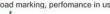


Asociación para el Estudio de las Tecnologías de Equipamiento de Carreteras, S.A

Quality control:

Durability test for road marking materials
 Road marking, perfomance in use





C/ Isaac Peral, nº 1 (nave 4). E-28914 Leganés (Madrid) - Spain Tel. +34 916 800 160 - Fax. + 34 916 886 001 - aetec@aetec.es

ROAD MARKING MATERIALS (Durability against abrasion: UNE-EN 13197:2012+A1:2014)

CERTIFICATE OF DURABILITY TEST

REF.

Client:

EUPINCA S.A.

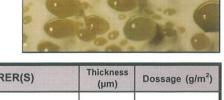
C/ Londres 13, Pol. Ind. Cabezo Beaza 30353 CARTAGENA - Murcia - ESPAÑA

Issue date:

October 05th, 2016

1.-**TESTED ROAD MARKING SYSTEM**

IDENTIFICATION



MATERIALS IDENTIFICATION, TRADE MARK NAME AND TYPE OF APPLICATION		MANUFACTURER(S)	Thickness (µm)	Dossage (g/m²)
Nature: Trade mark ¹ : Applied by:	White acrylic paint TKROM ACRÍLICO TRÁFICO PRO Spray	EUPINCA S.A.	-	850
Nature: Trade mark ² : Applied by:	Glass beads ECHOSTAR 20 SBP Drop-on	SOVITEC		480

TYPE OF MATERIAL:

White acrylic paint without premix glass beads applied by spray and with drop-on glass beads.

CHARACTERISTIC OF THE ROAD MARKING:

(in accordance with UNE-EN 1436:2009+A1:2009)

Not structured

- 1) The characteristics of identification of the material can be obtained from the own manufacturer or in this laboratory with his autorization.
- 2) The tested material is identified by its CE Declaration of Conformity and their accompanying documents.

B) TEST RESULTS: on roughness (in accordance with UNE-EN 13197:2012+A1:2014)



REQ	UIREMENTS OF THE ROAD MARKING in accordance with UNE-EN 1436:2009+A1:2009			express	ed in TRAFFIC	OURABILITY CLASSES, in accord 197:2012+A1:2014	dance with UNE-EN
According to the intend	led use of the road marking system, not all requirements ar	re necesaries	Expressed in	P0	P4	P5	21
		dry	Class (R)	R5	R4	R4	*
Night-time visibility Coefficient of retro reflections of the coefficient of retro reflections of the coefficient of the coeff	Coefficient of retro reflected luminance R _L	rain	Class (RR)	RR2	RR2	RR1	
		wet	Class (RW)	RW5	RW4	RW3	
Luminance coeficient in diffuse illumination Qd		Class (Q)	Q5	Q5	Q5		
Day-time visibility	or luminance factor ß		Class (B)	B5	B5	B5	
	Chromatcity coordinates (x,y)		Pass / Not Pass	pass	pass	pass	
Skid resistence	SRT units		Class (S)	S2	S2	S2	
Туре	Type road marking system		Type I / II			II	
IO PICKUP-TIME:	-EN 13197:2012+A1:2014		Class (T)			T4	

			1.0	la of
Date of start of the test:	August 8th, 2016	Date of end the test:	13/	August 29th, 2016
			1401	aciec les

CERTIFICATE OF	Ref.	lssue date	aboratory Manager	4-18	Document reference	
DURABILITY TEST	2040/0 00 #	0 - 1 - 1 - 2 0 54 b - 2 0 4 C	auda -	2891.4	I-7-MC Rev. 9	
This certificate is identical to	3919/P-RR-II	October 05th, 2016	- V	A Perg of	A CONTRACTOR OF THE CONTRACTOR	
the original spanish version.), Francisco J. Guerra		Rage 1 of	400000

