Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Member of EOTA
www.eota.eu

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-16/0579 of 11 September 2017

English translation prepared by DIBt – Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	ORALITE® 6710 Engineer Prismatic Grade - originally dyed
Product family to which the construction product belongs	Microprismatic retro-reflective sheetings
Manufacturer	ORAFOL Europe GmbH Orafolstraße 2 16515 Oranienburg DEUTSCHLAND
Manufacturing plant	ORAFOL Europe GmbH Orafolstraße 2 16515 Oranienburg DEUTSCHLAND
This European Technical Assessment contains	28 pages including 4 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 120001-01-0106
This version replaces	ETA-16/0579 issued on 20 October 2016

The European Technical Assessment is issued by the Technical Assessment Body in its official language. Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and shall be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full. However, partial reproduction may only be made with the written consent of the issuing Technical Assessment Body. Any partial reproduction shall be identified as such.

This European Technical Assessment may be withdrawn by the issuing Technical Assessment Body, in particular pursuant to information by the Commission in accordance with Article 25(3) of Regulation (EU) No 305/2011.

Specific Part

1 Technical description of the product

The product consists of retro-reflective sheeting on the basis of microprisms, which consist of optical elements, where the retro-reflection is created by total internal reflection on prisms. The microprisms are moulded in a transparent polymer enclosed in air capsules and provided with an adhesive, which can connect the sheeting with a substrate. The sheeting has a smooth surface and a regular structure visible on the surface forming the air capsules and serving to identify the orientation.

The product is delivered as reflective sheeting, the types of which are stated in Table 1.

Trade name	Component	Colour/Code		Properties
"ORALITE® 6710 Engineer Prismatic Grade – originally dyed"	Self-adhesive retro-reflective sheeting on the basis of microprisms	White Yellow Orange Blue Green Brown	6710-010 6710-020 6710-035 6710-050 6710-060 6710-080	Sheeting thickness (without protective paper and adhesive): 0,23 mm Dimension of the roll: 1,22 m x 50 m or customized

Tab. 1: Types of reflective sheeting "ORALITE® 6710 Engineer Prismatic Grade – originally dyed"

The indications of the manufacturer regarding the definition of the colours comply with the colour boxes of the CIE system (according to class CR2 of EN 12899-1) and are shown in Table 2.

Colour		Daylight chromaticity				Luminance factors
		1	2	3	4	
White	x y	0,305 0,315	0,335 0,345	0,325 0,355	0,295 0,325	≥ 0,35
Yellow	x y	0,494 0,505	0,470 0,480	0,493 0,457	0,522 0,477	≥ 0,27
Orange	x y	0,610 0,390	0,535 0,375	0,506 0,404	0,570 0,429	≥ 0,17
Blue	x y	0,130 0,086	0,160 0,086	0,160 0,120	0,130 0,120	≥ 0,01
Green	x y	0,110 0,415	0,150 0,415	0,150 0,455	0,110 0,455	≥ 0,04
Brown	x y	0,455 0,397	0,523 0,429	0,479 0,373	0,558 0,394	$0,03 \leq \beta \leq 0,09$

Tab. 2: Daylight chromaticity and luminance factors according to the indications of the manufacturer which comply with class CR2 (CR1 for Orange) of EN 12899-1

2 Specification of the intended use in accordance with the applicable European Assessment Document

The construction product described here is used to manufacture signal aspects of fixed, vertical traffic signs (see also EN 12899-1:2007). The further intended applications are all other traffic signs and traffic installations, route guidance with retro-reflective elements and variable message signs.

However, the intended use excludes the manufacture of road marking elements according to EN 1436. The intended sign support material is aluminium, galvanised steel, polycarbonate or other materials. Tests within the framework of this assessment were carried out on aluminium-based samples.

The performances given in section 3 are only valid if the conditions laid down in the accompanying product data sheets and in the processing instructions given by the manufacturer have been respected throughout the production, processing, packaging, transport and storage of "ORALITE® 6710 Engineer Prismatic Grade – originally dyed" (essential specifications acc. to manufacturer's instructions are given in Annex 4).

