

**REPORT 493/L DATE 01.10.2018**

Laboratory	GFC Chimica S.r.l. Viale Marconi, 73 44122 Ferrara
Customer	Global Institute for Motor Sport Safety SA c/o: Fédération Internationale de l'Automobile Chemin de Blandonnet 2 1215 Geneva 15 Switzerland
Samples identification	RACE LINE batch 8218038
Samples description	Waterborne Road Marking Paint (Producer: Ore Peinture)
Date of measures	27-28.09.2018

**1 INTRODUCTION**

GFC Chimica has tested a sample of 'anti slip road marking paint' identified and described as reported in the table above, as per order from Global Institute, herein indicated as the customer.

As per previous quotation and agreement between the laboratory and the customer, the laboratory has carried out the following tests:

TEST (PARAMETER)	ROAD SURFACE TYPE
<b>SRT</b> Skid resistance measurements. The measures are carried out using the test method described in DRAFT FIA (see EN 13036-4 and EN 1436). The values of SRT of the paint and road surface <sup>1</sup> are compared.	Asphaltic Cement plate
<b>Q<sub>D</sub></b> Measurement of luminance coefficient under diffuse illumination	Asphaltic
<b>x,y</b> Measurements of chromaticity coordinates (x,y)	Asphaltic
<b>Drying time</b> Measurement for determining the no-pick-up time by a rubber wheel	Asphaltic Glass plate

The tests have been performed using the following equipment:

- Spectrophotometer X-Rite SP64
- Photometer Q<sub>D</sub>/R<sub>L</sub> Zehntner ZRM 1013
- Skid Resistance Tester Stanley London
- No pick up tester



<sup>1</sup> The measures of SRT on asphalt without paint are carried out in date 19.09.2018

The measures of dry thickness film (DTF) of the sample applied on glass plates are carried out according with method EN 1062-1.

## 2 APPLICATION AND OPERATIVE CONDITION

The applications<sup>2</sup> were carried out by the applicator engaged by paint producer (Ore Peinture) according with the schemes defined in the ANNEX 1.

The applications were:

- two stripes of signage on both the roadside on asphalt using a paint striping machine (main and third site, cement and glass plates),
- a short track using a roller.

### APPLICATION TIME (27/09/2018)

First line (stripping machine) 09:25

Second line (stripping machine) 09:54

Roller 10:26

LINE 1 - main site LENGHT = 24,3 m Time for application = 16 sec Width = 14 cm

LINE 2 - main site LENGHT = 23,5 m Time for application = 18 sec Width = 14 cm

ROLLER - secondary site Dotted line

### WEATHER CONDITIONS

Parameters	27/09/2018 09:25 (LINE 1)	27/09/2018 09:54 (LINE 2)	27/09/2018 10:26 (ROLLER)
HR(air) (%)	52,0	50,9	47,4
T(air) (°C)	12,7	14,2	15,2
wind (miles/h)	5,1	4,8	12,6
T(surface) (°C)	13,5	14,4	16,0

## 3 RESULTS

All the measures were carried out according with the schemes defined in the ANNEX 1.

### 3.1 DRYING TIME AND THICKNESS

#### 3.1.1 DRYING TIME ON GLASS PLATES

TIME (minutes)	GLASS PLATE 5	GLASS PLATE 6
0		
5		



<sup>2</sup> The paint was applied on asphalt onto GFC Chimica's forecourt



10	KO	KO
15	KO	KO
20	KO	KO
25	KO	KO
27	KO	KO
30	KO	KO
35	KO	KO
37	OK	KO
40	OK	KO
45		KO
47		KO
50		OK

KO = WET; OK = DRY

Drying time on glass = 37 and 50 minutes

### 3.1.2 DRYING TIME ON MAIN TEST SITE

0		
5		
10	KO	KO
15		KO
17		KO
20	KO	KO
23	OK	
25	OK	OK

KO = WET; OK = DRY

Drying time on asphalt = 23 and 25 minutes

### 3.1.3 THICKNESS ON GLASS PLATES

PLATE	THICKNESS (micron)*
GLASS PLATE 1	90,37
GLASS PLATE 2	92,28
GLASS PLATE 3	108,82
GLASS PLATE 4	98,00

\*Measure obtained with the calculation (see EN 1062-1)

