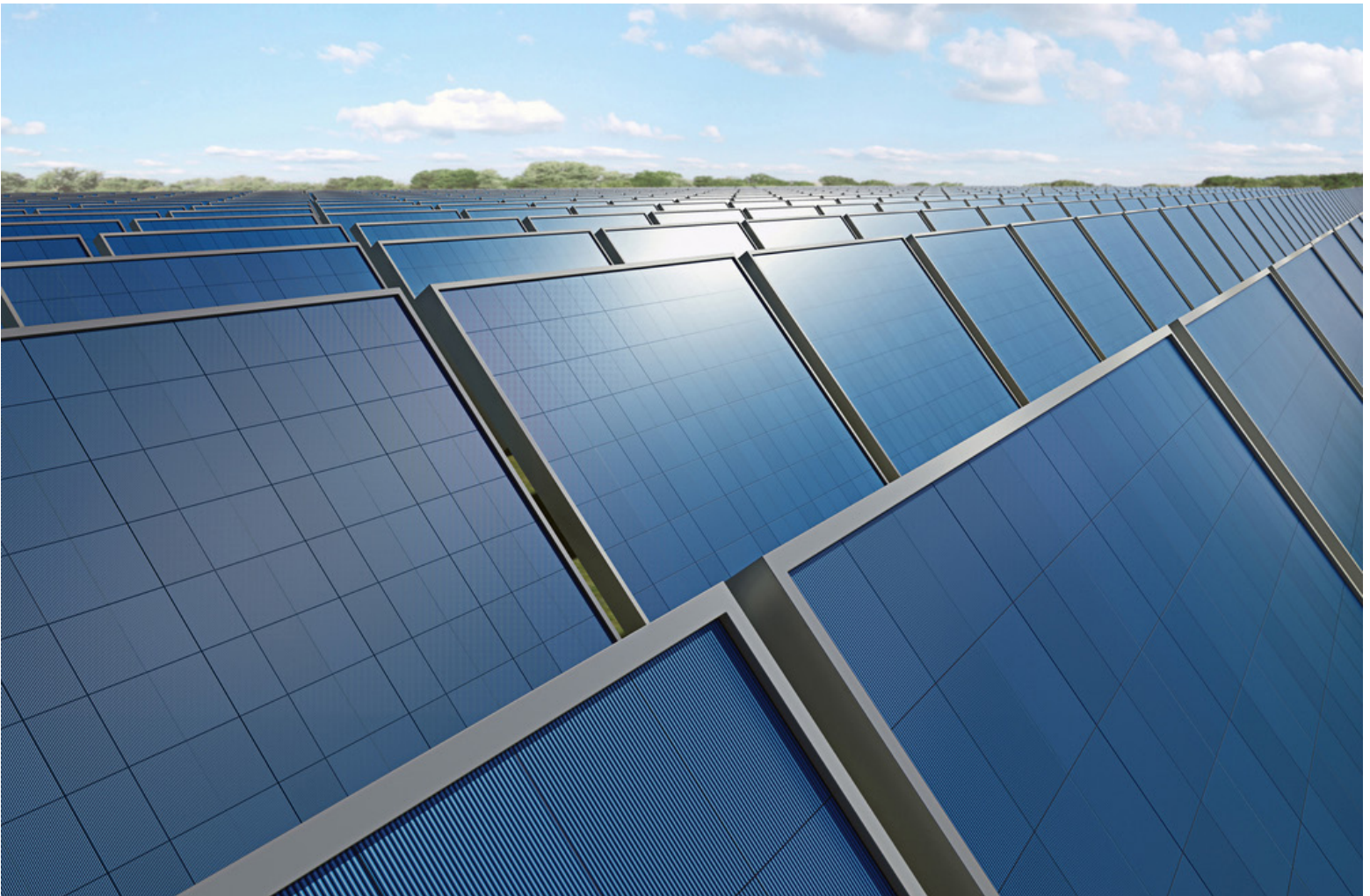


# Solutions for Solar Panel Applications



**Adhesive solutions that power innovation**

As a global technology leader, Adhesives Research (AR) provides connectivity, moisture barrier, and dielectric protection to critical electronics segments, including photovoltaic (PV) solar energy, solar thermal energy (STE), concentrated solar power (CSP), passive solar energy, and building-integrated photovoltaics (BIPV) production. AR's portfolio of pressure sensitive adhesives is designed for a broad range of applications throughout the production process, including charge collection, cell positioning, and edge sealing. Our chemists and engineers are passionate about developing novel products that enable our customers to overcome challenges in meeting the demands of an ever-evolving energy market.

