Arclean® 90176	Acid-free, low outgassing acrylic PSA for use in medical applications	DCT	Off-white paper/ 84# / 160 µm	Acrylic / 38 µm	Clear polyester / 51 µm	Acrylic / 38 µm	Clear polyester / 51 µm	55 (15.3)	-
ARcare® 92660	High tack, shear and adhesion acrylic PSA for medical device assembly.	DCT	Clear polyester / 51 µm	Acrylic / 38 µm	White polyester / 178 µm	Acrylic / 38 µm	Clear polyester / 51 µm	85 (23.6)	-
ARcare® 93836	Acrylic PSA for bonding, laminating and assembly of medical devices	DCT	Clear polyester / 51 µm	Acrylic / 20 µm	Clear polyester / 51 µm	Acrylic / 20 µm	Clear polyester / 51 µm	45 (12.5)	-
ARcare® 90106NB	High tack and peel adhesion acrylic PSA ideally suited for bonding, laminating and assembly of low-surface energy medical device components	DCT	White polyester / 51 µm	Acrylic / 58 µm	Clear polyester / 25 µm	Acrylic / 58 µm	White polyester / 51 µm	150 (41.7)	-
ARcare® 92848	Thermoplastic, heat sealing adhesive for joining of polymer plastic and metalized plastic substrates in medical devices	HDCT	Clear polyester / 51 µm	Heat seal / 23 µm	White polyester / 51 µm	Heat seal / 23 µm	Clear polyester / 51 µm	-	-
ARcare® 92712	Flexible, thin, conformable acrylic adhesive for bonding, laminating and assembly of medical devices	DCT	Clear polyester / 51 µm	Acrylic / 18 µm	Clear polyester / 13 µm	Acrylic / 18 µm	Clear polyester / 51 µm	66 (18.3)	67 (18.6)
ARseal™ 94119	Silicone PSA evaporation barrier for bonding, laminating and assembly of medical devices	DCT	Clear polyester / 51 µm	Silicone / 46 µm	Clear polypropylene / 51 µm	Silicone / 46 µm	Clear polyester / 51 µm	65 (18.1)	-
ARcare® 7737	High tack self-wound tape for bonding, laminating and assembly of medical devices	DCT	Off-white paper/ 55# / 81 µm	Acrylic / 33 µm	Clear polyester / 25 µm	Acrylic / 33 µm	-	91 (25.3)	-
ARcare® 92448	Rubber PSA for bonding, laminating and assembly of medical devices	DCT	Clear polyester / 51 µm	Rubber / 76 µm	Clear polyester / 250 µm	Rubber / 76 µm	Clear polyester / 51 µm	198 (55.0)	-

CONDUCTIVE BONDING

Product	Description	Construction	1st Release Liner/Backing (Type/Thickness)	1st Adhesive (Type/Thickness)	Carrier (Color/Type/ Thickness)	2nd Adhesive (Type/Thickness)	2nd Release Liner (Type/Thickness)	Peel Adhesion to Stainless Steel (ozf/in [N/25.4 mm])	Volume Resistance	Surface Resistance
ARcare® 90615	Acrylic conductive nonwoven PSA for bonding, laminating and assembly	DCT	Double-sided white paper / 94# / 152 µm	Electrically conductive acrylic / 51 µm	Electrically conductive non-woven / 20 µm	Electrically conductive acrylic / 51 µm	-	45 (12.5)	≤ 3 mΩ	11 Ω/sq
ARcare® 8881	Acrylic conductive nonwoven PSA for bonding, laminating and assembly	DCT	Double-sided white paper / 94# / 152 µm	Electrically conductive acrylic / 51 µm	Electrically conductive non-woven / 20 µm	Electrically conductive acrylic / 51 µm	-	64 (17.8)	3 Ω maximum	6-8 Ω/sq
ARcare® 8874	Acrylic conductive nonwoven PSA for bonding, laminating and assembly	DCT	Clear polyester / 51 µm	Electrically conductive acrylic / 46 µm	Electrically conductive nonwoven / 20 µm	Electrically conductive acrylic / 46 µm	White paper / 55# / 81 µm	52 (14.5)	-	3.7 Ω/sq
ARcare® 90366	Acrylic conductive nonwoven PSA for bonding, laminating and assembly	TT	Double-sided clear polyester / 51 µm	Electrically conductive acrylic / 33 µm	-	-	-	25 (7.0)	10 Ω maximum	-