The verifications and assessment methods as well as the product information of the manufacturer on which this European Technical Assessment is based lead to the assumption of a working life of this product of at least 10 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Safety and accessibility in use (BWR 4)

For the preparation of the specimens, the test pieces of the reflective sheeting were applied by the manufacturer on a plane aluminium plate with a thickness of 2,0 mm (± 0,05 mm).

Essential characteristic	**Performance**
Visibility of "ORALITE 6710® Engineer Prismatic Grade – originally dyed"	
Daylight chromaticity and luminance factors	See Annex 1
Night-time colour	No performance assessed
Coefficient of retro-reflection and rotational symmetry	See Annex 2
Durability of "ORALITE 6710® Engineer Prismatic Grade – originally dyed"	
Impact resistance	Passed according to EN 12899-1
Temperature resistance	No performance assessed
Visibility after artificial weathering	See Annex 3
Visibility after natural weathering	No performance assessed
Adhesion	No performance assessed

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with EAD No 120001-01-0106, the applicable European legal act is: Decision 96/579/EC.

The system(s) to be applied is: 1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

6 Reference list

This European Technical Assessment is based on the following test report:

- Interims test report No. V3-031/2015 of 29 April 2016 by Federal Highway Research Institute (Bundesanstalt für Straßenwesen - BASt) on the testing of microprismatic reflective sheetings
- Interims test report No. V3-013/2016 of 30 November 2016 by Federal Highway Research Institute (Bundesanstalt für Straßenwesen - BASt) on the testing of microprismatic reflective sheetings

Issued in Berlin on 11 September 2017 by Deutsches Institut für Bautechnik

Dr.-Ing. Karsten Kathage
Head of Department

beglaubigt:
Petrik

Deutsches Institut für Bautechnik DIBt

Annex 1

Daylight chromaticity and luminance factors according to clause 2.2.1 of the EAD

Colour	Sample	x	y	β
White	1	0,310	0,326	0,49
	2	0,310	0,326	0,49
	3	0,309	0,325	0,48
Yellow	1	0,531	0,464	0,34
	2	0,530	0,464	0,34
	3	0,531	0,464	0,34
Orange	1	0,592	0,382	0,21
	2	0,590	0,383	0,21
	3	0,589	0,382	0,21
Blue	1	0,138	0,123	0,06
	2	0,139	0,125	0,06
	3	0,139	0,124	0,06
Green	1	0,136	0,457	0,10
	2	0,136	0,458	0,10
	3	0,135	0,457	0,10
Brown	1	0,500	0,396	0,05
	2	0,501	0,396	0,05
	3	0,497	0,394	0,05

Deutsches Institut für Bautechnik DIBt

Annex 2

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Coefficient of retro-reflection for "White" (Part 1)

Note: # Indicates a value greater than zero but not significant or applicable.

Colour / Sample				White Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	0°	193	138	146	159	70
	30°			63	47	49	53	30
	40°			19,0	15,2	15,7	16,6	10,0
0,33°	5°			129	96	98	108	50
	30°			58	44	45	49	24
	40°			16,8	13,8	13,6	14,7	9,0
2°	5°			20	23	23	22	5,0
	30°			16,6	15,9	14,8	15,8	2,5
	40°			5,6	5,7	5,5	5,6	1,5

Coefficient of retro-reflection started at ε=0° [cd m^{-2} lx^{-1}]

Colour / Sample				White Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	30°	170	119	129	139	70
	30°			59	41	45	48	30
	40°			29	23	24	25	10,0
0,33°	5°			99	70	77	82	50
	30°			52	37	40	43	24
	40°			27	21	22	23	9,0
2°	5°			14,5	15,8	16,8	15,7	5,0
	30°			13,9	15,7	15,1	14,9	2,5
	40°			6,6	6,5	6,5	6,5	1,5

Coefficient of retro-reflection started at ε=30° [cd m^{-2} lx^{-1}]

Colour / Sample				White Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	45°	167	116	128	137	70
	30°			87	59	70	72	30
	40°			12,7	9,1	10,7	10,8	10,0
0,33°	5°			96	68	76	80	50
	30°			75	54	61	63	24
	40°			11,9	8,8	9,8	10,2	9,0
2°	5°			12,7	13,8	16,3	14,3	5,0
	30°			7,4	9,6	10,1	9,0	2,5
	40°			5,3	5,5	5,4	5,4	1,5