# Solar Panel Applications

## Typical Applications Include:

### Charge Collection

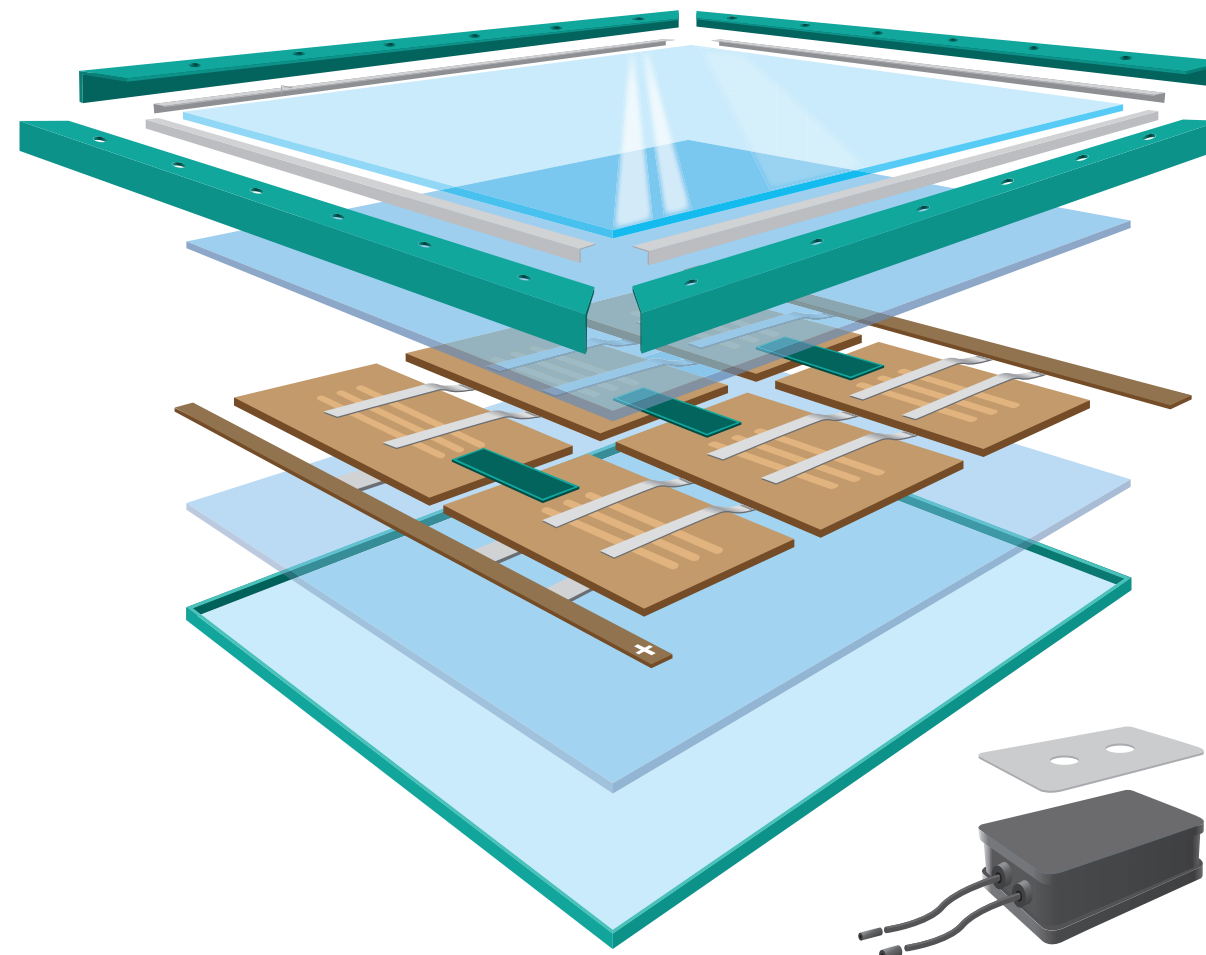
Highly conductive tapes to solve interconnection challenges, available as foil-backed tapes, transfer tapes and heat seals. Selective versions are also available on spools.

