



YOUR DEVELOPMENT PARTNER

UN Regulation 118 Series 02

Influence of adhesive agent in samples

27th November 2018

01_ Objective of the work

02_ Samples

03_ Test results

04_ Conclusions

0.1 – Objective of the work

- ⊕ To determine the influence of adhesive agents used by component manufacturers and bodybuilders to create components used in the interior compartment, the engine compartment and any separate heating compartment
- ⊕ Different samples of composite materials has been tested in two different testing laboratories to get a more accurate result
- ⊕ Laboratories involved in the project has been:



• Instituto Universitario de Investigación del Automóvil

Campus Sur UPM. Carretera de Valencia (A3) km.7 28031 Madrid. www.insia-upm.es



• Idiada Automotive Technology – Heavy Duty Vehicles Homologation Department

Pol. Ind. L'Albornar, 43710 Santa Oliva, Tarragona. www.applusidiada.com

- ⊕ The test done is the “test to determine the vertical burning rate of materials” according to Annex 8 to UN Regulation 118 Series 02

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0.2 – Samples

- ⊕ All samples will be composite materials because they are created bonding materials using the same adhesive agent.
- ⊕ Sample size is 560x170 mm
- ⊕ The surface material has been always the same and has been changed the substrate material, it can be:
 - Metal sheet
 - Plywood (three layer plywood, thickness of 4,4 mm, density of 1,82 gr/cm³)
 - Fiberglass plates reinforced with polyester resin (FRP)
 - FRP type 1: Gelcoat+600 fiberglass+coremat+450 fiberglass+ resine
 - FRP type 2: Gelcoat+450 fiberglass+450 fiberglass+ resine
- ⊕ The surface material is a synthetic leather: (Poliurethane (exterior layer) + polyester, composite material, 2 layers, 1,25 mm – Gazebo Perla Liso)
- ⊕ The adhesive agent is (Contact glue, Golden Spray D-107 AY, comp: Isohexane+Toluene+Acetone+Ethyl Acetate)

0.2 – Samples

- ⊕ List of samples generated and the laboratory of testing

	INSIA	IDIADA
<ul style="list-style-type: none">• Synthetic leather	CF-0811	HVI-1811/507
<ul style="list-style-type: none">• Plywood	CF-0815	
<ul style="list-style-type: none">• FRP type 1		HVI-1807/30
<ul style="list-style-type: none">• FRP type 2		HVI-1807/41
<ul style="list-style-type: none">• Metal sheet + Synthetic leather	CF-0812	HVI-1811/527
<ul style="list-style-type: none">• Plywood + Synthetic leather	CF-0813	HVI-1811/524
<ul style="list-style-type: none">• FRP type 1 + Synthetic leather	CF-0814	
<ul style="list-style-type: none">• FRP type 2 + Synthetic leather		HVI-1811/513

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0.3 – Test Results

⊕ Sample identification

	INSIA	IDIADA
• Synthetic leather	CF-0811	HVI-1811/507
• Plywood	CF-0815	
• FRP type 1		HVI-1807/30
• FRP type 2		HVI-1807/41
• Metal sheet + Synthetic leather	CF-0812	HVI-1811/527
• Plywood + Synthetic leather	CF-0813	HVI-1811/524
• FRP type 1 + Synthetic leather	CF-0814	
• FRP type 2 + Synthetic leather		HVI-1811/513

0.3 – Test Results

0.3.1 – Test results from INSIA

		1st marker threads			2nd marker threads			3rd marker threads		
		t1	d1	v1	t2	d2	v2	t3	d3	v3
Synthetic leather	t=5 seg		220			150			150	
	t=15 seg	13	220	1015,4	12	150	750,0	31	150	290,3
	t=15 seg		220			150			150	
Metal sheet + Synthetic leather	t=5 seg		220			150			150	
	t=15 seg		220			150			150	
	t=15 seg		220			150			150	
Plywood + Synthetic leather	t=5 seg		220			150			150	
	t=15 seg		220			150			150	
	t=15 seg		220			150			150	
FRP type 1 + Synthetic leather	t=5 seg		220			150			150	
	t=15 seg	146	220	90,4	120	150	75,0	58	150	155,2
	t=15 seg		220			150			150	
Plywood	t=5 seg		220			150			150	
	t=15 seg		220			150			150	
	t=15 seg	64	220	206,3	48	150	187,5	34	150	264,7