2.- TEST CONDITIONS:

in accordance with the specifications given in UNE-EN 13197:2012+A1:2014

Size: Test plates: Roughness: ta amb: 24% Material temperature (thermoplastic) °C: Conditions during application: 32°C HR: Glass beads: 0,00 Others materials: Materials applied, % desviation on requested: Film maker material: -3,06 Antiskid aggregates: Mixture: Premix: Test Tyres: **NEUMÁTICO COMERCIAL 205/60 R15** Numer of wheels: 3000 ± 300 Load on wheels (N): $0,25 \pm 0,02$ Tyre air pressure (Mpa): 0° ± 20' Support angle (degrees): alternating + 1° (± 10') / - 1° (± 10') Steering angle (degrees): Room temperature: between + 5°C y + 10°C In accordance with UNE-EN 13197:2012+A1:2014 Dryving cycle: Periodicity of measurements: 0,01; 0,1; 0,2; 0,5; 1,0; 2,0; 3,0 and 4,0 x 10⁶ wheel passages Desviations:

3.- PASS/FAIL CRITERIA:

CARACTERISTIC	TECHINCAL CLASSES AND MINIMUM VALUES	
Night-time visibility under	R _L DRY	R2 (100) ¹ - R1 (80) ²
conditions: (mcd·m	R _L RAIN	RR1 (25)
² ·lx ⁻¹)	R _L WET	RW1 (25)
	(x,y)	inside the relevant polygon
Day-time visibility	β	B2 (0,3)1 - B1 (0,2)2
	Qd (mcd·m ⁻² ·lx ⁻¹)	Q2 (100) ¹ - Q1 (80) ²
Skid resistance	SRT	S1 (45)

TRAFFIC CLASSES AND REQUIRED N° OF ROLL-OVERS in accordance with UNE-EN 13197:2012+A1:2014				
TRAFFIC CLASS	N° ROLL-OVERS x 10 ⁶			
P0	<0,05			
P1	0,05 (optional)			
P2	0,1			
P3	0,2			
P4	0,5			
P5	1,0			
P6	2,0			
P7	4,0			

4.- TEST RESULTS: initial and retained values and their techical classes

in accordance with UNE-EN 1436:2009+A1:2009

Techolo

CARACTERISTIC		value and for each number of roll-overs x 10 ⁶					Uncertainty	
		0,01 (P0)	0,1 (P2)	0,2 (P3)	0,5 (P4)	1,0 (P5)		Oncortainty
Nicht fine ciclettit.	dry	348	338	327	293	254		±7%
Night-time visibility R _L (mcd·m ⁻² ·lx ⁻¹)	rain	48	50	35	35	27		± 8 %
KE (mea.m. ax.)	wet	118	96	87	80	63		± 8 %
	×	0,328	0,328	0,329	0,330	0,330		± 0,004
Day day a statistic	у	0,348	0,349	0,349	0,350	0,350		± 0,004
Day-time visibility	β	0,659	0,637	0,653	0,641	0,632		± 0,013
	Qd (mcd·m ⁻² ·lx ⁻¹)	214	216	222	218	217		±8%
0111	SRT	51	50	50	50	50		± 5
Skid resistance	Temperature water used in the test (°C)	31	30	30	23	25		± 0,2

5.- KEY WORDS FOR IDENTIFICATION OF ROAD MARKING ASSEMBLY:

There are three groups of key words:

A first key word to identify if is for permanent or for temporary purposes.

P For a permanent road marking assembly.

T For a temporary road marking assembly.

A second key to identify the retrorreflective properties of the road marking assembly:

R For a road marking assembly retrorreflective under dry conditions.

RW For a road marking assembly retrorreflective under dry and wet conditions.

RR For a road marking assembly retrorreflective under dry, wet and rain conditions.

NR For a road marking assembly not retrorreflective.

A third key to identify the type of the road marking assembly:

I For a conventional road marking.

II For a road marking assembly with special properties to enhance the retroreflection on wet or/and rainy conditions.

6.- NOTE:

The results in this report relate only to the samples tested and cannot be extended to other manufacturer's production.

The results achieved by a road marking assembly on the durability test, shall not be interpreted as being a guarantee for working life in practice. The later depends on many factors beyond the materials such as design, location (type of road surface, weather conditions, etc) and application conditions.

