

Two-components MK 50 series | bushing and bracket structural bonding on Carbon fibre cars seat shell

Short introduction: structural adhesives are increasingly present on the market together with the use of composites and/or combinations of different materials. Suitable for creating joints durable and lightweight components, structural adhesives have the right combination of adhesion, resistance and flexibility useful to create the ideal joint.

MK 50-06, MK 50-13 are two-component 1:1 mix-ratio methacrylate adhesives designed for the bonding of unprepared metals or with minimal surface preparation, as well as engineering plastics and composite reinforced materials.

Type of test preparation of MK 50-serie

Test results after curing of MK 50-serie

Lap Shear Strength (ASTM D-1002)

MK Climatic Aging Cycle → 40 steps

[8 h @ -45°C + 8 h @ 40°C (U.R. 98%) + 8 h @ 95°C]

[T° @ 23°C | specimen adhesive thickness @ 0,254 mm]

Al | Al → 22 ÷ 27 N/mm² (Cohesive Failure mode)

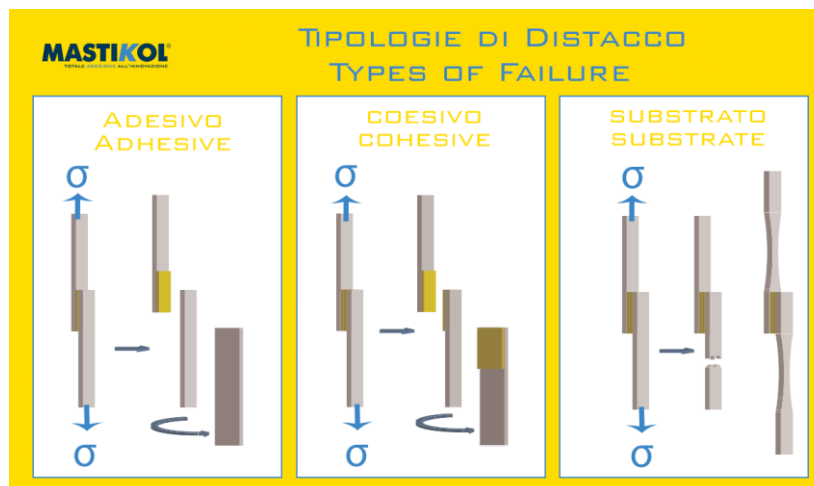
ABS | ABS → 6 ÷ 12 N/mm² (Thermoplastic Failure mode)

GRP | GRP → 6 ÷ 12 N/mm² (Fibre Failure)

CFK | CFK → 9 ÷ 16 N/mm² (Fibre Failure)

Al | CFK → 10 ÷ 12 N/mm² (Fibre Failure mode)

AISI 316 | AISI 316 → 20 ÷ 25 N/mm² (Cohesive Failure mode)



This internal preliminary study examined two typical components classically assembled through structural two-components adhesives during the construction of high-tech OEM' seats, the experience wanted to discover possible strength differences between the bonding of a cataphoresis steel (of standard bracket) and the same when abraded. During the preparation of the original substrates' specimens, the CFK was lightly abraded.

The test compared dissimilar two-component adhesive products on two different metal surface preparations; we are going to show/reporting only Mastikol product results. Looking at shear strength report, our product recorded a great result (the highest values), in addition in the best case (where bonded directly on cataphoresis steel !!) the failure of the CFK specimen has determinate the highest strength comparing to all the others cases recorded.

During A-4 shear-strength test, the paint has been removed from the metal surface but keeping up to 18.9 MPa of strength. Looking always to reduce manual operations/preparations before bonding and to **don't removing surface protections** such as painting, this experience shows us only advantages for MK 50 series: a technology that allows to achieve adhesion strength always at high level of 17 MPa when used to bond different materials but in particular when used directly onto **KTL painted steel**.



Test Report

Prodotto : MK 50-xx	Materiale : CFK d=0,6 mm // STEEL d=1,7 mm
Tipo di Prova : Lap Shear Strength	Note... : CFK - Cataphoresis bracket
Precarico : 150 N	
Velocità di prova : 1,3 mm/min	

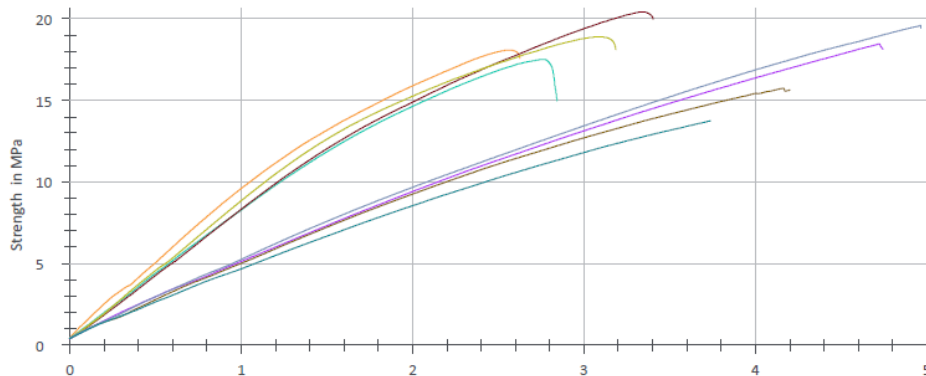
Test Results

Legenda	ID provino	Batch n°	a ₀ mm	b ₀ mm	F _{Max} N	F _{Max 2} kg	R _m MPa	A _{gt} %	A _t %	t _{Test} s	Dettagli sulla rottura
	A-1	ABRADED	30	12	6511,51	663,99	18,1	2,6	2,6	102,64	85% CF + 15% FF
	A-2	ABRADED	30	12	6304,95	642,93	17,5	2,8	2,8	110,64	100% CF
	A-3	CATAPHORESIS	30	12	7356,81	750,19	20,4	3,3	3,4	131,34	100% SF (LAMINATE)
	A-4	CATAPHORESIS	30	12	6804,03	693,82	18,9	3,1	3,2	123,28	100% SF (PAINT)
	A-5	CATAPHORESIS	30	12	6648,72	677,98	18,5	4,7	4,7	94,74	100% CF
	A-6	CATAPHORESIS	30	12	5672,76	578,46	15,8	4,2	4,2	84,48	100% SF (LAMINATE)
	A-7	CATAPHORESIS	30	12	7055,95	719,51	19,6	5,0	5,0	103,08	100% SF (LAMINATE)
	A-8	CATAPHORESIS	30	12	4948,89	504,65	13,7	3,7	3,7	78,94	100% SF (LAMINATE)

Statistics

Series n = 8	a ₀ mm	b ₀ mm	F _{Max} N	F _{Max 2} kg	R _m MPa	F(1 mm) N	A _{gt} %	A _t %	t _{Test} s
\bar{x}	30	12	6412,95	653,94	17,8	3861,34	3,7	3,7	103,64
s	0,000	0,000	776,95	79,23	2,16	213,33	0,9	0,9	17,97
v [%]	0,00	0,00	12,12	12,12	12,12	5,52	24,25	23,18	17,34

Serie's Chart



Specimen's shape is not ASTM regular, because the material came directly from the production, we are active to complete the report congruently with the standard design for the specimens like D-1002 dimensions type in the near future.

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