Proven products. Innovative ideas.

Total package solutions for extrusion coating and lamination.

Contents

There are many options in the flexible packaging marketplace. There are 10 pages worth right here, and this is just an overview! The good news? We've been in the business of helping extrusion coating and laminating professionals for more than 60 years. Responding to customers with nimble and innovative solutions. And anticipating needs for evolving extrusion coating and laminating demands.

And today, as brand owners and consumers continue to drive toward more sustainable solutions, we're right here alongside, working to help provide the innovation, expertise and testing facilities to help make a difference for their products and for our planet.

The whole package.

Dow's resins portfolio covers the packaging gamut – from containing soup to nuts – and everything in between. From package convenience, to seal integrity, to cost efficiency, Dow's solutions deliver the performance you want across a variety of extrusion coating and laminating applications.

LDPE low density polyethylene resins

PROCESSING SEALANT

The key building block for the extrusion coating market, Dow's LDPE products offer a strong balance of processability, sealabilty, barrier and cost.

Agility performance LDPE

PROCESSING SEALANT

AGILITY™ Performance LDPE Resins are Dow's newest addition to a growing family of performance LDPEs designed to meet the future needs of the packaging industry. Dow has integrated this advanced LDPE technology with its expanding global manufacturing footprint to provide a future platform for the demanding needs of the extrusion coating and laminating markets.

AGILITY™ Performance LDPE resins are specifically designed to allow for:

- Higher coating speeds
- Increased draw down
- Excellent adhesion
- Global availability

The draw down and processing of AGILITY™ LDPE grades have improved performance to traditional autoclave resins at a given melt index (MI), so when choosing an AGILITY™ product, select one with ~1/2 the MI value of the autoclave incumbent grade.

Table 1: Overview of AGILITY™ Performance LDPE & Autoclave LDPE extrusion coating grades[1]

Product	Melt index	Density	Applications
AGILITY™ EC 7000	3.9	0.919	General purpose performance LDPE for flexible packaging, cups, and cartons
XUS 60020.06* Performance LDPE	7.0	0.917	High and ultra high speed performance LDPE for high draw down and light coating weights
DOW™ LDPE 5004i	4.2	0.924	Extrusion coating sealant and liquid barrier for cups and cartons
DOW™ LDPE 5005	5.7	0.921	High speed extrusion coating for cups and cartons
DOW™ LDPE 722	8.0	0.918	General purpose autoclave LDPE for coating or lamination of flexible packaging, cups, and cartons
DOW™ LDPE 4010	10.0	0.917	Flexible packaging, typical laminations
DOW™ LDPE 4012	12.0	0.918	Flexible packaging, typical laminations

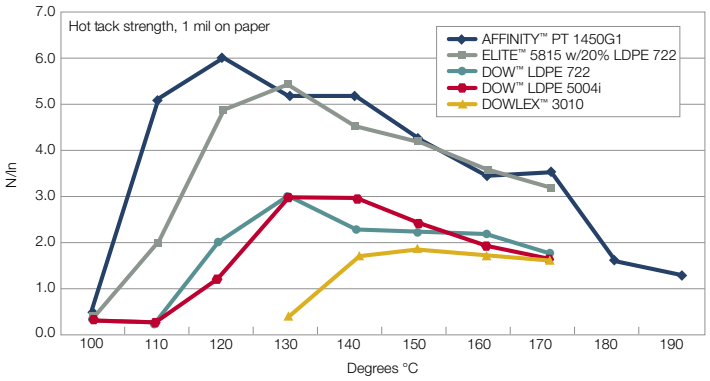
[1]Data per Dow and ASTM testing. Typical properties, not to be construed as specifications. Additional information available upon request. *Developmental product of The Dow Chemical Company
*Developmental product of The Dow Chemical Company

Affinity polyolefin plastomers

ABUSE PROCESSING SEALANT

AFFINITY™ Polyolefin Plastomers have been the industry's leading high-performance sealant resin for over 20 years. AFFINITY™ PT 1450G1 is effective in applications demanding excellent seal strength and low temperature sealability, and also provides outstanding tear, abrasion, and environmental stress crack resistance.

