h-old®

Tape Solutions for Electro-mechanical

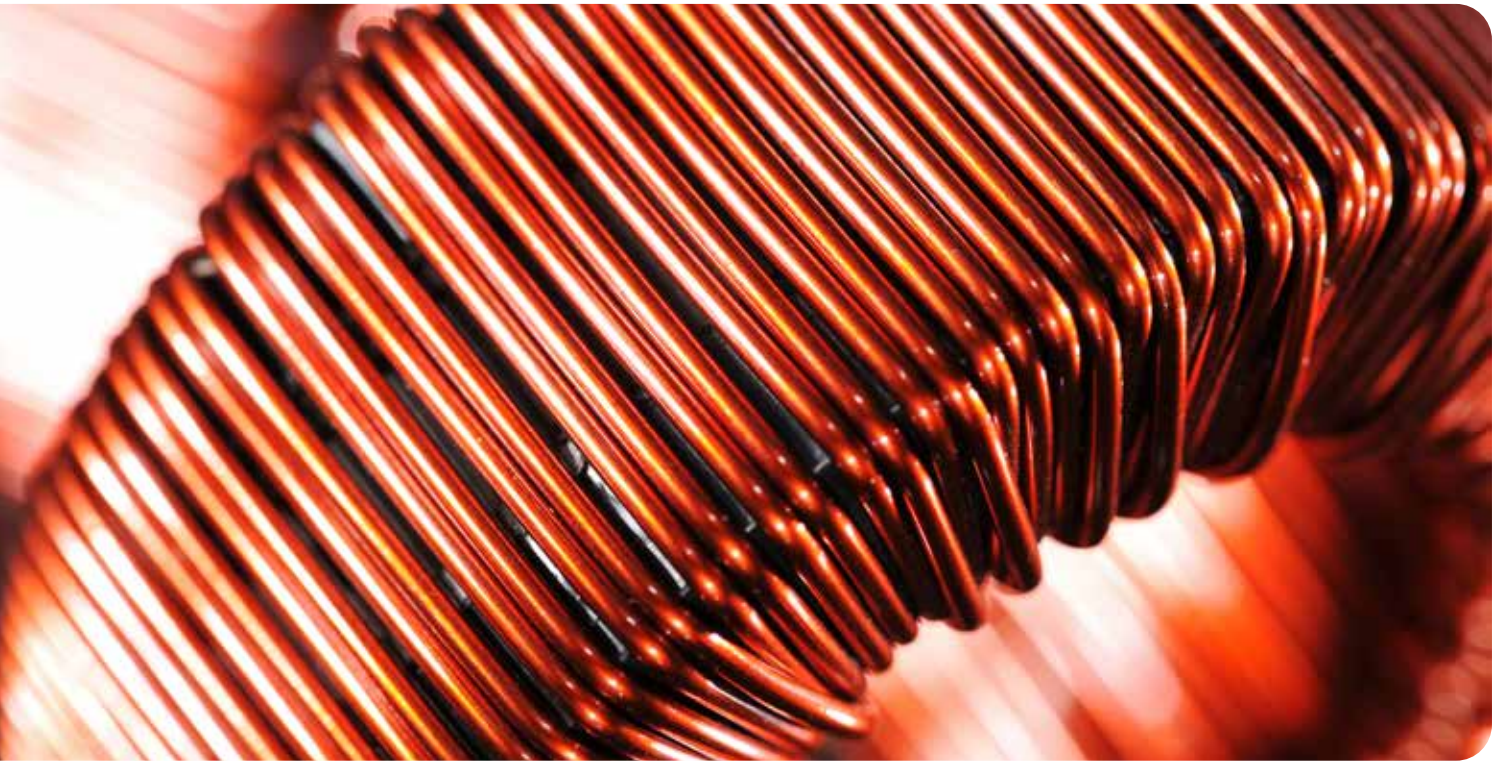
SAINT-GOBAIN

Tape Solutions for Electro-mechanical

Saint-Gobain® h-old® Tapes are designed to solve the most demanding needs of electro-mechanical applications, including transformers, motors, generators and coils. Our electrically insulating pressure sensitive adhesive tapes solve key electrical, thermal, dielectric, mechanical and chemical design challenges and assembly criteria through unique combinations of backings and adhesives. Take advantage of our knowledge and competence to use and convert high performance films and papers with acrylic-, silicone- or rubber-based adhesives or customize a solution to your exact requirements.