### Cell Positioning Tape

High-performance low-outgassing acrylic tape designed to hold cells in place during the lamination process.

### Process Aids

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



### Edge Sealing and Moisture Barrier Protection

Specialty hydrophobic adhesives, with superior thermooxidative and UV stability, to protect the most sensitive components.

### Dielectric Solutions

Insulating adhesives to enable improved electrical designs, allowing circuits to withstand higher voltages without potential dielectric breakdown.

### General Bonding

Versatile bonding options throughout the cell or module (including low VOC, low surface energy and high surface energy substrates).

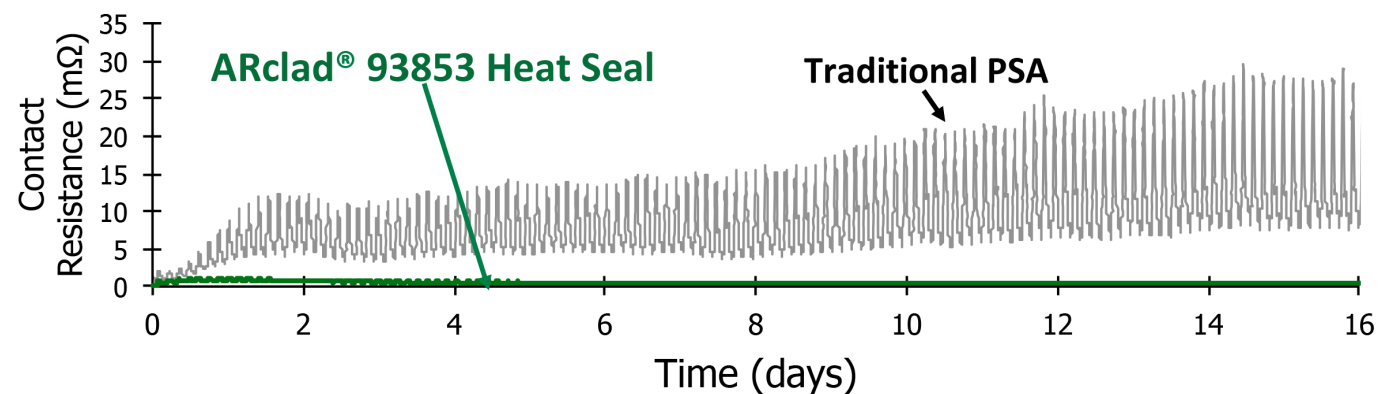
## Technology Highlights

### Conductive Heat Seal Busbar

#### Key features:

- ✓ Electrically and thermally conductive adhesive heat seal supported by a tin-coated copper foil carrier.
- ✓ Eliminates contact resistance creep during thermal cyclic exposure.
- ✓ Eliminates the need for soldering.
- ✓ Suitable for small contact applications (6mm x 6mm).
- ✓ Adhesion to a wide range of substrates including Kapton, tin, copper, aluminum, stainless steel, ITO and other metal substrates.

#### Performance comparison



#### Product details

Product	Description	Construction	Adhesive (Type/Thickness)	Carrier (Color/Type/Thickness)	Peel Adhesion to Stainless Steel (ozf/in [N/25.4 mm])	Volume Resistance	Surface Resistance
ARclad® 93853	Heat-seal adhesive for shielding and electrical bonding; Resistant to temperature and humidity	SCT	Conductive curable heat seal/33 µm	Roll-annealed tin-coated copper foil/36 µm	40 (11)	<50 mΩ	<118 mΩ