Paint (volatile=21,5%; solid content=78,5%; specific weight = 1,75 gr/ml)



### 3.2 MEASURE OF SRT

#### 3.2.1 MEASURES ON ASPHALT AND PLATES (date 19.09.2018)

##### ASPHALT

		SRT							
		1	2	3	4	5	Average	Min	Max
POSITION 1	MEASURES	70	70	70	69	69		69	70
							70		
	RESULT	T(Water) (°C) = 30,8					SRT* = 72		
POSITION 2	MEASURES	71	72	72	72	71		71	72
							72		
	RESULT	T(Water) (°C) = 31,7					SRT* = 74		
POSITION 3	MEASURES	71	71	71	70	70		70	71
							71		
	RESULT	T(Water) (°C) = 32,1					SRT* = 73		
POSITION 4	MEASURES	71	71	71	71	71		71	71
							71		
	RESULT	T(Water) (°C) = 32,6					SRT* = 73		
POSITION 5	MEASURES	70	70	71	69	69		69	71
							70		
	RESULT	T(Water) (°C) = 31,9					SRT* = 72		
POSITION 6	MEASURES	71	71	71	70	70		70	71
							71		
	RESULT	T(Water) (°C) = 31,7					SRT* = 73		
POSITION 7	MEASURES	66	65	64	64	63		63	66
							64		
	RESULT	T(Water) (°C) = 32,3					SRT* = 66		

POSITION 8	MEASURES	69	69	68	68	67		67	69
	RESULT	T(Water) (°C) = 32,4					SRT* = 70		
POSITION 9	MEASURES	65	66	65	66	66		65	66
	RESULT	T(Water) (°C) = 32,6					SRT* = 68		
POSITION 10	MEASURES	68	69	68	68	68		68	69
	RESULT	T(Water) (°C) = 33,8					SRT* = 70		
POSITION 11	MEASURES	71	72	71	71	71		71	72
	RESULT	T(Water) (°C) = 33,6					SRT* = 73		
POSITION 12	MEASURES	68	68	67	66	66		66	68
	RESULT	T(Water) (°C) = 32,6					SRT* = 69		
		SRT							
		1	2	3	4	5	Media	Min	Max
POSITION 19	MEASURES	72	73	73	72	72		72	73
	RESULT	T(Water) (°C) = 27,8					SRT* = 73		
		SRT							
		1	2	3	4	5	Media	Min	Max
POSITION 20	MEASURES	68	69	69	69	68		68	69
	RESULT	T(Water) (°C) = 27,4					SRT* = 70		
		SRT							
		1	2	3	4	5	Media	Min	Max
POSITION 21	MEASURES	66	69	69	68	67		66	69



							68		
RESULT		T(Water) (°C) = 27,8					SRT* = 69		
		SRT							
		1	2	3	4	5	Media	Min	Max
POSITION 22	MEASURES	65	66	66	66	66		65	66
							66		
	RESULT	T(Water) (°C) = 27,6					SRT* = 67		
		SRT							
		1	2	3	4	5	Media	Min	Max
POSITION 23	MEASURES	71	73	72	72	72		71	73
							72		
	RESULT	T(Water) (°C) = 27,4					SRT* = 73		
		SRT							
		1	2	3	4	5	Media	Min	Max
POSITION 24	MEASURES	67	71	71	71	70		67	71
		71	70	70			70		
	RESULT	T(Water) (°C) = 27,1					SRT* = 71		

*CEMENT PLATES*

		SRT							
		1	2	3	4	5	Average	Min	Max
CEMENT PLATE 1	MEASURES	59	56	53	52	51		46	59
		50	49	47	47	46			
	RESULT	T <sub>(WATER)</sub> (°C) = 21,3					SRT* = 47		
		SRT							
		1	2	3	4	5	Average	Min	Max
CEMENT PLATE 2	MEASURES	63	59	59	59	57		55	63
		57	55	56	56				
	RESULT	T <sub>(WATER)</sub> (°C) = 22,0					SRT* = 56		
		SRT							