Coefficient of retro-reflection started at ε=45° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed	Annex 2
Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD	

Deutsches Institut für Bautechnik DIBt

Coefficient of retro-reflection for "White" (Part 1 continued)

Colour / Sample				White Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	60°	170	120	131	140	70
	30°			55	37	47	46	30
	40°			29	21	26	25	10,0
0,33°	5°			98	72	81	84	50
	30°			48	34	41	41	24
	40°			27	20	24	24	9,0
2°	5°			14,9	16,8	19,4	17,0	5,0
	30°			11,9	13,1	13,4	12,8	2,5
	40°			6,9	6,7	6,9	6,8	1,5

Coefficient of retro-reflection started at ε=60° [cd m^{-2} lx^{-1}]

Colour / Sample				White Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	90°	194	140	151	162	70
	30°			61	43	48	51	30
	40°			21	15,2	15,6	17,3	10,0
0,33°	5°			129	100	107	112	50
	30°			56	41	44	47	24
	40°			19,9	14,0	14,6	16,2	9,0
2°	5°			21	25	28	25	5,0
	30°			15,7	14,8	16,3	15,6	2,5
	40°			7,0	6,0	6,1	6,4	1,5

Coefficient of retro-reflection started at ε=90° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Rotational symmetry for "White" (Part 1)

α	β1	β2	Colour Sample ε	White 1	2	3
0,33	5	0	-75	155	121	126
			-50	185	144	142
			-25	170	130	128
			0*	129	96	98
			25	102	72	78
			50	96	69	77
			Ratio	**1,93**	**2,09**	**1,84**

* Rotational symmetry started at ε=0° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	White 1	2	3
0,33	5	0	-75	155	119	117
			-50	116	84	88
			-25	97	69	76
			0*	98	72	81
			25	121	93	101
			50	165	129	133
			Ratio	**1,70**	**1,87**	**1,75**

* Rotational symmetry started at ε=60° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	White 1	2	3
0,33	5	0	-75	185	144	143
			-50	163	125	123
			-25	122	90	93
			0*	99	70	77
			25	97	70	79
			50	115	86	96
			Ratio	**1,91**	**2,06**	**1,86**

* Rotational symmetry started at ε=30° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	White 1	2	3
0,33	5	0	-75	110	80	85
			-50	96	69	76
			-25	101	74	84
			0*	129	100	107
			25	173	135	138
			50	187	145	143
			Ratio	**1,95**	**2,10**	**1,88**

* Rotational symmetry started at ε=90° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	White 1	2	3
0,33	5	0	-75	176	136	133
			-50	137	103	103
			-25	105	76	81
			0*	96	68	76
			25	105	78	87
			50	138	106	113
			Ratio	**1,83**	**2,00**	**1,75**

* Rotational symmetry started at ε=45° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Coefficient of retro-reflection for "Yellow" (Part 2)

Colour / Sample				Yellow Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	0°	149	147	147	148	50
	30°			49	49	50	49	22
	40°			8,1	8,3	8,5	8,3	7,0
0,33°	5°			79	78	76	78	35
	30°			34	34	34	34	16
	40°			6,9	7,9	8,4	7,7	6,0
2°	5°			3,9	4,1	4,1	4,0	3,0
	30°			2,1	2,2	2,1	2,1	1,5
	40°			0,8	0,8	0,9	0,8	1,0

Coefficient of retro-reflection started at ε=0° [cd m^{-2} lx^{-1}]

Colour / Sample				Yellow Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	30°	156	155	154	155	50
	30°			67	66	67	67	22
	40°			33	32	33	33	7,0
0,33°	5°			93	93	91	92	35
	30°			52	52	53	52	16
	40°			29	28	29	29	6,0
2°	5°			2,9	2,9	2,9	2,9	3,0
	30°			2,7	2,9	2,9	2,8	1,5
	40°			2,0	2,0	2,0	2,0	1,0

Coefficient of retro-reflection started at ε=30° [cd m^{-2} lx^{-1}]