Many **h-old** products meet OEM requirements by being UL recognized (UL 510) under File UL OANZ2 E 178430 and 11 E.I.S. (Electrical Insulation Systems), with thermal capabilities ranging from Class A (105°C) to Class H (180°C). Additionally, chemical compatibility with common electrical insulation components has been validated by over 100 UL system designations (UL 1446). A more detailed overview of **h-old** UL listings can be found at the end of this brochure.

H-old products, which include Film, Fabric, Reinforced, Paper and Aramid are made in Italy and follow the highest standards, including certification according to DIN EN ISO 9001, DIN EN ISO 14001 and OHSAS 18001 health and safety management. Furthermore, **h-old** products comply with the regulations of REACH and RoHS to ensure our products are free of dangerous or suspect substances.



Film Insulation Tapes

Film Insulation Tapes offer good adhesion to various substrates, good conformability, thermal resistance and insulation of electronic components. PET Film Insulation Tapes are an economical solution, whereas tapes based on **Teonex**® and Polyimide offer increased thermal and dielectric resistance. Film Insulation Tapes are ideal for wrapping and interlayer insulation of coils for e-motors and transformers or masking applications. PTFE Tapes are best for non-stick applications while Non-woven Polyester Film Laminates offer good puncture resistance for coil and bobbin wrapping.

- Polyester Film Tapes (rubber, silicone, acrylics)
- Polyester Film Laminates to non-woven or paper
- Polyimide Film Tapes
- PTFE Film Tapes
- **Teonex** PEN Film Tapes

Fabric and Reinforced Insulation Tapes

The reinforcement of insulation tapes with glass cloth or glass filaments combines high tensile strength with good adhesion, high temperature resistance and good conformability, making these tapes the right choice for the insulation and outer wrapping of e-motors and dry or oil-filled transformers.

- Glass Cloth Tapes
- Polyester Film Tapes Reinforced with glass filament

Paper and Aramid Paper Insulation Tapes

Paper based tapes with rubber or silicone adhesives offer good conformability, dielectric strength, tensile strength and temperature resistance. Tapes designed with **Nomex**® aramid paper and acrylic or rubber adhesive combine even higher temperature resistance with high impregnation properties for insulation of e-motors, generators and transformers.

- **Nomex** (paper) Tapes
- Paper Adhesive Tapes

Foil Isolation Tapes

The natural conductivity, flexibility and malleability of foil insulation tapes provide superior electromagnetic and radio frequency absorption and isolation as well as oxidation and corrosion resistance. These UL registered foil tapes and File OARC2 E506272 are frequently used for EMI/RFI shielding, static charge draining and grounding by the printed circuit industry or in end connectors, shielded cabinets and devices.