CERTIFICATE OF DURABILITY TEST This certificate is identical to Ref. Issue date Laberatory Manager Laberatory Manager Discument reference 1889 1989 1989 1989 1989 1989 1989 19					/ E
	TEST	WALL THE		269	Document reference
	This certificate is identical to the original spanish version.	D. Francisco J. Guerra	1	V	Page 2 of 2

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Asociación para el Estudio de las Tecnologías de Equipamiento de Carreteras, S.A

Quality control:

- Durability test for road marking materials Road marking, perfomance in use



C/ Isaac Peral, nº 1 (nave 4). E-28914 Leganés (Madrid) - Spain Tel. +34 916 800 160 - Fax. + 34 916 886 001 - aetec@aetec.es

ROAD MARKING MATERIALS

(Durability against abrasion: UNE-EN 13197:2012+A1:2014)

CERTIFICATE OF DURABILITY TEST

REF.

3919/P-RW-II

Client:

EUPINCA S.A.

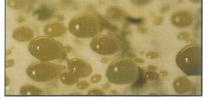
C/ Londres 13, Pol. Ind. Cabezo Beaza 30353 CARTAGENA - Murcia - ESPAÑA

Issue date:

October 05th, 2016

TESTED ROAD MARKING SYSTEM 1.-

IDENTIFICATION



MATERIALS IDENTIFICATION, TRADE MARK NAME AND TYPE OF APPLICATION		MANUFACTURER(S)	Thickness (µm)	Dossage (g/m²	
Nature: Trade mark ¹ : Applied by:	White acrylic paint TKROM ACRÍLICO TRÁFICO PRO Sprav	EUPINCA S.A.	-	850	
Nature: Trade mark ² : Applied by:	Glass beads ECHOSTAR 20 SBP Drop-on	SOVITEC		480	

TYPE OF MATERIAL:

White acrylic paint without premix glass beads applied by spray and with drop-on glass beads.

CHARACTERISTIC OF THE ROAD MARKING:

(in accordance with UNE-EN 1436:2009+A1:2009)

Not structured

- 1) The characteristics of identification of the material can be obtained from the own manufacturer or in this laboratory with his autorization.
- 2) The tested material is identified by its CE Declaration of Conformity and their accompanying documents.

TEST RESULTS: on roughness (in accordance with UNE-EN 13197:2012+A1:2014)



REQUIREMENTS OF THE ROAD MARKING SYSTEM in accordance with UNE-EN 1436:2009+A1:2009				DURABILITY expressed in TRAFFIC CLASSES, in accordance with UNE-EN 13197:2012+A1:2014				
According to the intend	ded use of the road marking system, not all requirements a	re necesaries	Expressed in	P0	P4	P5	P6	P7
Night-time Coefficient of actor reflected luminous B		Class (R)	R5	R4	R4	R4	R3	
visibility Coefficient of retro reflects	Coefficient of retro reflected luminance R _L	wet	Class (RW)	RW5	RW4	RW3	RW3	RW2
Luminance coeficient in diffuse illumination Qd		Class (Q)	Q5	Q5	Q5	Q5	Q5	
Day-time visibility	-time visibility or luminance factor ß		Class (B)	B5	B5	B5	B5	B5
	Chromatcity coordinates (x,y)		Pass / Not Pass	pass	pass	pass	pass	pass
Skid resistence SRT units		Class (S)	S2	S2	S2	S2	S2	
Type Type road marking system		Type I / II	II					
NO PICKUP-TIME: In accordance with UNE	-EN 13197:2012+A1:2014		Class (T)			T4		

		P	185 TE	CACIONIA
Date of start of the test:	August 8th, 2016	Date of end the test:	100	August 29th, 2016
			15/ MC	itac \s\
CERTIFICATE OF	Ref. Issue da	Laboratory Manager	us if	Document reference
DURABILITY TEST	3919/P-RW-II October 05	th 2016	67. LSa.	I-7-MC Rev. 9
This certificate is identical to	39 19/F-RWV-II October 03	D. Francisco V. Guerra	289144	Accepted 150
the original-spanish version.		D. Francisco-s. Guerra	Tolf Or	Page 1 of 2

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The validity status of the certificate can be confirmed in www.aetec.es