Colour / Sample				Yellow Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	45°	157	156	156	156	50
	30°			85	84	85	85	22
	40°			11,6	11,3	11,6	11,5	7,0
0,33°	5°			95	95	95	95	35
	30°			53	53	53	53	16
	40°			8,9	8,3	8,5	8,6	6,0
2°	5°			3,1	3,3	3,2	3,2	3,0
	30°			2,8	2,9	2,7	2,8	1,5
	40°			0,7	0,8	0,8	0,8	1,0

Coefficient of retro-reflection started at ε=45° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Coefficient of retro-reflection for "Yellow" (Part 2 continued)

Colour / Sample				Yellow Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	60°	156	155	158	156	50
	30°			69	67	68	68	22
	40°			33	33	33	33	7,0
0,33°	5°			94	94	96	95	35
	30°			50	49	49	49	16
	40°			28	28	27	28	6,0
2°	5°			3,3	3,6	3,5	3,5	3,0
	30°			2,1	2,1	2,2	2,1	1,5
	40°			2,1	2,2	2,0	2,1	1,0

Coefficient of retro-reflection started at ε=60° [cd m^{-2} lx^{-1}]

Colour / Sample				Yellow Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	90°	149	147	153	150	50
	30°			55	53	55	54	22
	40°			26	25	25	25	7,0
0,33°	5°			81	81	85	82	35
	30°			43	42	43	43	16
	40°			21	22	22	22	6,0
2°	5°			3,7	3,7	3,8	3,7	3,0
	30°			2,5	2,5	2,7	2,6	1,5
	40°			1,9	2,0	1,9	1,9	1,0

Coefficient of retro-reflection started at ε=90° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Rotational symmetry for "Yellow" (Part 2)

α	β1	β2	Colour Sample ε	Yellow 1	2	3
0,33	5	0	-75	75	75	78
			-50	74	73	75
			-25	74	73	73
			0*	79	78	76
			25	91	91	88
			50	95	95	95
			Ratio	**1,28**	**1,30**	**1,30**

* Rotational symmetry started at ε=0° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Yellow 1	2	3
0,33	5	0	-75	75	74	73
			-50	84	84	81
			-25	94	94	93
			0*	94	94	96
			25	83	83	88
			50	74	74	77
			Ratio	**1,27**	**1,27**	**1,32**

* Rotational symmetry started at ε=60° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Yellow 1	2	3
0,33	5	0	-75	75	74	75
			-50	74	74	73
			-25	81	81	79
			0*	93	93	91
			25	95	95	96
			50	86	85	90
			Ratio	**1,28**	**1,28**	**1,32**

* Rotational symmetry started at ε=30° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Yellow 1	2	3
0,33	5	0	-75	87	86	84
			-50	95	95	94
			-25	93	93	95
			0*	81	81	85
			25	74	73	76
			50	75	74	75
			Ratio	**1,28**	**1,30**	**1,27**

* Rotational symmetry started at ε=90° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Yellow 1	2	3
0,33	5	0	-75	74	74	74
			-50	77	77	75
			-25	89	89	86
			0*	95	95	95
			25	90	91	94
			50	78	78	82
			Ratio	**1,28**	**1,28**	**1,28**

* Rotational symmetry started at ε=45°[cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Coefficient of retro-reflection for "Orange" (Part 3)

Colour / Sample				Orange Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	0°	70	72	70	71	25
	30°			23	23	22	23	10,0
	40°			3,6	3,7	3,7	3,7	2,2
0,33°	5°			38	39	37	38	20
	30°			15,8	15,9	15,4	15,7	8,0
	40°			3,1	2,9	3,1	3,0	2,2
2°	5°			1,9	1,9	2,0	1,9	1,2
	30°			1,0	1,1	1,0	1,0	0,5
	40°			0,4	0,4	0,4	0,4	#

Coefficient of retro-reflection started at ε=0° [cd m^{-2} lx^{-1}]

