tesa® ACX^plus TECHNICAL INFORMATION AND DATA SHEET

tesa® ACX^plus – The Best Performance for Every Task

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Constructive bonding is a key element in every industry and can be very challenging. For many applications, high-tech materials are used that have special structures and properties that need to be maintained. Dissimilar materials need to be bonded. Traditional mechanical fasteners like rivets, welds, screws, or liquid glue may not be suitable or can even damage these materials.

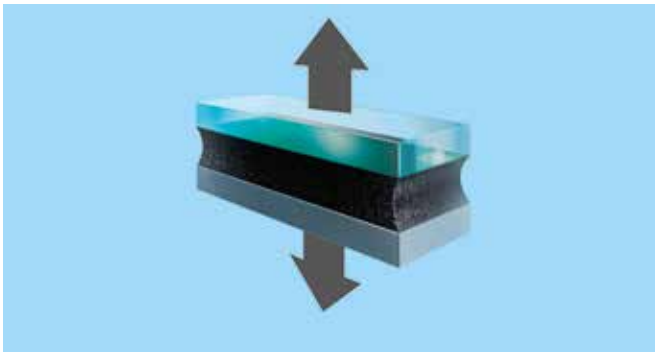
That is where our most innovative product comes into play: tesa® ACX^{plus}.

tesa® ACX^{plus} bonding solutions can outperform conventional fastening methods by optimizing our customers' production processes and the quality and aesthetics of their products.

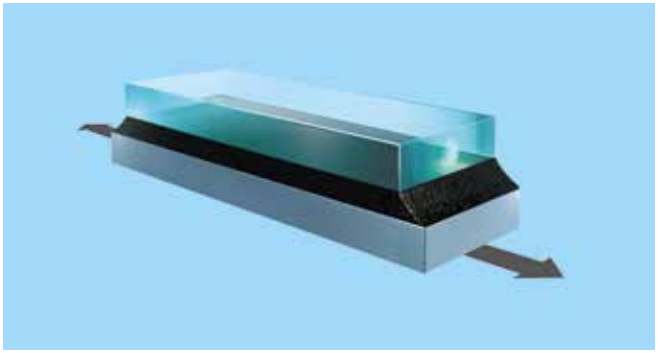
A high-quality and long-lasting bond requires a reliable tape that creates a perfect bond between different substrates, is suitable for outdoor use, and can withstand exposure to extreme temperatures, UV, chemicals, solvents, salt water, and cleaning agents.

The high performance of tesa® ACX^{plus} is based on its viscoelasticity: this leads to elastic and viscous characteristics, providing inner strength as well as relaxation of mechanical stresses. A special acrylic system results in the main features:

- Bonding power
- Stress dissipation
- Temperature and weather resistance



Bonding power



Stress dissipation

Temperature and weather resistance

Product Families

tesa® ACX^{plus} 704x Gray/White

Specially designed to allow invisible bonding of decorative elements, as the white and gray color adapts well to metal and plastic surfaces and avoids gleaming of translucent materials:

Product number	Thickness without liner [µm]	Construction	Color
tesa® 7042	500	Foamed pure acrylic	Gray or White
tesa® 7044	1,000		
tesa® 7046	1,500		
tesa® 7048	2,000		

tesa® ACX^{plus} 705x High Transparency

For constructions that involve transparent or translucent materials and where an invisible and durable bond is required, we recommend our high transparency series:

Product number	Thickness without liner [µm]	Construction	Color
tesa® 7054	500	Solid pure acrylic	Transparent
tesa® 7055	500		
tesa® 7056	1,000		
tesa® 7058	1,000		
tesa® 75530	3,000		

tesa® ACX^{plus} 706x High Adhesion

For materials with lower surface energy, commonly known as hard-to-bond materials, we recommend our high adhesion series:

Product number	Thickness without liner [µm]	Construction	Color
tesa® 7062	500	Foamed modified acrylic	Black
tesa® 7063	800		
tesa® 7065	1,200		
tesa® 7066	1,500		

tesa® ACX^{plus} 707x High Resistance

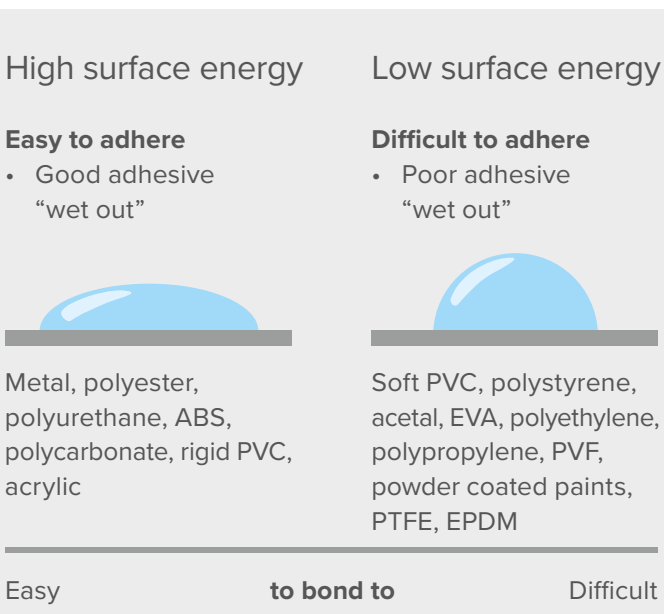
For challenging outdoor application and demanding conditions, such as very high temperatures or cold shock resistance, we recommend our high resistance series:

Product number	Thickness without liner [µm]	Construction	Color
tesa® 7072	500	Foamed pure acrylic	Black
tesa® 7074	1,000		
tesa® 7076	1,500		
tesa® 7078	2,000		
tesa® 70725	2,400		
tesa® 70730	2,900		
tesa® 70740	3,900		

tesa® ACX^{plus} 709x LSE Performer

For strong bonds to low surface energy substrates without the requirement of a surface pre-treatment (e.g. with adhesion promoter) and for processing tape in unheated production environments with temperatures down to 0 °C we recommend our LSE performer series:

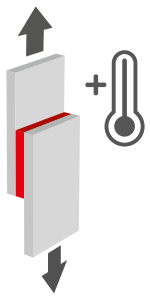
Product number	Thickness without liner [µm]	Construction	Color
tesa® 7092	500	Foamed pure acrylic	Black
tesa® 7094	1,000		
tesa® 7096	1,500		
tesa® 7098	2,000		



TECHNICAL FEATURES

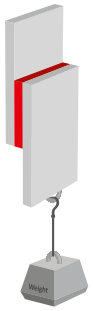
Temperature resistance

Temperature resistance characterizes the holding power of a tape in a product application at elevated temperatures. It is divided into short term (15 minutes) and long term (3 months). Subsequently, the tape's shear distance over the time is evaluated at elevated temperatures.



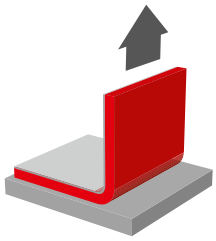
Static shear resistance

Shear resistance is defined by the inner cohesiveness of an adhesive and describes the holding power of a tape in a product application. Thus, shear resistance applies when the tape encounters high stress in the product application. A tape's shear resistance is measured in minutes by loading the tape with 5 N when adhered to a steel substrate on a 2.6 cm^2 bonding area at a temperature environment of 23°C and 50% humidity.



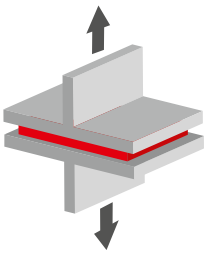
Peel adhesion

Adhesive strength describes the bonding power of the tape to steel. Hence, the value is an important parameter in any application. Its value depends significantly on the surface characteristics, the pressure, and the time exposed to the bonding materials. A tape's peel adhesion is measured in N/cm by peeling the tape at a 90° angle at a constant speed of 300 mm/min from the test substrate after 72 hours' dwell time.