0.3 – Test Results

0.3.2 – Test results from IDIADA

		1st marker threads			2nd marker threads			3rd marker threads		
		t1	d1	v1	t2	d2	v2	t3	d3	v3
Synthetic leather										
	t=15 seg		220			150			150	
	t=15 seg	1	220	13200,0	(*)	150			150	
	t=15 seg		220			150			150	
FRP type 1		t1	d1	v1	t2	d2	v2	t3	d3	v3
	t=15 seg		220			150			150	
	t=15 seg		220			150			150	
	t=15 seg		220			150			150	
FRP type 2		t1	d1	v1	t2	d2	v2	t3	d3	v3
	t=5 seg	95,5	220	138,2	10,8	150	833,3	24,5	150	367,3
	t=5 seg	97,6	220	135,2	12,3	150	731,7	26,6	150	338,3
	t=5 seg	102,6	220	128,7	14,1	150	638,3	23,4	150	384,6
Metal sheet + Synthetic leather		t1	d1	v1	t2	d2	v2	t3	d3	v3
	t=15 seg		220			150			150	
	t=15 seg		220			150			150	
	t=15 seg		220			150			150	
Plywood + Synthetic leather		t1	d1	v1	t2	d2	v2	t3	d3	v3
	t=15 seg		220			150			150	
	t=15 seg		220			150			150	
	t=15 seg		220			150			150	
FRP type 2 + Synthetic leather		t1	d1	v1	t2	d2	v2	t3	d3	v3
	t=15 seg		220			150			150	
	t=15 seg		220			150			150	
	t=15 seg		220			150			150	

(*) Burn while the burner flame is applied

01_ Objective of the work

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0.4 – Conclusions

Test results

	INSIA	IDIADA	RESULTS
• Synthetic leather	CF-0811	HVI-1811/507	BURN
• Plywood	CF-0815		BURN
• FRP type 1		HVI-1807/30	DO NOT BURN
• FRP type 2		HVI-1807/41	BURN
• Metal sheet + Synthetic leather	CF-0812	HVI-1811/527	DO NOT BURN
• Plywood + Synthetic leather	CF-0813	HVI-1811/524	DO NOT BURN
• FRP type 1 + Synthetic leather	CF-0814		BURN
• FRP type 2 + Synthetic leather		HVI-1811/513	DO NOT BURN

0.4 – Conclusions

Test results comments for base materials

We have chosen for the test some base materials that have burn in previous tests, but we have obtained also one “estrange result”

The plywood has burn, we think that the reason is that it’s a plywood very thin, of low quality and low density. Due to that the material has not been isotropic at the test

	INSIA	IDIADA	RESULTS
• Synthetic leather	CF-0811	HVI-1811/507	BURN
• Plywood	CF-0815		BURN
• FRP type 1		HVI-1807/30	DO NOT BURN
• FRP type 2		HVI-1807/41	BURN
• Metal sheet + Synthetic leather	CF-0812	HVI-1811/527	DO NOT BURN
• Plywood + Synthetic leather	CF-0813	HVI-1811/524	DO NOT BURN
• FRP type 1 + Synthetic leather	CF-0814		BURN
• FRP type 2 + Synthetic leather		HVI-1811/513	DO NOT BURN

0.4 – Conclusions

Test results comments for composite materials

FRP type 1 + Synthetic leather has burn, and we think this is also a “Strange result”, the FRP is hand made and in some cases could have density variations that could reduce the activation energy needed, so it can burn, only in one sample.

	INSIA	IDIADA	RESULTS
• Synthetic leather	CF-0811	HVI-1811/507	BURN
• Plywood	CF-0815		BURN
• FRP type 1		HVI-1807/30	DO NOT BURN
• FRP type 2		HVI-1807/41	BURN
• Metal sheet + Synthetic leather	CF-0812	HVI-1811/527	DO NOT BURN
• Plywood + Synthetic leather	CF-0813	HVI-1811/524	DO NOT BURN
• FRP type 1 + Synthetic leather	CF-0814		BURN
• FRP type 2 + Synthetic leather		HVI-1811/513	DO NOT BURN

0.4 – Conclusions

General comments

1- In general when a composite material is created by bonding two materials using glue, the new material created do not burn, because it has more density and less air between the layers, so it need more heat to be added to make it burn.

2- Any simple material that is bonded to another material becomes a new material that should be tested.

3- The composition of the bonding material must be declared in the documentation of the definition of composite materials

Thank you very much for your kind attention



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