Colour / Sample				Orange Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	30°	74	76	73	74	25
	30°			31	32	31	31	10,0
	40°			14,5	14,9	14,5	14,6	2,2
0,33°	5°			45	46	44	45	20
	30°			24	24	25	24	8,0
	40°			12,7	13,1	12,7	12,8	2,2
2°	5°			1,4	1,4	1,4	1,4	1,2
	30°			1,3	1,4	1,3	1,3	0,5
	40°			0,9	0,9	0,9	0,9	#

Coefficient of retro-reflection started at ε=30° [cd m^{-2} lx^{-1}]

Colour / Sample				Orange Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	45°	75	76	74	75	25
	30°			39	40	39	39	10,0
	40°			5,0	5,1	5,0	5,0	2,2
0,33°	5°			47	47	46	47	20
	30°			25	25	25	25	8,0
	40°			4,0	4,1	3,8	4,0	2,2
2°	5°			1,5	1,5	1,5	1,5	1,2
	30°			1,4	1,4	1,4	1,4	0,5
	40°			0,4	0,4	0,4	0,4	#

Coefficient of retro-reflection started at ε=45° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Coefficient of retro-reflection for "Orange" (Part 3 continued)

Colour / Sample				Orange Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	60°	75	76	74	75	25
	30°			31	31	30	31	10,0
	40°			14,2	14,5	14,1	14,3	2,2
0,33°	5°			47	47	46	47	20
	30°			23	23	22	23	8,0
	40°			11,8	12,4	11,7	12,0	2,2
2°	5°			1,7	1,7	1,6	1,7	1,2
	30°			1,1	1,1	1,1	1,1	0,5
	40°			1,0	1,1	1,0	1,0	#

Coefficient of retro-reflection started at ε=60° [cd m^{-2} lx^{-1}]

Colour / Sample				Orange Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	90°	72	72	71	72	25
	30°			24	25	24	24	10,0
	40°			11,0	11,1	10,6	10,9	2,2
0,33°	5°			41	40	41	41	20
	30°			19,5	19,5	19,2	19,4	8,0
	40°			8,2	9,2	5,7	7,7	2,2
2°	5°			1,7	1,8	1,8	1,8	1,2
	30°			1,3	1,3	1,3	1,3	0,5
	40°			0,9	0,9	0,9	0,9	#

Coefficient of retro-reflection started at ε=90° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Rotational symmetry for "Orange" (Part 3)

α	β1	β2	Colour Sample ε	Orange 1	2	3
0,33	5	0	-75	38	38	38
			-50	37	37	36
			-25	36	37	35
			0*	38	39	37
			25	44	45	43
			50	47	47	46
			Ratio	**1,31**	**1,27**	**1,31**

* Rotational symmetry started at ε=0° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Orange 1	2	3
0,33	5	0	-75	36	37	35
			-50	40	42	40
			-25	46	47	45
			0*	47	47	46
			25	42	42	42
			50	37	37	37
			Ratio	**1,31**	**1,27**	**1,31**

* Rotational symmetry started at ε=60° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Orange 1	2	3
0,33	5	0	-75	37	37	36
			-50	36	37	35
			-25	40	41	38
			0*	45	46	44
			25	47	47	46
			50	43	43	43
			Ratio	**1,31**	**1,27**	**1,31**

* Rotational symmetry started at ε=30° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Orange 1	2	3
0,33	5	0	-75	42	43	41
			-50	46	47	45
			-25	46	46	45
			0*	41	40	41
			25	37	37	36
			50	37	37	36
			Ratio	**1,24**	**1,27**	**1,25**

* Rotational symmetry started at ε=90° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Orange 1	2	3
0,33	5	0	-75	36	37	35
			-50	37	39	36
			-25	43	44	42
			0*	47	47	46
			25	45	45	45
			50	40	39	39
			Ratio	**1,31**	**1,27**	**1,31**

* Rotational symmetry started at ε=45° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Coefficient of retro-reflection for "Blue" (Part 4)

Colour / Sample				Blue Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	0°	15,3	15,6	16,1	15,7	4,0
	30°			5,0	5,2	5,2	5,1	1,7
	40°			0,8	0,9	0,9	0,9	0,5
0,33°	5°			7,3	7,2	7,3	7,3	2,0
	30°			3,2	3,3	3,4	3,3	1,0
	40°			0,7	0,7	0,8	0,7	#
2°	5°			0,6	0,6	0,5	0,6	#
	30°			0,2	0,2	0,2	0,2	#
	40°			0,1	0,1	0,1	0,1	#