Figure 1: Comparative hot tack performance[1]



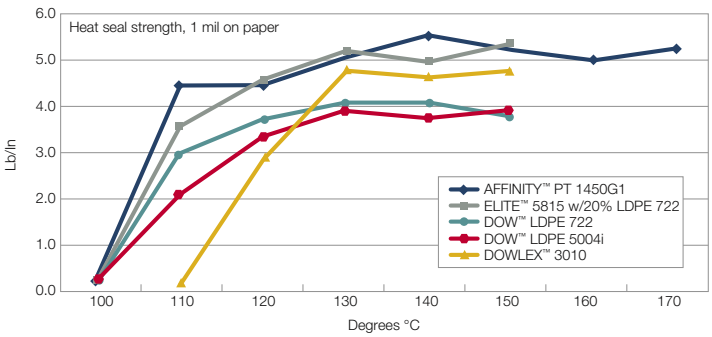
AFFINITY™ PT 1450G1 and ELITE™ 5815 with 20% LDPE 722 blends provide superior hot tack performance compared to LDPE

Elite enhanced polyethylene resins

ABUSE SEALANT

ELITE™ Enhanced Polyethylene (EPE) Resins are typically used as a blend component with LDPE to reduce heat seal initiation temperature and increase hot tack. Add 20-85% ELITE™ 5815 resins to your LDPE to reduce heat seal initiation temperature, increase hot tack strength, and improve overall performance of your traditional LDPE coatings/laminations.

Figure 2: Comparative heat seal performance[1]



AFFINITY™ PT 1450G1 and ELITE™ 5815/LDPE 722 blends excellent seal strength compared to LDPE

[1]Data per Dow and ASTM testing. Typical properties, not to be construed as specifications. Additional information available upon request.

Dowlex™ polyethylene resins

ABUSE SEALANT

In the product family of DOWLEX™ Polyethylene Resins, DOWLEX™ 3010 (5.4 MI, 0.921d) stands out as one of the most widely used LLDPEs in extrusion coating. In addition to improved sealing performance, this grade offers twice the tear strength and abrasion resistance compared to LDPE.

HDPE high density polyethylene resins

ABUSE BARRIER

HDPE resins are used in extrusion coating when applications require higher Water Vapor Transmission Rate (WVTR) performance, improved temperature resistance, or resistance to oils and grease. DMDA-8810 (11 MI, 0.950d) is extrusion-ready and fully formulated for web stability and ease of processing. Converters with blending or co-extrusion capabilities can tailor their own HDPE design with DMDA-8007 (8.3 MI, 0.965d) or DMDA-8812 (10 MI, 0.950d).

Table 2: Overview of additional high performing polyethylene grades[1]

Product	Melt index	Density	Applications
AFFINITY™ HT 1285G	6.0	0.900	Extrusion coating sealant for fast packaging conversion demanding low HSIT and high hot tack; blendable
AFFINITY™ PT 1450G1	7.5	0.902	Extrusion coating sealant for fast packaging conversion demanding low HSIT and high hot tack; fully formulated for web stability and processing
ELITE™ 5815	15.0	0.910	Extrusion coating sealant enhancer; blend with LDPE for reduced HSIT and increased hot tack
ELITE™ 5860	21.5	0.907	Extrusion coating sealant enhancer; blend with LDPE for reduced HSIT and increased hot tack; higher speed
DOWLEX™ 3010	5.4	0.921	Coatings and laminations demanding toughness and tear resistance; fully formulated for web stability and processing
DMDA-8007	8.3	0.965	Grease barrier for deli wraps and base coating for release liners; blendable
DMDA-8812	10.0	0.952	Grease barrier for deli wraps and base coating for release liners; blendable
DMDA-8810	11.5	0.950	Grease barrier for deli wraps and base coating for release liners; fully formulated for web stability and processing

[1]Data per Dow and ASTM testing. Typical properties, not to be construed as specifications. Additional information available upon request.

Surlyn ionomers

ABUSE BARRIER OPTICS SEALANT TIE

SURLYN™ Ionomer Resins provide a distinctive combination of polymer properties for extrusion coating end uses. When extrusion coating, SURLYN™ resins' high melt strength allows it to be downgauged, and its high adhesion to foil allows for packing many aggressive food types. For the end-user, its excellent seal integrity – even through oil and grease – makes it an ideal choice for structures using metallized films/foils like sachets, pillow pouches, composite cans, and other packaging formats requiring high performance for acidic foods. Table 3 lists SURLYN™ resins used in extrusion coating applications.