		1	2	3	4	5	Average	Min	Max
<b>CEMENT PLATE 3</b>	MEASURES	60	55	53	50	49		47	60
		48	47	47					
	RESULT	$T_{(WATER)} (°C) = 21,9$					SRT* = 47		
	SRT								
		1	2	3	4	5	Average	Min	Max
<b>CEMENT PLATE 4</b>	MEASURES	64	61	59	58	56		54	64
		56	54	56	55	55			
	RESULT	$T_{(WATER)} (°C) = 22,1$					SRT* = 55		
	SRT								
		1	2	3	4	5	Average	Min	Max
<b>CEMENT PLATE 5</b>	MEASURES	62	58	53	50	50		46	62
		49	49	47	46	47			
	RESULT	$T_{(WATER)} (°C) = 22,2$					SRT* = 47		
	SRT								
		1	2	3	4	5	Average	Min	Max
<b>CEMENT PLATE 6</b>	MEASURES	54	47	46	49	44		44	54
		44	45	44					
	RESULT	$T_{(WATER)} (°C) = 22,3$					SRT* = 44		

NOTES:

a) Single measurements = measurements carried out wetting the surface each time (ref. EN 1436 and 13063-4).

First 5 measures: indication of the average if satisfied the condition that SRT (average) =  $\pm 3$  units

Successive measurements: execution of measures until 3 consecutive with SRT =  $\pm 1$  unit is obtained.

b) SRT\* = Correct SRT with water temperature



### 3.2.2 MEASURE ON PAINT 27-28.09.2018

#### PAINT ON ASPHALT

#### Measures after 6 hours - MAIN TEST SITE

		SRT							
		1	2	3	4	5	Average	Min	Max
<b>POSITION 1</b>	MEASURES	87	80	79	76	76		74	87
		74	74	74					
	RESULT	T(WATER) (°C) = 24,3					SRT* = 75		
<b>POSITION 3</b>	MEASURES	87	82	80	78	78		76	87
		76	76	76					
	RESULT	T(WATER) (°C) = 24,6					SRT* = 77		
<b>POSITION 5</b>	MEASURES	85	81	79	77	76		74	85
		75	74	74					
	RESULT	T(WATER) (°C) = 25,0					SRT* = 75		
<b>POSITION 7</b>	MEASURES	86	81	78	79	76		74	86
		76	76	74					
	RESULT	T(WATER) (°C) = 26,1					SRT* = 77		
<b>POSITION 9</b>	MEASURES	81	76	73	71	71		69	81
		70	70	69					
	RESULT	T(WATER) (°C) = 25,3					SRT* = 71		
<b>POSITION 11</b>	MEASURES	84	79	77	76	75		73	84
		75	74	73					
	RESULT	T(WATER) (°C) = 26,4					SRT* = 76		



**Measures after 6 hours - SECONDARY TEST SITE (ROLLER)**

		SRT								
		1	2	3	4	5	Average	Min	Max	
<b>POSITION 19</b>	MEASURES	74	69	67	65	64		62	74	
		63	62	62						
	RESULT	T(WATER) (°C) = 20,3					SRT* = 62			
<b>POSITION 21</b>	MEASURES	76	72	71	69	67		65	76	
		67	65	66	66					
	RESULT	T(WATER) (°C) = 20,1					SRT* = 66			
<b>POSITION 23</b>	MEASURES	80	75	72	71	69		67	80	
		69	68	67						
	RESULT	T(WATER) (°C) = 20,1					SRT* = 69			



**Measures after 24 hours - MAIN TEST SITE**

		SRT								
		1	2	3	4	5	Average	Min	Max	
<b>POSITION 2</b>	MEASURES	86	82	80	79	78		74	86	
		77	76	75	74	74				
	RESULT	T(WATER) (°C) = 17,2					SRT* = 73			
<b>POSITION 4</b>	MEASURES	89	85	82	79	78		76	89	
		77	76	76						
	RESULT	T(WATER) (°C) = 16,7					SRT* = 75			
<b>POSITION 6</b>	MEASURES	92	87	85	82	81		79	92	
		79	80	79						

5

	RESULT	T(WATER) (°C) = 16,3					SRT* = 78		
POSITION 8	MEASURES	92	86	83	81	80		78	92
		80	79	78					
	RESULT	T(WATER) (°C) = 15,8					SRT* = 79		
POSITION 10	MEASURES	91	88	86	84	83		80	91
		82	81	80	80				
	RESULT	T(WATER) (°C) = 16,3					SRT* = 79		
POSITION 12	MEASURES	87	83	81	78	78		77	87
		77	78	77					
	RESULT	T(WATER) (°C) = 16,1					SRT* = 76		