Coefficient of retro-reflection started at ε=0° [cd m^{-2} lx^{-1}]

Colour / Sample				Blue Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	30°	15,8	16,0	16,8	16,2	4,0
	30°			5,8	6,1	6,4	6,1	1,7
	40°			2,4	2,5	2,7	2,5	0,5
0,33°	5°			8,4	8,5	8,9	8,6	2,0
	30°			4,2	4,4	4,7	4,4	1,0
	40°			2,0	2,1	2,3	2,1	#
2°	5°			0,4	0,5	0,4	0,4	#
	30°			0,4	0,4	0,4	0,4	#
	40°			0,1	0,1	0,1	0,1	#

Coefficient of retro-reflection started at ε=30° [cd m^{-2} lx^{-1}]

Colour / Sample				Blue Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	45°	16,0	16,4	17,2	16,5	4,0
	30°			8,1	8,3	8,7	8,4	1,7
	40°			1,1	1,1	1,2	1,1	0,5
0,33°	5°			8,9	9,1	9,5	9,2	2,0
	30°			4,7	4,8	5,0	4,8	1,0
	40°			0,8	0,8	0,9	0,8	#
2°	5°			0,5	0,5	0,5	0,5	#
	30°			0,3	0,4	0,4	0,4	#
	40°			0,0	0,1	0,1	0,1	#

Coefficient of retro-reflection started at ε=45° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Coefficient of retro-reflection for "Blue" (Part 4 continued)

Colour / Sample				Blue Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	60°	16,0	16,6	17,4	16,7	4,0
	30°			7,2	7,4	7,7	7,4	1,7
	40°			3,3	3,4	3,5	3,4	0,5
0,33°	5°			8,9	9,2	9,7	9,3	2,0
	30°			4,9	5,1	5,2	5,1	1,0
	40°			2,6	2,8	2,7	2,7	#
2°	5°			0,5	0,5	0,5	0,5	#
	30°			0,2	0,2	0,2	0,2	#
	40°			0,2	0,2	0,2	0,2	#

Coefficient of retro-reflection started at ε=60° [cd m^{-2} lx^{-1}]

Colour / Sample				Blue Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	90°	15,7	16,4	17,2	16,4	4,0
	30°			5,3	5,5	5,7	5,5	1,7
	40°			2,5	2,6	2,7	2,6	0,5
0,33°	5°			7,5	7,9	8,4	7,9	2,0
	30°			4,1	4,2	4,4	4,2	1,0
	40°			2,0	2,2	2,2	2,1	#
2°	5°			0,5	0,5	0,5	0,5	#
	30°			0,3	0,3	0,3	0,3	#
	40°			0,2	0,3	0,3	0,3	#

Coefficient of retro-reflection started at ε=90° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Rotational symmetry for "Blue" (Part 4)

α	β1	β2	Colour Sample ε	Blue 1	2	3
0,33	5	0	-75	7,2	7,6	8,1
			-50	7,9	8,2	8,1
			-25	7,5	7,5	7,6
			0*	7,2	7,2	7,3
			25	8,2	8,3	8,6
			50	8,9	9,2	9,7
			Ratio	**1,24**	**1,28**	**1,33**

* Rotational symmetry started at ε=0° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Blue 1	2	3
0,33	5	0	-75	7,3	7,2	7,3
			-50	7,6	7,6	7,7
			-25	8,6	8,8	9,2
			0*	8,9	9,2	9,7
			25	7,7	8,2	8,7
			50	7,2	7,6	7,8
			Ratio	**1,24**	**1,28**	**1,33**

* Rotational symmetry started at ε=60° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Blue 1	2	3
0,33	5	0	-75	8,0	8,1	8,1
			-50	7,4	7,4	7,4
			-25	7,5	7,4	7,6
			0*	8,4	8,5	8,9
			25	8,9	9,2	9,7
			50	8,0	8,5	9,0
			Ratio	**1,20**	**1,24**	**1,31**