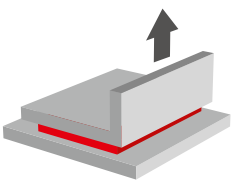
Dynamic tensile test (T-Block)

Method to determine the strength of double-sided adhesive tapes in z-direction. Two aluminum profiles in T-Shape, so called "T-Blocks", are bonded together with tesa® ACX^{plus} and pressed for 15 seconds with 110 N. After the dwell time of 24 hours, the test is carried out by separating the test piece in a tensile tester with a velocity of 300 mm/min. The measured maximum force is given as a result.



Dynamic cleavage test (L-Jig)

Method to determine the detachment force of tesa® ACX^{plus} under one-sided edge stress. A steel angle in L-shape, the "L-Jig", is fixed onto a test plate with tesa® ACX^{plus} and pressed for 5 seconds with 60 N. After the specified dwell time of 24 hours, a dynamic test is carried out with a constant speed of 300 mm/min.



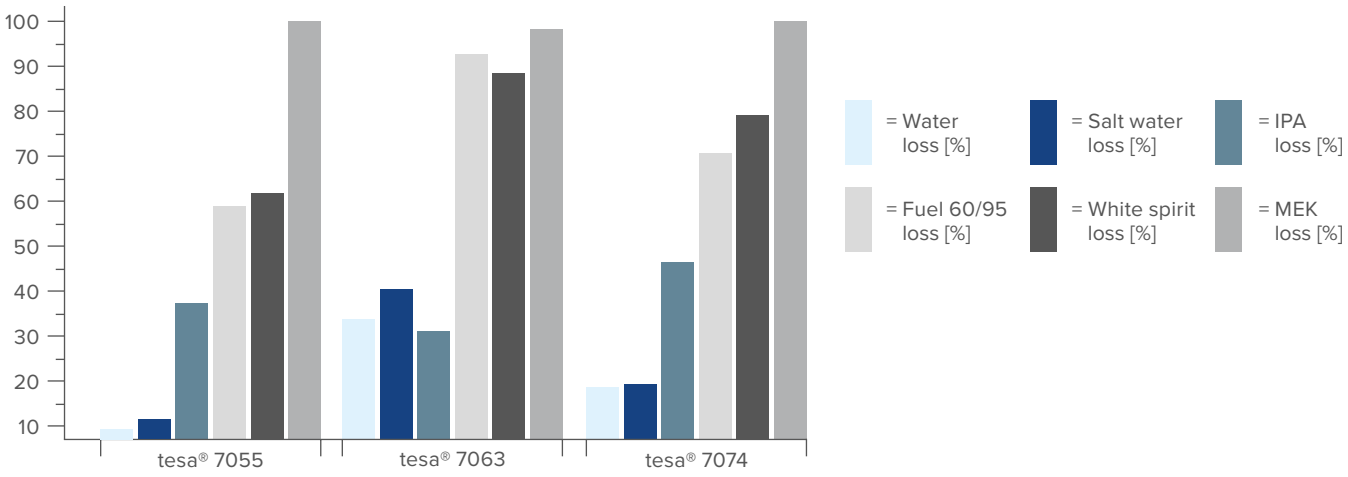
	tesa® ACX^{plus} tapes		Temperature resistance		Dynamic adhesion performance			Static shear
Product number	Thickness [µm]	Color	Short term minutes [°C]	Long term month [°C]	90° peel adhesion [N/cm]	Dynamic tensile test [N/cm²]	Dynamic cleavage test [N/2.5 cm]	Room temperature 5 N load [min]
tesa® ACX^{plus} 704x Gray/White								
tesa® 7042	500	Gray or White	200°C	110°C	23	≥100	≥250	≥10,000
tesa® 7044	1,000		200°C		33	≥100		
tesa® 7046	1,500		200°C		36	≥115		
tesa® 7048	2,000		170°C		38	≥110		
tesa® ACX^{plus} 705x High Transparency								
tesa® 7054	500	Trans-parent	200°C	100°C	19	≥80	≥220	≥10,000
tesa® 7055	1,000				24	≥80	≥250	
tesa® 7056	1,500				27	≥80	≥170	
tesa® 7058	2,000				29	≥50	≥170	
tesa® 75530	2,900				27	≥40	≥170	
tesa® ACX^{plus} 706x High Adhesion								
tesa® 7062	500	Deep black	170°C	70°C	24	≥90	≥250	≥10,000
tesa® 7063	800				30	≥110	≥220	
tesa® 7065	1,200				40	≥90	≥220	
tesa® 7066	1,500				45	≥80	≥320	
tesa® ACX^{plus} 707x High Resistance								
tesa® 7072	500	Deep black	220°C	120°C	20	≥50	≥200	≥10,000
tesa® 7074	1,000				30	≥50	≥210	
tesa® 7076	1,500				35	≥47	≥220	
tesa® 7078	2,000				40	≥45	≥230	
tesa® 70725	2,400				31	≥43	≥230	
tesa® 70730	2,900				44	≥40	≥230	
tesa® 70740	3,900				45	≥40	≥230	
tesa® ACX^{plus} 709x LSE Performer								
tesa® 7092	500	Deep black	100°C	80°C	40	70	≥250	≥10,000
tesa® 7094	1,000				40	70	≥215	
tesa® 7096	1,500				40	68	≥225	
tesa® 7098	2,000				40	68	≥235	