Measures after 24 hours - SECONDARY TEST SITE (MANUAL SPRAY)

		SRT							
		1	2	3	4	5	Average	Min	Max
POSITION 20	MEASURES	77	73	73	71	71		69	77
		69	70	70					
	RESULT	T(WATER) (°C) = 16,2					SRT* = 69		
POSITION 22	MEASURES	83	76	74	72	71		69	83
		71	69	70	69				
	RESULT	T(WATER) (°C) = 16,2					SRT* = 68		
POSITION 24	MEASURES	82	77	76	73	73		71	82
		72	71	71					
	RESULT	T(WATER) (°C) = 16,3					SRT* = 70		





*PAINT ON CEMENT PLATES*

**Measures after 6 hours**

		SRT									
		1	2	3	4	5	6	7	Average	Min	Max
<b>CEMENT PLATE 1</b>	MEASURES	96	93	91	89	89				87	96
		89	88	87							
	RESULT	T(WATER) (°C) = 20,5							SRT* = 89		
		1	2	3	4	5	6	7	Average	Min	Max
<b>CEMENT PLATE 2</b>	MEASURES	96	94	94	94	90				90	96
		90	92	92	91						
	RESULT	T(WATER) (°C) = 21,0							SRT* = 92		
		1	2	3	4	5	6	7	Average	Min	Max
<b>CEMENT PLATE 3</b>	MEASURES	93	90	88	87	86				85	93
		86	85	85							
	RESULT	T(WATER) (°C) = 20,3							SRT* = 85		

**Measures after 24 hours**

		SRT									
		1	2	3	4	5	6	7	Average	Min	Max
<b>CEMENT PLATE 4</b>	MEASURES	98	96	96	94	92				91	98
		92	92	91							
	RESULT	T(WATER) (°C) = 17,2							SRT* = 91		
		1	2	3	4	5	6	7	Average	Min	Max
<b>CEMENT PLATE 5</b>	MEASURES	89	86	84	84	83				81	89
		82	83	81							
	RESULT	T(WATER) (°C) = 17,1							SRT* = 82		
		1	2	3	4	5	6	7	Average	Min	Max
<b>CEMENT</b>	MEASURES	89	86	85	83	82				81	89



PLATE 6		82	82	81						
	RESULT	T(WATER) (°C) = 17,3						SRT* = 81		

NOTES:

a) Single measurements = measurements carried out wetting the surface each time (ref. EN 1436 and 13063-4).

First 5 measures: indication of the average if satisfied the condition that SRT (average) =  $\pm 3$  units

Successive measurements: execution of measures until 3 consecutive with SRT =  $\pm 1$  unit is obtained.

b) SRT\* = Correct SRT with water temperature

**3.3 MEASURE OF QD, X, Y**

	Qd (mcd/lx/m2)					
	1	2	3	Average	Min	Max
POSITION 1	202	191	204	199	191	204
POSITION 3	231	228	216	225	216	231
POSITION 5	212	231	234	226	212	234
POSITION 7	232	225	232	230	225	232
POSITION 9	227	240	227	231	227	240
POSITION 11	236	224	234	231	224	236

	X					
	1	2	3	Average	Min	Max
POSITION 1	0,315	0,320	0,318	0,318	0,315	0,320
POSITION 3	0,319	0,316	0,319	0,318	0,316	0,319
POSITION 5	0,320	0,315	0,317	0,317	0,315	0,320
POSITION 7	0,317	0,318	0,317	0,317	0,317	0,318
POSITION 9	0,316	0,316	0,316	0,316	0,316	0,316
POSITION 11	0,318	0,315	0,316	0,316	0,315	0,318