Table 3: Overview of SURLYN™ Ionomer grades[1]

Product	Melt index	Ion Type	Additives	Applications
SURLYN™ 1652	5.2	Zn		Food packaging; heat seal layer for FFS pouch/bag, sachets, personal care, pharma; heat seal for 4-sided seal pouches/soups, instant coffee, sauces; tie layer or sealant for aluminum foil or metallized film/acidic foods
SURLYN™ 1652-1	4.5	Zn		Non-food packaging; heat seal layer for FFS pouch/bag sachets, personal care, heat seal for 4-sided seal pouches/tie layer or sealant for aluminum foil or metallized film
SURLYN™ 1652SR	5.4	Zn	Slip, chill roll release	Food packaging; heat seal layer for FFS pouch/bag, sachets, personal care, pharma; heat seal for 4-sided seal pouches/soups, instant coffee, sauces; tie layer or sealant for aluminum foil or metallized film/acidic foods
SURLYN™ 1652SB	4.6	Zn	Slip, antiblock	Food packaging; heat seal layer for FFS pouch/bag, sachets, personal care, pharma; heat seal for 4-sided seal pouches/soups, instant coffee, sauces; tie layer or sealant for aluminum foil or metallized film/acidic foods
SURLYN™ 1702	14.0	Zn		Food packaging; low-temperature sealing with high hot tack; lidding sealant for glass
SURLYN™ 1702-1	14.0	Zn		Non-food packaging; heat seal layer for FFS pouch/bag sachets, personal care, heat seal for 4-sided seal pouches/tie layer or sealant for aluminum foil or metallized film
SURLYN™ 1705-1	5.5	Zn		Coextrusion; high purpose sealant; lidding sealant for glass
SURLYN™ 1857	4.0	Zn	Acrylate	Lidding sealant for glass
SURLYN™ 1605	2.5	Na		Heat seal for 4-sided seal pouches, soups, instant coffee, sauces; heat seal layer in composite cans
SURLYN™ 1605SBR	3.0	Na	Slip, antiblock, chill roll release	Heat seal layer in composite cans

[1]Data per Dow and ASTM testing. Typical properties, not to be construed as specifications. Additional information available upon request.

Nucrel acid copolymers

NUCREL™ Ethylene Acid Copolymers provide excellent adhesion to aluminum and other polar substrates, as well as to nylon and paper. As a sealant layer in laminated and coextruded structures, NUCREL™ copolymers resist delamination and seal failure, even in aggressive chemical environments. Table 4 includes grades of NUCREL™ copolymers for the extrusion coating market.

Conpol additive resin

Concentrated masterbatches using CONPOL™ Additive Resins are designed to modify the surface properties of films and coatings that are made with SURLYN™ ionomers and NUCREL™ resins in order to provide for the anti-block and/or slip needs of packaging films.

Table 5: Overview of CONPOL™ Additive Resins[1]

Product	Additive	Base resin
CONPOL™ 13B	12.5% antiblock (silica)	EMAA
CONPOL™ 20B	20% antiblock (silica)	EMAA
CONPOL™ 20S1	20% slip agent	EMAA
CONPOL™ 20S2	20% slip agent	EMAA
CONPOL™ 5R	5% chill roll release	EMAA

[1]Data per Dow and ASTM testing. Typical properties, not to be construed as specifications. Additional information available upon request.

Table 4: Overview of NUCREL™ Acid Copolymers[1]

Product	Melt index	Comonomer	Applications
NUCREL™ AE	10.0	Proprietary	Modifier for blending into LDPE to enhance foil adhesion properties
NUCREL™ 0427HS	25.0	Proprietary	Modifier for blending into LDPE to enhance foil adhesion properties
NUCREL™ 0411HS	11.0	4% MAA	Coextrusion; general purpose sealant; PE adhesion modifier
NUCREL™ 0609HSA	9.0	6.5% MAA	Coextrusion; general purpose sealant
NUCREL™ 0910 NUCREL™ 0910HS	10.0	8.7% MAA	Coextrusion; general purpose sealant; tie layer to aluminum foil in liquid packaging
NUCREL™ 0908HS	8.0	9.2% MAA	Coextrusion; general purpose sealant; tie layer to aluminum foil in liquid packaging
NUCREL™ 30707	7.0	7% AA	Tie layer for aluminum foil or metallized films, toothpaste tubes, etc.
NUCREL™ 30907	7.0	6.9% AA	Tie layer for aluminum foil or metallized films, toothpaste tubes, etc.
NUCREL™ 3990	10.0	9.5% AA	Tie layer or sealant for aluminum foil or metallized film; acidic foods
NUCREL™ 599	450.0	10% MAA	Industrial compounding, coating of fabrics and foams
NUCREL™ 699	95.0	11% MAA	Industrial compounding, coating of fabrics and foams
NUCREL™ 925	25.0	15% MAA	Industrial compounding, coating of fabrics and foams
NUCREL™ 960	60.0	15% MAA	Industrial compounding, coating of fabrics and foams

[1]Data per Dow and ASTM testing. Typical properties, not to be construed as specifications. Additional information available upon request.