Size: G Test plates: Roughness Material temperature (thermoplastic) °C: Conditions during application: ta amb: 32°C HR: 24% Glass beads: 0,00 Others materials: Materials applied, % desviation on requested: Film maker material: -3.06Antiskid aggregates: Mixture: Premix: Test Tyres: NEUMÁTICO COMERCIAL 205/60 R15 Numer of wheels: Load on wheels (N): 3000 ± 300 Tyre air pressure (Mpa): $0,25 \pm 0,02$ Support angle (degrees): 0° ± 20' alternating + 1° (± 10') / - 1° (± 10') Steering angle (degrees): between + 5°C y + 10°C Room temperature: Dryving cycle: In accordance with UNE-EN 13197:2012+A1:2014 Periodicity of measurements: 0,01; 0,1; 0,2; 0,5; 1,0; 2,0; 3,0 and 4,0 x 10⁶ wheel passages Desviations:

3.- PASS/FAIL CRITERIA:

For yellow colour.

PERFORMANCE REQUIREME in accordance with	NTS OF THE ROAD I UNE-EN 1436:2009	
CARACTERISTIC		TECHINCAL CLASSES AND MINIMUM VALUES
Night-time visibility under	R _L DRY	R2 (100) ¹ - R1 (80) ²
conditions: (mcd·m	R _L RAIN	RR1 (25)
2·1x ⁻¹)	R _L WET	RW1 (25)
	(x,y)	inside the relevant polygon
Day-time visibility	β	B2 (0,3)1 - B1 (0,2)2
	Qd (mcd·m ⁻² ·lx ⁻¹)	Q2 (100) ¹ - Q1 (80) ²
Skid resistance	SRT	S1 (45)

TRAFFIC CLASSES AND REQUIRED № OF ROLL-OVERS in accordance with UNE-EN 13197:2012+A1:2014				
TRAFFIC CLASS	N° ROLL-OVERS x 106			
P0	<0,05			
P1	0,05 (optional)			
P2	0,1			
P3	0,2			
P4	0,5			
P5	1,0			
P6	2,0			
P7	4,0			

4.- TEST RESULTS: initial and retained values and their techical classes

in accordance with UNE-EN 1436:2009+A1:2009

CARACTERISTIC		value and for each number of roll-overs x 10 ⁶								
		0,01 (P0)	0,1 (P2)	0,2 (P3)	0,5 (P4)	1,0 (P5)	2,0 (P6)	3,0	4,0 (P7)	Uncertainty
Night-time visibility	dry	348	338	327	293	254	233	208	194	± 7 %
$R_L (mcd \cdot m^{-2} \cdot lx^{-1})$	wet	118	96	87	80	63	67	47	43	± 8 %
Day-time visibility	×	0,328	0,328	0,329	0,330	0,330	0,330	0,331	0,333	± 0,004
	у	0,348	0,349	0,349	0,350	0,350	0,350	0,351	0,353	± 0,004
	β	0,659	0,637	0,653	0,641	0,632	0,618	0,639	0,629	± 0,013
	Qd (mcd·m ⁻² ·lx ⁻¹)	214	216	222	218	217	211	213	221	±8%
Skid resistance	SRT	51	50	50	50	50	50	52	52	± 5
	Temperature water used in the test (°C)	31	30	30	23	25	25	25	30	± 0,2

5.- KEY WORDS FOR IDENTIFICATION OF ROAD MARKING ASSEMBLY:

There are three groups of key words:

A first key word to identify if is for permanent or for temporary purposes.

P For a permanent road marking assembly.

For a temporary road marking assembly.

A second key to identify the retrorreflective properties of the road marking assembly:

R For a road marking assembly retrorreflective under dry conditions.

RW For a road marking assembly retrorreflective under dry and wet conditions.
RR For a road marking assembly retrorreflective under dry, wet and rain conditions.

NR For a road marking assembly not retrorreflective.

A third key to identify the type of the road marking assembly:

I For a conventional road marking

II For a road marking assembly with special properties to enhance the retroreflection on wet or/and rainy conditions.

6.- NOTE:

The results in this report relate only to the samples tested and cannot be extended to other manufacturer's production.