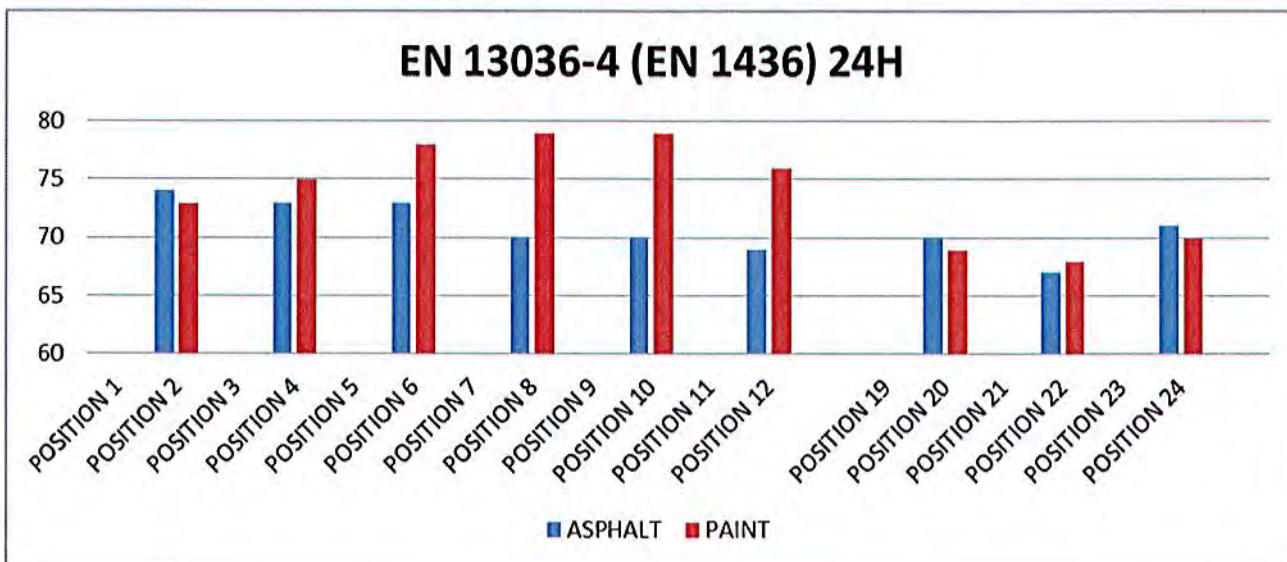
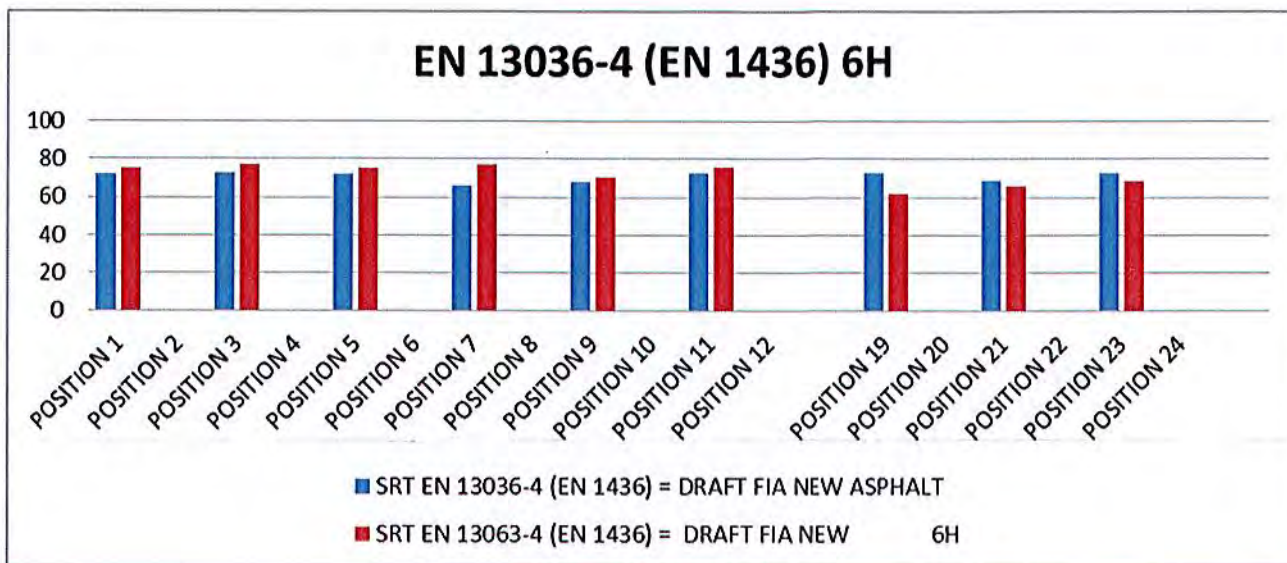
	Y					
	1	2	3	Average	Min	Max
POSITION 1	0,334	0,338	0,337	0,336	0,334	0,338
POSITION 3	0,337	0,335	0,338	0,337	0,335	0,338
POSITION 5	0,338	0,334	0,336	0,336	0,334	0,338
POSITION 7	0,336	0,336	0,336	0,336	0,336	0,336
POSITION 9	0,335	0,335	0,335	0,335	0,335	0,335
POSITION 11	0,337	0,335	0,336	0,336	0,335	0,337