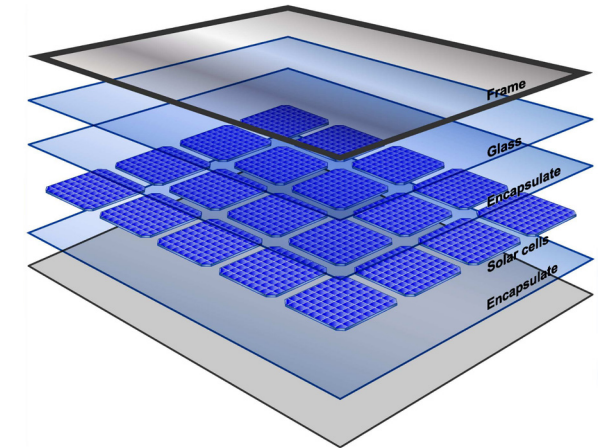


## Technology Highlights

### Moisture Barrier Transfer Tapes

#### Key features:

- ✓ Inert, non-reactive polyisobutylene chemistry enables direct contact with sensitive components.
- ✓ Optically clear with excellent thermo-oxidative and UV stability.
- ✓ Suitable for edge sealing and full encapsulation.
- ✓ Available in 12.5 and 25 micron thicknesses.



	ARclear® 44005	ARclear® 44010	ARclear® 44110
Description	Thin optically-clear moisture barrier	Optically-clear moisture barrier	High-peel optically-clear moisture barrier
Adhesive thickness (µm)	12.5	25	25
Moisture permeability (g·mil/m <sup>2</sup> ·day)	2.2	2.2	2.2
Refractive index	1.52	1.52	1.52
Peel adhesion to polycarbonate (N / 25.4 mm)	12.8	17.5	20.9

#### Transfer Tape

- Allows for easy die cutting and handling.
- Designed/manufactured in the USA.
- Slit sizes and length options.



# Adhesive Guide

## CHARGE COLLECTION

Product	Description	Construction	1st Release Liner (Type/Thickness)	1st Adhesive (Type/Thickness)	Carrier (Color/Type/Thickness)	2nd Release Liner (Type/Thickness)	Peel Adhesion to Stainless Steel (ozf/in [N/25.4 mm])	Volume Resistance	Surface Resistance
ARcare® 93758	Performance conductive acrylic; Resistant to creep, temperature, and humidity; Tin-coated backing for oxidation and corrosion resistance	SCT	Clear/PET/51 µm	Highly conductive acrylic/25 µm	Roll-annealed tin-coated copper foil/36 µm	-	35 (10)	<2 mΩ	<0.5 Ω
ARflow® 25014	Spooled ARclad® 93758								
ARclad® 93853	Heat-seal adhesive for shielding and electrical bonding; Resistant to temperature and humidity	SCT	-	Conductive curable heat seal/33 µm	Roll-annealed tin-coated copper foil/36 µm	-	40 (11)	<50 mΩ	<118 mΩ
ARflow® 26014	Spooled ARclad® 93853								
ARclad® 93886	Heat-seal adhesive for shielding and electrical bonding; Resistant to temperature and humidity	SCT	-	Conductive curable heat seal/33 µm	Black PET (51 µm)/ Dielectric acrylic adhesive (25 µm)/ Tin-Coated copper foil (36 µm)/ 62 µm	-	40 (11)	<50 mΩ	<0.2 Ω
ARflow® 26114	Spooled ARclad® 93886								
ARlow® 93400	Highly-conductive heat-seal transfer film; Thin consistent bond line; heat sink bonding, EMI/ RF grounding, etc.	HFT	Clear PET/51 µm	Conductive Rubber/5 µm	-	-	40 (11)	<20 mΩ	-
ARclad® 9032	Transfer tape adhesive with superior z-axis conductivity due to its unique filler package	TT	Clear/PET/51 µm	Conductive acrylic/25 µm	-	White PET/51 µm	30 (8)	<10 mΩ	>10 kΩ