- Copper Foil Tapes
- Aluminium Foil Tapes

Part Number	Colour†	Adhesive System	Backing Thickness		Adhesive Thickness		Total Thickness		Adhesion Strength		Tensile Strength		Elongation	Dielectric	Insulation Class	Temperature Range				Short Term		Comments
			mil	mm	mil	mm	mil	mm	oz/in	N/cm	lbs/in	N/cm	%	kV	°C	Min °F	Max °F	Min °C	Max °C	°F	°C	
POLYESTER FILM TAPES																						
P.31	Cl, Y, Bl, B, Nat	R	0.9	0.023	1.5	0.037	2.4	0.06	46	5.0	23	40	80	4.5	130 (B)	5	266	-15	130	320	160	UL File E178430
P.315	Y, Cl, B	R	2.0	0.050	1.5	0.037	3.4	0.087	55	6.0	40	70	100	7.0	130 (B)	5	266	-15	130	320	160	UL File E178430
11.B	Y, Bl	R	0.9	0.023	1.5	0.037	2.4	0.06	46	5.0	23	40	80	4.5	130 (B)	5	266	-15	130	320	160	UL File E178430
P.231	Y	R	0.9	0.023	2.6	0.067	3.5	0.09	46	5.0	23	40	80	4.5	130 (B)	-4	248	-20	120	320	160	
5369	Y	S	0.9	0.023	1.9	0.047	2.8	0.07	27	3.0	23	40	80	4.5	130 (B)	-94	356	-70	180	392	200	
5676	G	S	2.0	0.050	1.2	0.03	3.2	0.08	27	3.0	40	70	100	7.0	130 (B)	-94	356	-70	180	392	200	
12.SL	Cl, Bl, G (R*)	S	2.0	0.050	1.2	0.03	3.2	0.08	37	4.0	40	70	100	7.0	130 (B)	-94	356	-70	180	392	200	
6.SL	Cl, Bl, G, R	S	0.9	0.023	1.3	0.032	2.2	0.055	27	3.0	23	40	80	4.5	130 (B)	-94	356	-70	180	392	200	
P.40	Cl, Bl	S	0.9	0.023	1.5	0.037	2.4	0.06	27	3.0	23	40	80	4.5	130 (B)	-94	356	-70	180	392	200	
P.40	G, R	S	0.9	0.023	1.5	0.037	2.4	0.06	23	2.5	23	40	80	4.5	130 (B)	-94	356	-70	180	392	200	
P.42	Br	S	0.9	0.023	3.0	0.077	3.9	0.1	12	1.3	23	40	80	4.5	130 (B)	-94	356	-70	180	392	200	
P.43	Cl, G, Bl	S	1.4	0.036	1.5	0.039	3.0	0.075	26	2.8	31	55	90	7.0	130 (B)	-94	356	-70	180	392	200	
P.450	Bl, Cl	S	2.0	0.050	1.4	0.035	3.4	0.085	35	3.8	40	70	100	7.0	130 (B)	-94	356	-70	180	392	200	
P.450	G (R*, B*)	S	2.0	0.050	1.4	0.035	3.4	0.085	26	2.8	40	70	100	7.0	130 (B)	-94	356	-70	180	392	200	
P.4505	G (Cl*)	S	2.0	0.050	1.4	0.035	3.4	0.085	26	2.8	40	70	100	7.0	130 (B)	-94	356	-70	180	392	200	PET liner
P.34	Cl	A	0.9	0.023	1.5	0.037	2.4	0.06	32	3.5	23	40	80	4.5	130 (B)	-40	266	-40	130	356	180	UL File E178430
P.34	Y, R, G, Bl, B, W	A	0.9	0.023	1.5	0.037	2.4	0.06	23	2.5	23	40	80	4.5	130 (B)	-40	266	-40	130	356	180	UL File E178430
P.343	Cl	A	0.9	0.023	0.7	0.017	1.6	0.04	23	2.5	23	40	80	4.5	130 (B)	-40	266	-40	130	356	180	
P.355	Cl, Y	A	2.0	0.050	1.5	0.037	3.4	0.087	55	6.0	40	70	100	7.0	130 (B)	-40	266	-40	130	356	180	
10.B	Cl, Y, Bl, (B*)	A	0.9	0.023	1.5	0.037	2.4	0.06	46	5.0	23	40	80	4.5	130 (B)	-40	266	-40	130	356	180	UL File E178430
P.36	W	A	0.9	0.023	1.8	0.045	2.7	0.068	41	4.5	23	40	80	4.5	130 (B)	-22	266	-30	130	356	180	UL File E178430
POLYESTER FILM TAPES LAMINATED TO NON-WOVEN OR PAPER																						
40.AC	Cl	A	2.8	0.070	2.0	0.05	4.7	0.12	64	7.0	17	30	45	4.8	155 (F)	-22	311	-30	155	356	180	
PT.20/20	Cl	A	3.9	0.098	2.4	0.062	6.3	0.16	73	8.0	17	30	45	4.8	155 (F)	-40	311	-40	155	356	180	UL File E178430
PT.40	Cl	A	6.3	0.160	2.2	0.055	8.5	0.215	55	6.0	26	45	20	5.0	155 (F)	-40	311	-40	155	356	180	UL File E178430
4.B	W	R	2.8	0.070	1.6	0.04	4.3	0.11	55	6.0	20	35	25	4.8	130 (B)	5	266	-15	130	320	160	
PT.25	W	R	3.5	0.090	2.4	0.06	5.9	0.15	46	5.0	17	30	45	4.8	130 (B)	5	266	-15	130	320	160	UL File E178430
PT.45	W	R	7.1	0.180	2.2	0.055	9.3	0.235	59	6.5	26	45	20	5.0	130 (B)	5	266	-15	130	320	160	UL File E178430
R.180	Nat	R	6.3	0.160	2.4	0.06	8.7	0.22	59	6.5	40	70	20	8.0	130 (B)	5	266	-15	130	320	160	UL File E178430