**3.4 MEASURE OF SRT – AGGREGATE DATA**

	<b>ASPHALT SRT EN 13036-4 (EN 1436) = DRAFT FIA NEW ASPHALT</b>	<b>PAINT SRT EN 13063-4 (EN 1436) = DRAFT FIA NEW 6H</b>	<b>Difference</b>	<b>ASPHALT SRT EN 13036-4 (EN 1436) = DRAFT FIA NEW ASPHALT</b>	<b>PAINT SRT EN 13063-4 (EN 1436) = DRAFT FIA NEW 24H</b>	<b>Difference</b>
POSITION 1	72	75	-3			
POSITION 2				74	73	1
POSITION 3	73	77	-4			
POSITION 4				73	75	-2
POSITION 5	72	75	-3			
POSITION 6				73	78	-5
POSITION 7	66	77	-11			
POSITION 8				70	79	-9
POSITION 9	68	71	-3			
POSITION 10				70	79	-9
POSITION 11	73	76	-3			
POSITION 12				69	76	-7
POSITION 19	73	62	11			
POSITION 20				70	69	1
POSITION 21	69	66	3			
POSITION 22				67	68	-1
POSITION 23	73	69	4			
POSITION 24				71	70	1
<b>AVERAGE</b>	71	72	-1	71	74	-3





GFC Chimica Srl  
L'Analista  
Dr. Ing. Cristina Pocaterra

GFC Chimica Srl  
Il Responsabile di laboratorio  
PhD Arlen Ferrari

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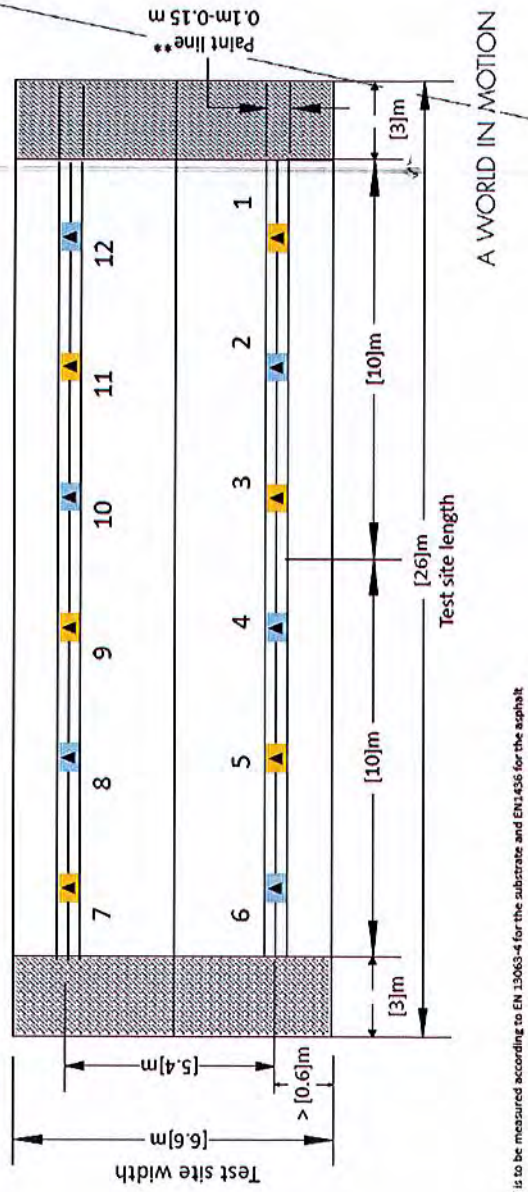


**TEST SESSION D WITH ORE PEINTURE**

**MAIN TEST SITE: SAMPLING AND MEASUREMENTS**

Main Test Site (TBD) – the paint will be applied with air-pressurized machine – 12 points will be selected for SRT measurements:

- ▲ SRT 6H after paint application according to EN-Standards\*
- ▲ SRT 24H after paint application according to EN-Standards\*



\*SRT is to be measured according to EN 13063-4 for the substrate and EN1456 for the asphalt



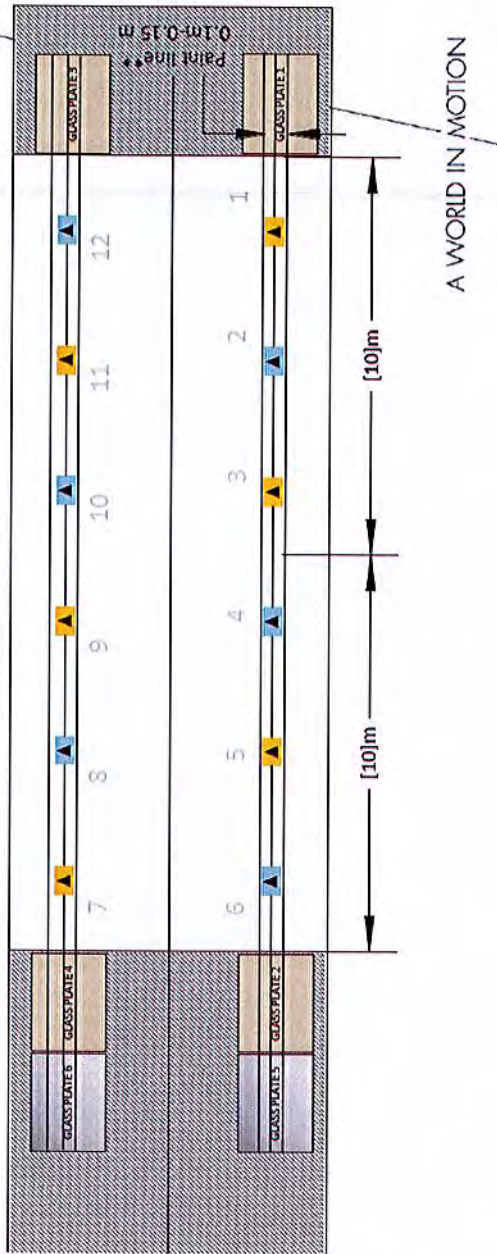


## TEST SESSION C WITH COLSAM (18-19.06.2018)

### DRYING TIME AND THICKNESS DETERMINATION

GfC Chimica is to provide 6 GLASS plates of dimensions [TBD]x[TBD] to be placed at both extremities of the paint line to carry out the following measurements:

- GLASS PLATES 1,2,3,4 to conduct 4 thickness determinations (for which a scale with 0.1g accuracy is required)
- GLASS PLATES 5,6 to conduct 2 drying time determination, as per ASTM D711