Note: The following technical information and features should be considered representative or typical and should not be used for specification purpose.

Solvent and fuel resistance

Product number	tesa® 7055	tesa® 7063	tesa® 7074
Peel adhesion after 72h storage in test solvent			
Water loss [%]	9	34	18
Salt water (3.4% NaCl) loss [%]	11	41	20
Isopropyl alcohol loss [%]	38	31	46
Fuel 60/95 loss [%]	59	93	71
White gas loss [%]	62	88	79
MEK loss [%]	100	97	100

Adhesion to steel after 72 hours' solvent immersion-loss of adhesion in %



Test method	Description	tesa® 7055	tesa® 7063	tesa® 7074
Electrical properties				
DIN EN 60243-1	Dielectric breakdown strength	26.5 kV/mm	22.5 kV/mm	25.5 kV/mm
DIN IEC 60093	Volume resistivity	70×10^{12} Ωcm	175×10^{12} Ωcm	2.0×10^{12} Ωcm
DIN IEC 60093	Surface resistivity	2.1×10^{15} Ω	3.6×10^{15} Ω	40.0×10^{12} Ω
VDE 0303 part 4, DIN 53483-1, and DIN 53483-2	Dielectric constant at 1 kHz	4.8	3.6	3.9
	Dissipation factor at 1 kHz	0.0274	0.0570	0.0099
VDE 0303 part 4, DIN 53483-1, and DIN 53483-2	Dielectric constant at 1 MHz	3.5	2.9	3.3
	Dissipation factor at 1 MHz	0.0895	0.0358	0.0770
Barrier properties				
DIN EN 821	Thermal conductivity	0.13 W/mK	0.07 W/mK	0.06 W/mK
Outgassing performance				
VDA 277	VOC in µg C/g	115	245	1015
DIN 75201	Fogging reflectometric (3 h, 100°C) in %	-0.35	-9.70	-0.97
DIN 75201	Fogging gravimetric (16 h, 100°C) in mg	2.4	0.7	2.6