The results achieved by a road marking assembly on the durability test, shall not be interpreted as being a guarantee for working life in practice. The tater depends on many factors beyond the materials such as design, location (type of road surface, weather conditions, etc) and application conditions.

CERTIFICATE OF DURABILITY TEST This certificate is identical to	October 05th, 2016		C/.	Document reference
the original spanish version.	D. Francisco J. Guerra	51.	6.677	Page 2 of 2





Asociación para el Estudio de las Tecnologías de Equipamiento de Carreteras, S.A

Quality control:

Durability test for road marking materials
 Road marking, perfomance in use





C/ Isaac Peral, nº 1 (nave 4). E-28914 Leganés (Madrid) - Spain Tel. +34 916 800 160 - Fax. + 34 916 886 001 - aetec@aetec.es

ROAD MARKING MATERIALS

(Durability against abrasion: UNE-EN 13197:2012+A1:2014)

CERTIFICATE OF DUBABILITY TEST

REF.

3745/P-R-I/A1

Client:

EUPINCA S.A.

C/ Londres 13, Pol. Ind. Cabezo Beaza 30353 CARTAGENA - Murcia - ESPAÑA

Issue date:

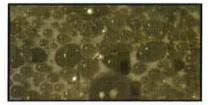
May 18th, 2016

This certificate substitutes the former with number 3745/P-R-I due to it had editorial mistakes,

1.-**TESTED ROAD MARKING SYSTEM**

IDENTIFICATION

(in accordance to UNE-EN 1436:2009+A1:2009)



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		. = 0
SOVITEC		480
х		x
	х	

- 1) The characteristics of identification of the material can be obtained from the own manufacturer or in this laboratory with his autorization.
- 2) The tested material is identified by its CE Declaration of Conformity and their accompanying documents.

TEST RESULTS: on roughness (in accordance to UNE-EN 13197:2012+A1:2014)

RG2

REQ	UIREMENTS OF THE ROAD MARKING in accordance to UNE-EN 1436:2009+A1:2009	DURABILITY expressed in TRAFFIC CLASSES, in accordance to UNE-EN 13197:2012+A1:2014						
According to the intend	led use of the road marking system, not all requirements a	re necesarles	Expressed In	P0	P4	P5	P6	P7
Night-time visibility	Coefficient of retro reflected luminance R _L	dry	Class (R)	R5	R4	R4	R4	R3
	Luminance coeficient in diffuse illuminati	Class (Q)	Q5	Q5	Q5	Q 5	Q5	
Day-time visibility	or luminance factor ß		Class (B)	B 5	B5	B5	B5	В3
	Chromatcity coordinates (x,y)	Pass / Not Pass	pass	pass	pass	pass	pass	
Skid resistence	SRT units	Class (S)	S4	S 3	S 3	S 3	S 3	
Туре	Type road marking system	Type I / II	ıı l				,	
NO PICKUP-TIME: In accordance with UNE	Class (T)	T3						

Date of start of the test:	March 28th, 2016	Date of end the test:	13/	OHI	April 25th, 2016
Andreas and the state of the st			J.	Or Co	neral 1 E
CERTIFICATE OF DURABILITY TEST This certificate is identical to the original against version	Ref. Issue date 3745/P-R-I/A1 May 18th, 201	Laboratory Manager	4	gota is reli. 91	Document référence

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A Asociacia

2.- TEST CONDITIONS:

in accordance with the specifications given in UNE-EN 13197:2012+A1:2014

Test plates:	1		Roug	hness:	RG2	Size:	G
Conditions during application:	t ^a amb:	17°C	HR:	34%	Material ten	perature (thermoplastic) °C:	x
Materials applied, % desviation on requested:	Film maker n	naterial:	-1,11	Glass beads	0,00	Others materials:	x
	Antiskid aggi	regates:	×	Mixture:	x	Premix:	x
Test Tyres:	NEUMÁTICO	COMERCIA	AL 205/60 I	R15			
Numer of wheels:	4						
Load on wheels (N):	3000 ± 300						
Tyre air pressure (Mpa):	0,25 ± 0,02						
Support angle (degrees):	0° ± 20'						
Steering angle (degrees):	alternating 4	1º (± 10') /	- 1° (± 10')				
Room temperature:	between + 5	°C y + 10°C					
Dryving cycle:	In accordance to UNE-EN 13197:2012+A1:2014						
Periodicity of measurements:	0,01; 0,1; 0,2; 0,5; 1,0; 2,0; 3,0 and 4,0 x 10 ⁶ wheel passages						
Desviations:							