Part Number	Colour†	Adhesive System	Backing Thickness		Adhesive Thickness		Total Thickness		Adhesion Strength		Tensile Strength		Elongation	Dielectric	Insulation Class	Temperature Range				Short Term		Comments
			mil	mm	mil	mm	mil	mm	oz/in	N/cm	lbs/in	N/cm	%	kV	°C	Min °F	Max °F	Min °C	Max °C	°F	°C	
POLYESTER FILM TAPES REINFORCED WITH GLASS FILAMENT																						
46.AC	Cl	A	3.0	0.075	2.0	0.05	4.9	0.125	55	6.0	126	220	5	5.0	155 (F)	-22	311	-30	155	356	180	
PS.25	Cl	A	3.3	0.085	2.8	0.07	6.1	0.155	69	7.5	217	380	5	5.0	155 (F)	-13	311	-25	155	356	180	UL File E178430
PS.30	Cl	A	3.9	0.100	3.0	0.075	6.9	0.175	64	7.0	314	550	5	5.0	155 (F)	-13	311	-25	155	356	180	UL File E178430
PVX.30	Cl	A	4.3	0.110	2.4	0.06	6.7	0.17	55	6.0	217	380	4	5.0	155 (F)	-13	266	-25	130	356	180	UL File E178430
6601	W	A	5.1	0.130	4.1	0.105	9.3	0.235	59	6.5	228	400	7	2.6	130 (B)	-22	266	-30	130	320	160	
PG.70	W	A	6.1	0.155	3.7	0.095	9.8	0.25	55	6.0	228	400	3	2.0	130 (B)	-13	266	-25	130	320	160	
PR.25	W	R	3.3	0.085	1.4	0.035	4.7	0.12	32	3.5	217	380	5	5.0	130 (B)	5	266	-15	130	320	160	UL File E178430
PR.30	Cl	R	3.9	0.100	3.0	0.075	6.9	0.175	37	4.0	314	550	5	5.0	130 (B)	5	266	-15	130	320	160	UL File E178430
PAPER ADHESIVE TAPES																						
6765	Nat	R	3.7	0.095	1.2	0.03	4.9	0.125	23	2.5	16	28	8			5	176	-15	80	194	90	
CP.50	Nat	R	4.3	0.110	1.6	0.04	5.9	0.15	23	2.5	26	45	9			5	212	-15	100	266	130	
SP.110	W	S	3.9	0.100	1.8	0.045	5.7	0.145	27	3.0	17	30	5			-94	356	-70	180	428	220	
GLASS CLOTH ADHESIVE TAPES																						
GL.94	W, B	A	4.7	0.120	1.8	0.045	6.5	0.165	37	4.0	171	300	5	2.5	155 (F)	-58	311	-50	155	356	180	UL File E178430
GL.95	W, B	R	4.7	0.120	2.0	0.05	6.7	0.17	32	3.5	171	300	5	2.5	130 (B)	5	266	-15	130	320	160	UL File E178430
GL.96	W	S	4.7	0.120	2.0	0.05	6.7	0.17	21	2.3	171	300	5	2.5	180 (H)	-112	356	-80	180	572	300	UL File E178430
GL.97	W	A	4.7	0.120	2.3	0.058	7.0	0.178	41	4.5	228	400	7	3.0	155 (F)	-58	311	-50	155	356	180	
GL.99	W	S	4.7	0.120	1.8	0.045	6.5	0.165	20	2.2	143	250	5	2.5	180 (H)	-94	356	-70	180	536	280	UL File E178430
TEONEX® PEN FILM ADHESIVE TAPES																						
K.30 AC	Cl	A	1.0	0.025	1.4	0.035	2.4	0.06	46	5.0	23	40	50	6.0	155 (F)	-94	311	-70	155	392	200	UL File E178430
K.50 AC	Bl (Cl on demand)	A	2.0	0.050	1.4	0.035	3.4	0.085	41	4.5	51	90	60	8.0	155 (F)	-94	311	-70	155	428	220	
K.30	Bl (Cl, R on demand)	S	1.0	0.025	1.4	0.035	2.4	0.06	27	3.0	23	40	50	6.0	180 (H)	-94	356	-70	180	464	240	UL File E178430
K.305		S	1.0	0.025	1.4	0.035	2.4	0.06	27	3.0	23	40	50	6.0	180 (H)	-94	356	-70	180	464	240	PET liner, UL File E178430
K.50	R (Cl and Bl on demand)	S	2.0	0.050	1.4	0.035	3.4	0.085	23	2.5	51	90	60	8.0	180 (H)	-94	356	-70	180	464	240	UL File E178430
K.505		S	2.0	0.050	1.4	0.035	3.4	0.085	23	2.5	51	90	60	8.0	180 (H)	-94	356	-70	180	464	240	PET liner