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PROCESS AIDS

Product	Description	Construction	Carrier (Color/Type/ Thickness)	Adhesive (Type/ Thickness)	Peel Adhesion to Stainless Steel (ozf/in [N/25.4 mm])	Release Classification	Release Force (g/2 in)
ARclad® 79027	Low-tack acrylic self-wound tape suitable for temporary protection or as a process aid for casting	SCT	Clear polyester / 51 µm	Acrylic / 18 µm	0.3 (0.08)	-	-
ARclad®79029		SCT	Clear polyester / 51 µm	Acrylic / 23 µm	2 (0.6)	-	-
ARclean® W-5029	Clean liner with low extractables	SCT / Liner	Clear polyester / 51 µm	-	-	Tight	100
ARclean® W-5030	Ultra-clean liner with ultra-low extractables; Ideal for sensitive medical and electrical components	SCT / Liner	Clear polyester / 51 µm	-	-	Medium-tight	54
ARclean® W-5047	Thermally cured, solventless, silicone liner suitable for clean and consist-ent removal of liner from adhesive and cast materials	SCT / Liner	Clear polyester / 51 µm	-	-	Easy	15
ARclean® W-5048		SCT / Liner	Clear polyester / 51 µm	-	-	Medium-tight	50 - 70
ARclean® W-5049		SCT/Liner	Clear polyester / 51 µm	-	-	Easy-medium	25
ARclean® W-5051		SCT / Liner	Clear polyester / 51 µm	-	-	Tight	70-130
ARclean® W-3361	Low extractable silicone liner suitable for applications that require practically zero extractable silicone	SCT / Liner	Clear polyester / 38 µm	-	-	Easy-medium	30
ARclean® W-3362	Silicone liner suited as a secondary or lay-in liner in medical applications	SCT / Liner	Clear polyester / 51 µm	-	-	Easy-medium	≤ 40
ARclean® W-3363	Fluorosilicone liner suited as a secondary or lay-in liner in medical applications	SCT / Liner	Clear polyester / 51 µm	-	-	Easy-medium	24
ARclean® W-3473	Clean, low extractables, silicone liner. Formulated and designed with the smoothest surface and high thickness consistency	SCT/Liner	Clear polyester/ 51 µm	-	-	Easy	22
ARclean® W-3474		SCT/Liner	Clear polyester/ 51 µm	-	-	Medium-tight	60

Types of Tape Construction

Transfer Tape (TT)

Unsupported adhesive is coated directly onto a release liner, allowing transfer films to be the most flexible and conformable of all bonding systems.

- ✔ Provide thinnest overall height
- ✔ Medical grade, non interacting adhesives
- ✔ High bond strength to a variety of substrates

Single-Coated Tape (SCT)

Single-coated tapes consist of a backing that is coated on one side with an adhesive. Single-coated tapes are available either in selfwound rolls or with a release liner for ease of application.

- ✔ Used as cover tapes
- ✔ Suitable for PCR, ELISA and other assays
- ✔ Hydrophilic options available

Double- Coated Tape (DCT)

Double-coated tapes have a carrier that is coated on both sides with an adhesive. The instant bonding capabilities of double-coated tapes make them very conductive to automation and high-speed processing.

- ✔ Offers ease of handling
- ✔ Spacer thickness from 48 to 250 microns
- ✔ Highly uniform thickness (± 2 microns)
- ✔ Allows for differential adhesion

Heat-activated Film Tape

Heat-activated film tapes require heat and pressure to achieve final bonding to any surface.

- ✔ Clean die cutting
- ✔ High ultimate bond strength
- ✔ Hydrophilic options available

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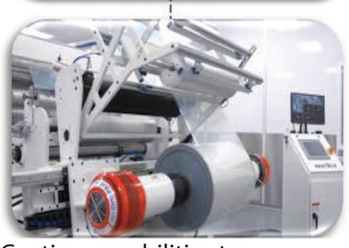
About Adhesives Research

Full-scope development-to-production partnership

Do you need a specific product for your wearable design? Adhesives Research (AR) provides a one-stop shop for design, production, and converting. Consider AR as your program partner for your next development. For more than 60 years, we have positioned ourselves as a technology leader through continuous innovation programs. We are committed to working in partnership with our customers towards the qualification of application-specific products that fill your unmet needs.

Adhesives Research's primary guiding principle is to be the best in our market. Our Innovation Team, with many PhD's, is constantly developing high performance products and solutions for our customers and target markets.



Coating capabilities to manufacture a broad range of commercial products and vertical integration from polymer synthesis to converting.

Utilize our state-of-the art converting suite to finalize your design whether in a roll-to-roll or single piece solution. We can also help to optimize your final product with design iterations throughout the development process.

Additional brochures

From skin bonding to display screen applications

Diabetes Care

Diabetes Care is a growing market within healthcare and is focused on providing glucose monitoring and insulin delivery systems for patients with Diabetes type 1 or 2. **ARcare®** products minimize skin irritation to maximize patient comfort and improve bonding at the skin and device level for more accurate readings. Customizable solutions for total device constructions further enhance performance by tailoring wear times, managing moisture mitigation and improving processing performance.

Diagnostics Devices

The **Diagnostic Device** market has seen dramatic developments over the past few years. Adhesives Research's technologies enable Diagnostics manufacturers to develop cost-effective, highly sensitive and accurate products in a shortened development cycle. **ARcare®** and **ARflow®** products have been developed to assist Diagnostic Device manufacturers in a broad range of applications. Our products meet the stringent performance requirements in a very consistent manner.

Display Applications

Displays and Touchscreens see a constant development into new technical requirements and performance criteria. They face relatively short development cycles and require high performance Optical Clear Adhesive technologies. **ARclear®** products have been developed directly with Display and Touchscreen OEM's and are offering a unique group of PSA technologies for the assembly for these type of applications.

Adhesives Research®

About Adhesives Research:

Adhesives Research is a permanently independent developer and manufacturer of adhesives and coatings for various markets.

We utilize our material knowledge, polymer synthesis/formulation expertise, and versatile manufacturing capabilities to supply key components to the industry. We offer robust products and technologies and can also rapidly customize to meet the specific needs of an application.

Headquartered in Glen Rock, PA. Adhesives Research has also sales and manufacturing facilities in Ireland and sales offices in China and Singapore.

To learn more information about how Adhesives Research can help solve tape and materials engineering challenges, contact us today.

Scan me for more details

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