Appeel peelable resins

APPEEL™ Peelable Resins are a wide range of solvent-free, extrudable sealants designed to deliver easy opening/lidding functionality. Table 6 provides details regarding representative resins for extrusion coating.

Bynel adhesive resins

BYNEL™ Adhesive Resins are a family of high-performing products that offer low gel performance and exceptional adhesion across numerous substrates. They're used in a wide variety of applications, including sealants and tie layers. Table 7 lists BYNEL™ resins product grades and adhesion requirements.

Table 6: Overview of APPEEL™ coextrudable peelable resins[1]

Product	Melt index	Density	Base resin	Substrates	Applications
APPEEL™ 1181	8.9	0.96	EVA	PE, PP, PET, PVC, HIPS, Aluminum	Refrigerated/frozen foods, ice cream
APPEEL™ 11D554	9.5	0.93	EVA	PP, PS, PE, PET	General packaging applications
APPEEL™ 11D888	32.0	0.94	EVA	PP, PS, PE, PET, PVC	Refrigerated/frozen foods, ice cream
APPEEL™ 20D784	9.0	0.93	EMA	PP, PS, PVC, PE, PET	Refrigerated foods, ice cream, yogurt, etc.
APPEEL™ 20D828	13.0	1.02	EMA	PS, PP, PET, PE, PVC, ACN-MA, Aclar®, PCTFE, PVdC, Epoxy	Frozen juice cups, foil and film vacuum seals, pharma packaging
APPEEL™ 20D855	8.0	1.00	EMA	PS, PP, PET, PVC	Shelf-stable snack cups; hot-fill applications

®Aclar is a registered trademark of Honeywell.

Table 7: Overview of BYNEL™ coextrudable adhesive resins[1]

Product	Melt index	Base resin	Adhesion	Applications
BYNEL™ 1123	6.7	EVA	PE, EVA, PP, PS, PET	Coextrusion; thermal lamination film
BYNEL™ E418	12.0	EVA	PE, PP, PS, PVC, PA, PET, EVOH	Styrenic sheet, PS foams, adhesive films
BYNEL™ 2002	10.0	ACR	PE, EVA, PA, Ionomer, Alu Foil	Low-temperature extrusion or coex coating/laminating
BYNEL™ 2022	35.0	ACR	PE, EVA, PA, Ionomer, Alu Foil	Low-temperature extrusion or coex coating/laminating
BYNEL™ 21E533	7.1	EMA	PE, PP, PA, PET, EVOH	Diverse flexible packaging; fabric coextrusion and lamination
BYNEL™ 22E757	8.0	EMA	PE, PP, PET	Diverse flexible packaging; fabric coextrusion and lamination
BYNEL™ 41E710	2.7	LLDPE	PA, EVOH, PE	Concentrate
BYNEL™ 41E1057	3.0	VLDPE	PA, EVOH, PE	Concentrate
BYNEL™ 4288	4.7	LDPE	PA, EVOH, PE, Paper	Fully formulated for extrusion coating
BYNEL™ 42E703	6.0	LDPE	PE, PA, EVOH, Ionomer	Barrier for bag-in-box films, large pouches for institutional use
BYNEL™ 50E739	6.0	PP	PP, PA, EVOH	Coextrusion barrier coatings
BYNEL™ 50E806	25.0	PP	PP, PA, EVOH	Semi-concentrate
BYNEL™ 50E803	471.0	PP	PP, PA, EVOH	Concentrate

[1]Data per Dow and ASTM testing. Typical properties, not to be construed as specifications. Additional information available upon request.