Part Number	Colour†	Adhesive System	Backing Thickness		Adhesive Thickness		Total Thickness		Adhesion Strength		Tensile Strength		Elongation	Dielectric	Insulation Class	Temperature Range				Short Term		Comments
			mil	mm	mil	mm	mil	mm	oz/in	N/cm	lbs/in	N/cm	%	kV	°C	Min °F	Max °F	Min °C	Max °C	°F	°C	
COPPER AND ALUMINIUM FOIL TAPES																						
4536	Met	A	1.4	0.036	1.5	0.039	3.0	0.075	50	5.5	37	65	6			-40	302	-40	150	356	180	
CUN.38	Met	A	1.6	0.040	1.8	0.045	3.4	0.085	37	4.0	29	50	6			-40	302	-40	150	356	180	Tin clad copper, electrically conductive adhesive
SCUT.36	Met	A	1.4	0.036	1.5	0.039	3.0	0.075	46	5.0	37	65	6			-40	302	-40	150	356	180	Electrically conductive adhesive, UL File E506272
CAL.40	Met	A	1.6	0.040	1.9	0.048	3.5	0.088	37	4.0	29	50	6			-40	302	-40	150	356	180	Electrically conductive adhesive
PTFE FILM ADHESIVE TAPES																						
TF.50	Br	S	2.0	0.050	2.0	0.05	3.9	0.1	27	3.0	23	40	100	9	180 (H)	-94	428	-70	220	500	260	UL File E178430
TFE.130	Gr	S	5.1	0.130	2.4	0.06	7.5	0.19	32	3.5	46	80	320	11.5	180 (H)	-94	428	-70	220	500	260	
POLYIMIDE FILM ADHESIVE TAPES																						
H.20 AC	Br	A	1.0	0.025	1.4	0.035	2.4	0.06	37	4.0	26	45	35	6.0	155 (F)	-40	311	-40	155	356	180	**Kapton**® film
H.50 AC	Br	A	2.0	0.050	1.6	0.04	3.5	0.09	35	3.8	43	75	35	10.0	155 (F)	-40	311	-40	155	356	180	**Kapton** film
70.AC	Br	A	1.0	0.025	1.4	0.035	2.4	0.06	37	4.0	23	40	35	6.0	155 (F)	-40	311	-40	155	356	180	UL File E178430
H.20	Br	S	1.0	0.025	1.4	0.035	2.4	0.06	21	2.3	26	45	35	6.5	180 (H)	-94	356	-70	180	500	260	**Kapton** film, UL File E178430
H.205	Br	S	1.0	0.025	1.4	0.035	2.4	0.06	21	2.3	26	45	35	6.5	180 (H)	-94	356	-70	180	500	260	**Kapton** film, PET liner
H.50	Br	S	2.0	0.050	1.4	0.035	3.4	0.085	23	2.5	43	75	35	10.0	180 (H)	-94	356	-70	180	500	260	**Kapton** film, UL File E178430
560	Br	S	1.0	0.025	1.4	0.035	2.4	0.06	21	2.3	23	40	35	6.0	180 (H)	-94	356	-70	180	500	260	
660	Br	S	2.0	0.050	1.4	0.035	3.4	0.085	23	2.5	43	75	35	10.0	180 (H)	-94	356	-70	180	500	260	
71.SL	Br	S	1.0	0.025	1.4	0.035	2.4	0.06	21	2.3	23	40	35	6.0	180 (H)	-94	356	-70	180	500	260	UL File E178430
KAPTON FILM TAPES																						
H.220	Br	S	1.0	0.025	3.0	0.075	3.9	0.1	25	2.7	26	45	35	6.5	180 (H)	-94	356	-70	180	500	260	PET liner