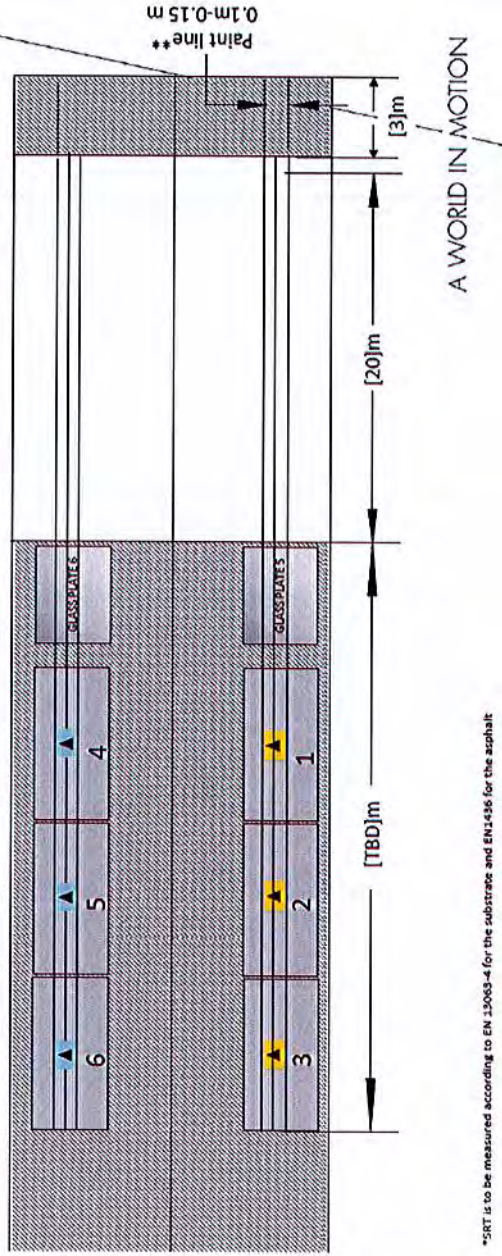




## SRT MEASUREMENTS ON CEMENT

GfC Chimica is to provide 6 CEMENT plates of dimensions [TBD]x[TBD] and thickness 4 mm to be placed at one end of the paint line and after the glass plates, to carry out the following measurements:

-  CEMENT PLATE 1,2,3: 3 SRT measurements after 6H after application, according to EN-Standards\*
-  CEMENT PLATE 4,5,6: 3 SRT measurements after 24H after application, according to EN-Standards\*



\*SRT is to be measured according to EN 13068-4 for the substrate and EN1456 for the asphalt





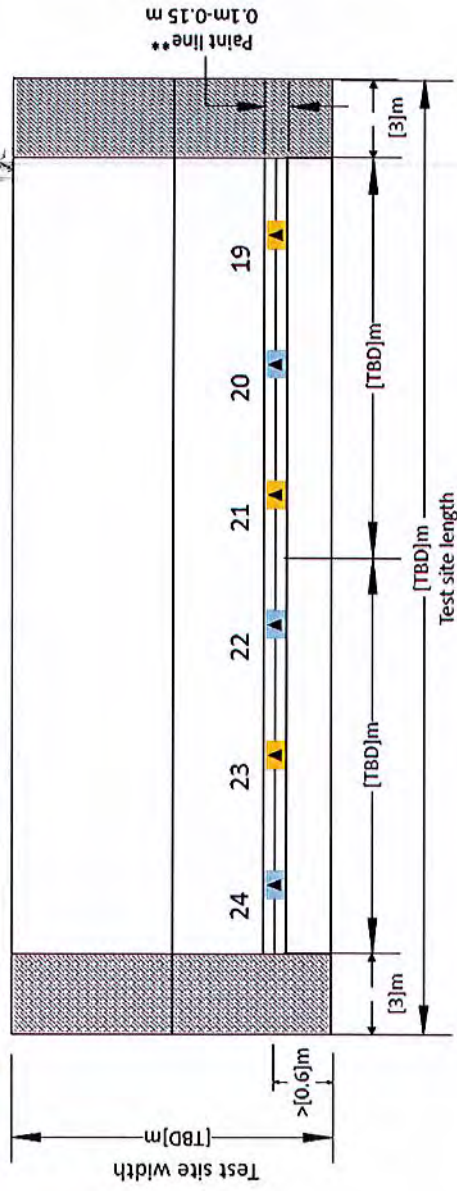


## TEST SESSION C WITH COLSAM (18-19.06.2018)

### SECONDARY TEST SITE : SAMPLING AND MEASUREMENTS

Secondary Test Site (TBD) – the paint will be applied with manual roller – 6 points will be selected for SRT measurements:

-  SRT 6H after paint application according to EN-Standards\*
-  SRT 24H after paint application according to EN-Standards\*



\*SRT is to be measured according to EN 13063-4 for the substrate and EN1436 for the asphalt







## TEST SESSION C WITH COLSAM (18-19.06.2018)

### Qd, XY MEASUREMENTS

Main Test Site – 6 measurement points to be selected for Qd and XY measurements respectively, as follows:

- 6 Q<sub>d</sub> measurement to be carried out 6H after application onto the points 1, 3, 5, 7, 9, 11
- 6 XY measurements to be carried out 6H after application onto the points 1, 3, 5, 7, 9, 11

The total number of Qd, XY measurements to be carried out amounts to 12.



ANNEX 2 – CERTIFICATE OF CONFORMITY OF RUBBER FOR SKID TEST (SRT)

ANNEX 3 – GFC CHIMICA MANAGEMENT SYSTEM CERTIFICATE

ANNEX 4 – CERTIFICATE OF CALIBRATION OF RETROREFLECTOMETER (QD)

END OF THE REPORT

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