Table 8: Overview of ELVAX™ Ethylene Vinyl Acetate Copolymers[1]

Product	Melt index	Comonomer	Additives	Applications
ELVAX™ 3124	7.0	9% VA		General purpose sealant
ELVAX™ 3155	25.0	15.5% VA		Thermal lamination films
ELVAX™ 3174	8.0	18% VA		HFSS applications desiring high optics
ELVAX™ 3174SHB	8.0	18% VA	Slip and antiblock	HFFS and VFFS applications needing lower CoF
ELVAX™ 3176	30.0	18% VA	Slip and chill roll release	Cheese packaging
ELVAX™ 3176CW-3	30.0	18% VA	Slip and chill roll release	Cheese packaging
ELVAX™ 3178Z	20.0	20% VA		Thermal lamination films
ELVAX™ 3200-2	32.0	22.5% VA	Wax	Simple peelable lidding
ELVAX™ 3175	6.0	28% VA		Coextrusion; thermal lamination of barrier film to tray
ELVAX™ 3180	25.0	28% VA		Coextrusion; thermal lamination of barrier film to tray
ELVAX™ 3185	43.0	32% VA		Coextrusion; thermal lamination of barrier film to tray

Elvax ethylene vinyl acetate copolymers

ELVAX™ EVA Copolymers provide excellent impact strength, puncture resistance, flex crack resistance, and adhesion – even at low temperatures. Used alone or blended with other resins, they can be fabricated as monolayer or coextruded films. See Table 8 for common grades used in extrusion coating and lamination.

Elvaloy AC acrylate copolymers

ELVALOY™ AC Copolymers offer good low-temperature toughness and adhesion between polyolefins such as PE and PP. They can be used alone or in blends for tailoring performance needs.

Table 9: Overview of ELVALOY™ AC Acrylate Copolymers[1]

Product	Weight %	Melt index	Density	Acrylate	Applications
ELVALOY™ AC 1609	9.0	6.0	0.930	MA	Industrial films and laminations; packaging films and laminations
ELVALOY™ AC 1913	13.0	9.0	0.930	MA	Industrial films and laminations; packaging films and laminations
ELVALOY™ AC 1820	20.0	8.0	0.942	MA	Industrial films and laminations; packaging films and laminations
ELVALOY™ AC 12024S	24.0	20.0	0.944	MA	Compounding masterbatches; industrial laminations

[1]Data per Dow and ASTM testing. Typical properties, not to be construed as specifications. Additional information available upon request.

Pack Studios: making things better, faster, together

We do it at Pack Studios. Across four continents. Nine countries. Ten sites (to date) and a global virtual network of key players in the packaging value chain. Our Pack Studios locations are geographic hubs tailor-made for imagining and creating new solutions. With our customers, we collaborate to accelerate the innovations that help them succeed.

For our customers in the extrusion coating and laminating markets, Pack Studios can be especially helpful, with new assets coming online and on-going improvements always in mind. Working together, we'll find ways our diverse catalog of extrusion coating & laminating products and our developmental, fabrication, and testing resources can meet your packaging needs – quickly, innovatively, and efficiently.

Let's get rolling.

We're ready to collaborate on your next need. To get in touch, or to learn more about extrusion coating and laminating products and capabilities from Dow, visit **www.dow.com/packaging**.

The latest technology

Pack Studios Freeport houses an industry-scale extrusion coating line for customer use. Recent upgrades to our Egan Davis-Standard/Black Clawson extrusion coating and lamination line include the following components and benefits:

- **Nordson EDI Ultraflow™ V-L Adjustable Co-extrusion Feedblock**
  - Produces multi-layer structures for a variety of customer applications
  - Validates tie layer capabilities
- **NDC Infrared Engineering Inc. Reflective Gauge System**
  - Synchronized with auto-die control system
- **Nordson EDI 36" Autoflex™ VI LH40 EPC Die**
  - Internal deckle system allows for edge bead control
  - Automated die lip adjustment ensures a flat web profile
- **ITW Pillar Combination Protean 1™ Pre-Treater**
  - For non-conductive and conductive substrates (e.g. - metallized film)
  - Corona treating in normal atmospheric air
  - Plasma treating using atmospheric gas control (several gas options and mixtures available)
  - Flame treating for paper, paperboard, and aluminum substrates
  - Flame only mode
  - Corona or Plasma only modes
  - Flame treating followed by Corona or Plasma treating in-line mode

The extrusion coating and laminating resources available through Pack Studios touch on development options across numerous applications:

- Food packaging
- Specialty packaging
- Foil laminations
- Board coating
- Carpet backing

To learn more about Pack Studios and extrusion coating and laminating opportunities at Pack Studios, visit **dowpackaging.com**.

pack STUDIOS

For more information about Dow, visit **www.dow.com/about.** To contact a Dow representative, visit, **www.dow.com/contact**.

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