Protection against water and LEED

Product number	Thickness [µm]	Color	Protection against water immersion	LEEDv4 and LEED 2009
tesa® ACX^{plus} 704x Gray/White				
tesa® 7042	50	Gray or White	Passed	1 credit point
tesa® 7044	1,000			
tesa® 7046	1,500			
tesa® 7048	2,000			
tesa® ACX^{plus} 705x High Transparency				
tesa® 7054	500	Transparent	Passed	1 credit point
tesa® 7055	1,000			
tesa® 7056	1,500			
tesa® 7058	2,000			
tesa® 75530	2,900			
tesa® ACX^{plus} 706x High Adhesion				
tesa® 7062	500	Deep black	Passed	1 credit point
tesa® 7063	800			
tesa® 7065	1,200			
tesa® 7066	1,500			
tesa® ACX^{plus} 707x High Resistance				
tesa® 7072	500	Deep black	Passed	1 credit point
tesa® 7074	1,000			
tesa® 7076	1,500			
tesa® 7078	2,000			
tesa® 70725	2,400			
tesa® 70730	2,900			
tesa® 70740	3,900			

Protection against water ingression, IPX 7 test method:
Immersion for 30 minutes at a depth of one meter after 72 hours' dwell time.

LEEDv4 and LEED 2009 EQ c4.1, SCAQMD rule 1168:
All tesa® ACX^{plus} products contain <5 g/L VOC and therefore contribute for one credit point according to LEED v4.

UL 746C – File QOQW2.E309290
Double-sided adhesive tape, suitable for indoor and outdoor applications

Product family	Substrates	Temperature rating	
		Minimum	Maximum
705x High Transparency	PC	-35°C	90°C
	Aluminum (anodized), glass		105°C
	ABS		75°C
706x High Adhesion	PC, aluminum (anodized), glass, galvanized steel		90°C
	ABS		75°C
707x High Resistance	Aluminum (anodized), glass, galvanized steel, stainless steel		120°C
	ABS		60°C

Cycle test at: 24-hour immersion in water, 96 hours at 35°C/95% r.h., 8 hours at -35°C ➔ three repetitions, 120 days' storage at 155°C for a temperature rating of 120°C, followed by dynamic shear test, seven days' storage at 60°C/95% r.h.

Shelf life

The shelf life of tesa® ACX^{plus} products is 12 months from the date of delivery if the storage and transportation guidelines are followed. tesa® ACX^{plus} should be stored at temperatures between 15°C and 35°C avoiding high humidity. Ensuring that no dust, dirt, or any contamination enters during transportation and storage will prevent any damage or deformation of the packaging. All slitted edges should be covered with suitable separators made of siliconized film.

Die-cut ability and spools tesa® ACX^{plus}

All tesa ®ACX^{plus} products are able to be die-cut and available in spools, logs, and hand rolls.