# Adhesive Guide

## CHARGE COLLECTION (CONTINUED)

Product	Description	Construction	1st Release Liner (Type/Thickness)	1st Adhesive (Type/Thickness)	Carrier (Color/Type/Thickness)	2nd Release Liner (Type/Thickness)	Peel Adhesion to Stainless Steel (ozf/in [N/25.4 mm])	Volume Resistance	Surface Resistance
ARlow® 93802	High-performance transfer tape adhesive; chemically inert and stable in harsh or corrosive environments	TT	Clear PET/51 µm	Conductive Rubber/25 µm	-	Clear PET/51 µm	23 (6)	<50 mΩ	-
ARflow® 94141	Ultra-thin transfer adhesive with high-peel; chemically inert and stable in harsh or corrosive environments	TT	Clear PET/51 µm	Conductive Rubber/5 µm	-	Clear PET/51 µm	31 (9)	<50 mΩ	-
ARflow® 94274	Ultra-thin, transfer adhesive with high-shear (<5000 min at 70 C); chemically inert and stable in harsh or corrosive environments	TT	Clear PET/51 µm	Conductive Rubber/5 µm	-	Clear PET/51 µm	12 (3)	<50 mΩ	-

## DIELECTRIC SOLUTIONS

Product	Description	Construction	Backing color/type/ thickness	Adhesive type/thickness	Release Liner type/thickness	Peel Adhesion to Stainless Steel ozf/in (N/25 mm)
ARcare® 93948	Resistant to high-temp bubbling & bond failure; Acid-free	SCT	Black/PET/51 µm	Acrylic/25 µm	PET/51 µm	50 (13.9)
ARclean® 92073	Clean, low VOCs, heat resistant; Acid-free	SCT	Black/PET/76 µm	Acrylic/38 µm	PET/51 µm	78 (21.7)
ARcare® 93945	Clean adhesive; Highly flexible polyurethane backing	SCT	Clear/PU/51 µm	Acrylic/73 µm	PET/51 µm	74 (20.1)
ARcare® 93469	Low tack for temporary/ in-process device wrapping applications; Heat stabilized PET backing	SCT	Clear/ PET/ 51 µm	Acrylic/18 µm	PET/51 µm	3 (0.8)
ARcare® 7759	Clean adhesive; Clear PET backing	SCT	Clear/ PET/ 51 µm	Acrylic/30 µm	PET/51 µm	50 (13.9)

# Adhesive Guide

## CELL POSITIONING TAPE

Product	Description	Construction	Backing color/ type/ thickness	Adhesive type/ thickness	Release Liner type/thickness	Peel Adhesion to Stainless Steel (ozf/in [N/25 mm])
ARflow® 90420	Ultra-clean, ultra-low VOC single coated tape; ideal for cell positioning	SCT	Clear/ PET/ 51 µm	Acrylic/38 µm	PET/51 µm	60 (16)

## EDGE SEALING & MOISTURE BARRIER PROTECTION

Product	Description	Construction	1st Release Liner (Type/ Thickness)	Adhesive (Type/ Thickness)	2nd Release Liner (Type/ Thickness)	“Peel Adhesion (N/25.4 mm)”	Moisture permeability (g-mil/ m2-day)
ARclear® 44005 (formally ARcare® 93453)	Moisture barrier adhesive with strong adhesion to various substrates; Chemically inert with excellent thermo-oxidative and UV stability	TT	Clear/ PET/ 51 µm	Rubber/ 13 µm	Clear PET/51 µm	6 (Glass) / 13 (PC)	2.2
ARclear® 44010 (formally ARcare® 92734)	Moisture barrier adhesive with strong adhesion to various substrates; Chemically inert with excellent thermo-oxidative and UV stability	TT	Clear/ PET/ 51 µm	Rubber/ 25 µm	Clear PET/51 µm	17 (Glass) / 18 (PC)	2.2
ARclear® 44110 (formally ARcare® 93378)	Moisture barrier adhesive with strong adhesion to various substrates; Chemically inert with excellent thermo-oxidative and UV stability	TT	Clear/ PET/ 51 µm	Rubber/ 25 µm	Clear PET/127 µm	17 (Glass) / 21 (PC)	2.2
ARclad® 74000 series	Clean acrylic with low outgassing and low VOCs	See ARclad® 74000 Series table for construction details				12 (Glass) / 15 (PC)	-