NOMEX® PAPER ADHESIVE TAPES

Part Number	Colour‡	Adhesive System	Backing Thickness		Adhesive Thickness		Total Thickness		Adhesion Strength		Tensile Strength		Elongation	Dielectric	Insulation Class	Temperature Range				Short Term		Comments
			mil	mm	mil	mm	mil	mm	oz/in	N/cm	lbs/in	N/cm	%	kV	°C	Min °F	Max °F	Min °C	Max °C	°F	°C	
X.50	W	A	2.0	0.050	2.0	0.05	3.9	0.1	50	5.5	20	35	5	2.5	155 (F)	-40	311	-40	155	356	180	UL File E178430
X.80	W	A	3.1	0.080	1.6	0.04	4.7	0.12	50	5.5	34	60	5	3.8	155 (F)	-40	311	-40	155	356	180	
X.130	W	A	5.1	0.130	2.0	0.05	7.1	0.18	64	7.0	63	110	5	5.0	155 (F)	-40	311	-40	155	356	180	
X.51	W	R	2.0	0.050	1.8	0.045	3.7	0.095	46	5.0	20	35	5	2.5	155 (F)	5	311	-15	155	320	160	UL File E178430
X.180	W	R	7.1	0.180	2.4	0.06	9.5	0.24	37	4.0	114	200	5	6.7	155 (F)	5	311	-15	155	356	180	
GX.50	W	R	4.3	0.110	1.6	0.04	5.9	0.15	41	4.5	91	160	3	3.5	155 (F)	5	311	-15	155	320	160	**Nomex**/ Glass cloth
PX.50	W	R	3.5	0.090	1.8	0.045	5.3	0.135	50	5.5	37	65	10	7.0	155 (F)	5	311	-15	155	320	160	**Nomex**/PET film, UL File E178430
RX.50	W	R	4.9	0.125	1.4	0.035	6.3	0.16	46	5.0	46	80	5	2.5	155 (F)	5	311	-15	155	320	160	**Nomex**/PET filaments, UL File E178430
19.F	W	R	3.5	0.090	1.8	0.045	5.3	0.135	50	5.5	37	65	10	7.0	155 (F)	5	311	-15	155	320	160	**Nomex**/PET film, UL File E178430