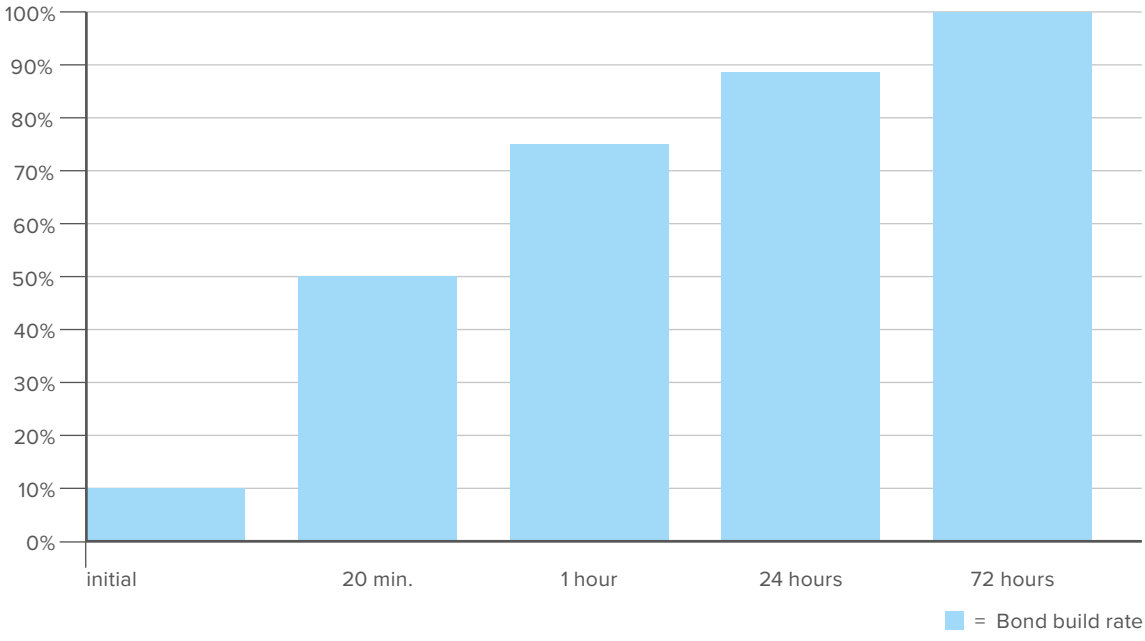
Application guide

It is important to follow some specific rules when applying tesa® ACX^{plus} products in order to have an appropriate working area and to achieve the maximum performance of our acrylic core tapes. The surface should be free of dust, grease, oil, moisture, and other contaminants as they will decrease the level of bonding significantly. For correct cleaning of the surface, use appropriate solvents such as ethanol or isopropanol or our tesa Industry Cleaner together with a lint-free cloth. Please always test the surface before using solvents. We don't recommend using them on PC or PMMA. Recommended ambient and application temperature is between 15°C and 30°C, avoiding sharp temperature changes over the day. The tape and bonded materials should be stored at this temperature as well. Bonding power and humidity resistance can be enhanced significantly by using tesa Adhesion Promoter.

The tape should be applied with sufficient pressure, a uniform pressure of 20 N/cm^2 over the complete area. The bonding strength of tesa® ACX^{plus} will increase over time as the high-performing acrylic system flows onto the bonding surface. At a room temperature of 21°C and 50% rel. humidity, 50% of the total bonding power will be achieved after 20 minutes, and complete strength after 72 hours. Applying tesa Adhesion Promoter can also have the positive effect of increasing the bond strength and achieving the complete strength faster.

General application guidelines are available upon request.

Bond build rate tesa® ACX^{plus}



PROVEN QUALITY

Confirmed and tested by independent institutes

tecnalia	ETAG 003, Category IV Resistance to functional damage from hard body impact load – 0.5 kg steel ball. Resistance to functional damage from soft body impact load – 50 kg bag UN-EN ISO 140-3: Certificate for sound reduction index
UL	UL 746C
MFPA	DIN EN 13501-1:2012
TÜVRheinland	Static shear test including mathematical extrapolation up to ten years
ift	Dynamic tensile and shear measurements according to VE-08/1 ift DI-02/1-2: 2009-03
MPA	Dynamic tensile measurement according to ETAG 002
CSTB	Static shear and static tensile load Creep measurement according to ETAG002
GBC	LEED (EQ credit 4.1: Low-Emitting Materials: adhesive and sealants)
Falcão Bauer	Full part wind load test regarding ABNT NBR 10821-3/11
INGENIERÍA DICTUC	AAMA 501.6-09 Earthquake Test
ATRI	STN EN ISO 6892-1 Road Sign
Architectural Testing	ASTM E 284-04, 330-02,331-00 Rain Screen Testing
JAMES COOK UNIVERSITY AUSTRALIA	AS 4040.2/3, AS 4040.3 Cyclone Testing

Company certificates

- ISO/TS 16949: 2009/Quality Management System
- ISO 9001: 2008/Quality Management System
- ISO 14001: 2004 + Cor1:2009/Environmental Management System