## PROCESS AIDS

Product	Description	Construction	Carrier (Color/Type/ Thickness)	Adhesive (Type/ Thickness)	Release Force (g/2in)
ARclean® W-10002	Clean, low extractables fluorosilicone liner; Ideal for silicone components and adhesives	SCT/Liner	Clear/PET/51 µm	-	4
ARclean® W-10004		SCT/Liner	Clear/PET/76 µm	-	4
ARclean® W-3363		SCT/Liner	Clear/PET/51 µm	-	11
ARclean® 4010	Ultra-clean liner with ultra-low extractables; Ideal for sensitive electrical components and cast materials like ceramics and colloids	SCT/Liner	Clear/PET/51 µm	-	10
ARclean® 4013		SCT/Liner	Clear/PET/76 µm	-	10
ARclean® 4026		SCT/Liner	Clear/PET/51 µm	-	10
ARclean® 5030		SCT/Liner	Clear/PET/51 µm	-	54
ARclean® 3473	Clean, low extractables, silicone liner; Formulated and designed with the smoothest surface and high thickness constancy	SCT/Liner	Clear/PET/51 µm	-	22
ARclean® 3474		SCT/Liner	Clear/PET/51 µm	-	59
ARclad® 79027	Low-tack acrylic suitable for temporary protection or as a process aid for casting	SCT	Clear/PET/51 µm	Acrylic/18 µm	17
ARclad® 79029		SCT	Clear/PET/51 µm	Acrylic/23 µm	113

# Adhesive Guide

## GENERAL BONDING

Product	Description	Construction	1st Release Liner (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])
ARclad® 7418	Aggressive acrylic adhesive with superior adhesion to various surfaces	TT	White/ Poly-coated paper/160 µm (double-faced)	Acrylic/ 64 µm	-	-	-	50 (13.9)
ARclad® 8645-78	Temperature-resistant foam tape offering excellent shear and peel performance on diverse surfaces	DCFT	Blue/ PP/ 76 µm (double-faced)	Acrylic/ 58 µm	Grey/ closed-cell PE foam/ 42 mil (1067 µm)	Acrylic/58 µm	-	85 (23.6)
ARclad® 8314-10	Resistant to temperature and humidity; Offers strong adhesion to low surface energy materials and is ideal for rough surfaces and gap filling	DCFT	White/ SCK paper/81 µm (double-faced)	Acrylic/ 84 µm	Clear PET/ 25 µm	Acrylic/84 µm	-	90 (25.0)
ARclad® 71000 series	Acrylic designed for enhanced bonding to high surface energy materials	See ARclad® 71000 Series table for construction details						89 (24.7)
ARclad® 73000 series	Acrylic designed for enhanced bonding to low surface energy materials	See ARclad® 73000 Series table for construction details						122 (33.9)
ARclad® 74000 series	Clean acrylic with low outgassing and low VOCs	See ARclad® 74000 Series table for construction details						48 (13.3)



# Adhesive Guide

## ARCLAD® 71000 SERIES

Product	Construction	1st Release Liner (Type/Thickness)	1st Adhesive (Type/Thickness)	Carrier (Color/Type/Thickness)	2nd Adhesive (Type/Thickness)
ARclad® 71020	TT	Brown, Poly-coated Kraft Paper / 109 µm	Acrylic / 51 µm	-	-
ARclad® 71035	TT	Brown, Poly-coated Kraft Paper / 109 µm	Acrylic / 89 µm	-	-
ARclad® 71150	DCT	Brown, Poly-coated Kraft Paper / 109 µm	Acrylic / 51 µm	Clear PET / 25 µm	Acrylic / 51 µm
ARclad® 71180	DCT	Brown, Poly-coated Kraft Paper / 109 µm	Acrylic / 89 µm	Clear PET / 25 µm	Acrylic / 89 µm