3.- PASS/FAIL CRITERIA:

CARACTERIST	TECHINCAL CLASSES ANI MINIMUM VALUES	
Night-time visibility under	R _L DRY	R2 (100) ¹ - R1 (80) ²
conditions:	R _L RAIN	RR1 (25)
(mcd·m ⁻² ·lx ⁻¹)	R _L WET	RW1 (25)
	(x,y)	inside the relevant polygon
Day-time visibility	β	B2 (0,3) ¹ - B1 (0,2) ²
	Qd (mcd·m ⁻² ·lx ⁻¹)	Q2 (100) [†] - Q1 (80) ²
Skid resistance	SRT	S1 (45)

TRAFFIC CLASSES AND REQUIRED N° OF ROLL-OVERS in accordance to UNE-EN 13197:2012+A1:2014					
TRAFFIC CLASS	N° ROLL-OVERS x 10 ⁶				
P0	<0,05				
P1	0,05 (optional)				
P2	0,1				
P3	0,2				
P4	0,5				
P5	1,0				
P6	2,0				
P7	4,0				

4.- TEST RESULTS: initial and retained values and their techical classes

in accordance to UNE-EN 1436:2009+A1:2009

CARACTERISTIC		value and for each number of roll-overs x 10 ⁸								Uncertainty
OANAO	ILNISTIC	0,01 (P0)	0,1 (P2)	0,2 (P3)	0,5 (P4)	1,0 (P5)	2,0 (P6)	3,0	4,0 (P7)	Oncortainty
Night-time visibility R _L (mcd·m ⁻² -lx ⁻¹)	dry	324	310	289	263	251	201	192	192	±9%
	х	0,332	0,332	0,332	0,333	0,332	0,334	0,334	0,339	± 0,004
Day-time visibility	у	0,354	0,353	0,353	0,354	0,353	0,355	0,356	0,358	± 0,004
	β	0,640	0,635	0,619	0,624	0,619	0,604	0,591	0,475	± 0,013
	Qd (mcd m ⁻² lx ⁻¹)	238	237	228	231	243	214	212	219	±7%
Skid resistance	SRT	60	59	54	57	55	57	55	55	±5
	Temperature water used in the test (°C)	14	14	14	14	13	14	14	14	± 0,2

5.- KEY WORDS FOR IDENTIFICATION OF ROAD MARKING ASSEMBLY:

There are three groups of key words:

A first key word to identify if is for permanent or for temporary purposes.

P For a permanent road marking assembly.

T For a temporary road marking assembly.

A second key to identify the retrorreflective properties of the road marking assembly:

R For a road marking assembly retrorreflective under dry conditions,

RW For a road marking assembly retrorreflective under dry and wet conditions.

RR For a road marking assembly retrorreflective under dry, wet and rain conditions.
 NR For a road marking assembly not retrorreflective.

A third key to identify the type of the road marking assembly:

I For a conventional road marking.

II For a road marking assembly with special properties to enhance the retroreflection on wet or/and rainy conditions.

6.- NOTE:

The results in this report relate only to the samples tested and cannot be extended to other manufacturer's production.

The results achieved by a road marking assembly on the durability test, shall not be interpreted as being a guarantee for working life in practice. The later depends on many factors beyond the materials such as design, location (type of road surface, weather conditions, etc) and application conditions:

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CERTIFICATE OF DURABILITY	Ref.	lesue date Laboratory Manager 💉 🐔	Document reference
TEST		uon Qu	MarkX
This curtificate is identical to	3745/P-R-I/A1	May 18th, 2016	2. I-7-MC Rev. 9
the original spanish version		D: Francisco J. Guerra	Page 2 of 2

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