UL ELECTRICAL INSULATING SYSTEMS LISTING H-OLD ADHESIVE TAPES

File No	Manufacturer	System Designation	Thermal Class
E 217046	**h-old*** (2)	HT 180A	180°C (H)
E 765117	Dolph's (1)	DU 155J	155°C (F)
E 69939	DuPont Coating (2)	Z 130 HE	130°C (B)
E 69939	DuPont Coating (2)	R 150 HE	130°C (B)
E 69939	DuPont Coating (2)	Z 150 HE	130°C (B)
E 69939	DuPont Coating (2)	C 190 HE	130°C (B)
E 69939	DuPont Coating (2)	Z 200 HE	155°C (F)
E 69939	DuPont Coating (2)	R 201 HE	155°C (F)
E 69939	DuPont Coating (2)	R 203 HE	155°C (F)
E 69939	DuPont Coating (2)	C 290 HE	155°C (F)
E 69939	DuPont Coating (2)	CZ 255 HE	155°C (F)

Under Dolph's System are listed the following tapes of **h-old**:
P.31 - PR.30 - PT.25 - PR.25 - GL.94 - GL.95 - GL.96 - PX.50 - GX.50 - X.50 - PS.25 - PS.30 - H.20

(2) Under DuPont Coating Systems are listed the following tapes of **h-old**:
H.20 - H.20AC - GL.94 - GL.95 - GL.96 - K.30 - X.50 - PX.50 - PS.25 - P.31 - P.315 - P.34 - PT.25 - PT.20 - PR.30

(*) This File is the same as DuPont R 340 N (File No. E69939) but with tape component substitution.

Details of components provided in UL E.I.S. are available on website: **data.ul.com/systems**
General information about UL certification, recognised components etc. are available on website: **www.ul.com**

‡COLOUR LEGEND

B = Black Bl = Blue Br = Brown Cl = Clear G = Green Gr = Grey Met = Metallic Nat = Natural R = Red W = White Y = Yellow
* = on demand

Your Partner in Custom Tape Solutions

A custom tape solution can pay for itself many times over thanks to the process and product improvements it can provide. Tape development engineers will work with partners to design an economical but highly effective tape product.

Even with endless permutations of industrial tapes available there is only one company that can deliver a custom-made tape with optimal adhesive, the perfect backing materials, seamless process integration and superb performance.

To learn more about how **Saint-Gobain** can help solve tape and materials engineering challenges, call us or visit us online.

Scan to visit our website:

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As we constantly update our brochures, please check our website regularly for the latest versions.

All statements and information listed above regarding these products are typical values for general guidance, these data have not to be intended as conformity specification. These suggestions are based on tests we believe reliable, but are not guaranteed for accuracy and completeness. The user must test, evaluate and validate this product before the use, assuming risks and liability of such use. This document may be revised without prior notice. Suggested storage temperature is between 10°C and 30°C with 50% relative humidity.

IMPORTANT: It is the user's responsibility to ensure the suitability and safety of Saint-Gobain products for all intended uses and that the materials to be used comply with all applicable regulatory requirements. Saint-Gobain assumes no responsibility for any product failures that occur due to misuse of the materials it provides arising out of the design, fabrication or application of the products into which the materials are incorporated.

WARRANTY: For a period of six (6) months, Saint-Gobain warrants this product(s) to be free from defects in manufacturing. The only obligation under any applicable product warranty will be to replace any portion proving defective, or at our option, to refund the purchase price thereof. SAINT-GOBAIN DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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