## ARCLAD® 72000 SERIES

Product	Construction	1st Release Liner (Type/Thickness)	1st Adhesive (Type/Thickness)	Carrier (Color/Type/Thickness)	2nd Adhesive (Type/Thickness)
ARclad® 72020	TT	Brown, Poly-coated Kraft Paper / 109 µm	Rubber / 51µm	-	-
ARclad® 72035	TT	Brown, Poly-coated Kraft Paper / 109 µm	Rubber / 89 µm	-	-
ARclad® 72150	DCT	Brown, Poly-coated Kraft Paper / 109 µm	Rubber / 51µm	Clear PET / 25 µm	Rubber / 51µm
ARclad® 72255	DCT	Brown, Poly-coated Kraft Paper / 109 µm	Rubber / 51µm	Tissue / 38 µm	Rubber / 51µm
ARclad® 72340	DCT	Brown, Poly-coated Kraft Paper / 109 µm	Rubber / 51µm	DC Scrim	Rubber / 51µm

## ARCLAD® 73000 SERIES

Product	Construction	1st Release Liner (Type/Thickness)	1st Adhesive (Type/Thickness)	Carrier (Color/Type/Thickness)	2nd Adhesive (Type/Thickness)
ARclad® 73020	TT	Brown, Poly-coated Kraft Paper / 109 µm	Acrylic / 51 µm	-	-
ARclad® 73035	TT	Brown, Poly-coated Kraft Paper / 109 µm	Acrylic / 89 µm	-	-
ARclad® 73150	DCT	Brown, Poly-coated Kraft Paper / 109 µm	Acrylic / 51 µm	Clear PET / 25 µm	Acrylic / 51 µm
ARclad® 73180	DCT	Brown, Poly-coated Kraft Paper / 109 µm	Acrylic / 89 µm	Clear PET / 25 µm	Acrylic / 89 µm

## ARCLAD® 74000 SERIES

Product	Construction	1st Release Liner (Type/Thickness)	1st Adhesive (Type/Thickness)	Carrier (Color/Type/Thickness)	2nd Adhesive (Type/Thickness)
ARclad® 74018	TT	Brown, Poly-coated Kraft Paper / 109 µm	Low VOC Acrylic / 46 µm	-	-
ARclad® 74030	TT	Brown, Poly-coated Kraft Paper / 109 µm	Low VOC Acrylic / 76 µm	-	-
ARclad® 74146	DCT	Brown, Poly-coated Kraft Paper / 109 µm	Low VOC Acrylic / 46 µm	Clear PET / 25 µm	Low VOC Acrylic / 46 µm
ARclad® 74251	DCT	Brown, Poly-coated Kraft Paper / 109 µm	Low VOC Acrylic / 46 µm	Tissue / 38 µm	Low VOC Acrylic / 46 µm
ARclad® 74336	DCT	Brown, Poly-coated Kraft Paper / 109 µm	Low VOC Acrylic / 46 µm	DC Scrim	Low VOC Acrylic / 46 µm

# 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.

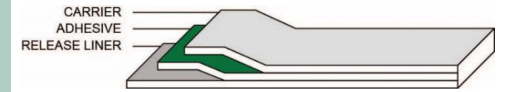
- ✓ Vibration damping
- ✓ Bonds with consistently thin line
- ✓ High strength bonding to a variety of industrial substrates
- ✓ Conforms well to irregular surfaces



### 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.

- ✓ Ideal for over-lamination
- ✓ Protecting
- ✓ Energy management



### Double-Coated Tape (DCT)

Double-coated tapes have a carrier that is coated on both sides with an adhesive, eliminating heat and solvent cure cycles. The instant bonding capabilities of double-coated tapes make them very conducive to automation and high-speed processing.

- ✓ Offers ease of handling
- ✓ Bonding rigid materials to irregular surfaces
- ✓ Compensates for thermal expansion
- ✓ Reduces sound, shock, and vibration
- ✓ Allows use of two different adhesives per application



### Heat-activated Film Tape

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

- ✓ Ideal for plasticized materials
- ✓ High ultimate bonding strength
- ✓ Conforms to irregular or textured surfaces



### High-performance Thin Foam Tape

High-performance thin foam tape is designed for mounting smart devices and other components in various electronics applications.

- ✓ Fill narrow gaps
- ✓ Excellent impact resistance
- ✓ Distribute stress uniformly over the bonded area





## 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

2023, Adhesives Research, Inc.

(December 2023)

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