* Rotational symmetry started at ε=30° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Blue 1	2	3
0,33	5	0	-75	7,9	7,8	8,1
			-50	8,8	9,0	9,4
			-25	8,7	9,1	9,6
			0*	7,5	7,9	8,4
			25	7,1	7,5	7,9
			50	7,7	7,9	8,1
			Ratio	**1,24**	**1,21**	**1,22**

* Rotational symmetry started at ε=90° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Blue 1	2	3
0,33	5	0	-75	7,7	7,8	7,8
			-50	7,2	7,1	7,2
			-25	8,1	8,0	8,3
			0*	8,9	9,1	9,5
			25	8,6	8,9	9,5
			50	7,3	7,7	8,1
			Ratio	**1,24**	**1,28**	**1,32**

* Rotational symmetry started at ε=45° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Coefficient of retro-reflection for "Green" (Part 5)

Colour / Sample				Green Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	0°	28	29	29	29	9,0
	30°			8,7	9,2	9,1	9,0	3,5
	40°			1,4	1,6	1,5	1,5	1,5
0,33°	5°			13,8	13,7	14,2	13,9	7,0
	30°			5,8	6,1	6,0	6,0	3,0
	40°			1,1	1,7	1,6	1,5	1,2
2°	5°			1,0	1,0	1,0	1,0	0,5
	30°			0,4	0,4	0,4	0,4	0,3
	40°			0,2	0,2	0,2	0,2	0,2

Coefficient of retro-reflection started at ε=0° [cd m^{-2} lx^{-1}]

Colour / Sample				Green Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	30°	29	30	30	30	9,0
	30°			10,3	11,5	11,3	11,0	3,5
	40°			4,3	5,0	4,8	4,7	1,5
0,33°	5°			15,5	16,0	16,3	15,9	7,0
	30°			7,7	8,6	8,5	8,3	3,0
	40°			3,7	4,3	4,2	4,1	1,2
2°	5°			0,7	0,7	0,7	0,7	0,5
	30°			0,7	0,6	0,6	0,6	0,3
	40°			0,3	0,3	0,3	0,3	0,2

Coefficient of retro-reflection started at ε=30° [cd m^{-2} lx^{-1}]

Colour / Sample				Green Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	45°	29	30	30	30	9,0
	30°			14,5	15,6	15,5	15,2	3,5
	40°			2,0	2,2	2,1	2,1	1,5
0,33°	5°			16,2	17,1	17,0	16,8	7,0
	30°			8,8	9,3	9,2	9,1	3,0
	40°			1,5	1,6	1,6	1,6	1,2
2°	5°			1,0	0,9	0,9	0,9	0,5
	30°			0,6	0,6	0,7	0,6	0,3
	40°			0,1	0,2	0,1	0,1	0,2

Coefficient of retro-reflection started at ε=45° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Coefficient of retro-reflection for "Green" (Part 5 continued)

Colour / Sample				Green Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	60°	29	31	30	30	9,0
	30°			12,7	13,3	13,4	13,1	3,5
	40°			5,8	6,0	6,0	5,9	1,5
0,33°	5°			16,3	17,4	17,1	16,9	7,0
	30°			8,9	9,1	9,1	9,0	3,0
	40°			4,7	4,8	5,0	4,8	1,2
2°	5°			1,0	1,0	0,9	1,0	0,5
	30°			0,4	0,4	0,4	0,4	0,3
	40°			0,3	0,3	0,3	0,3	0,2

Coefficient of retro-reflection started at ε=60° [cd m^{-2} lx^{-1}]

Colour / Sample				Green Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	90°	28	30	30	29	9,0
	30°			9,6	10,2	10,2	10,0	3,5
	40°			4,6	4,8	4,8	4,7	1,5
0,33°	5°			14,3	15,7	15,0	15,0	7,0
	30°			7,5	7,9	7,9	7,8	3,0
	40°			4,0	4,0	3,9	4,0	1,2
2°	5°			0,9	0,9	0,9	0,9	0,5
	30°			0,6	0,6	0,6	0,6	0,3
	40°			0,4	0,5	0,5	0,5	0,2

Coefficient of retro-reflection started at ε=90° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Rotational symmetry for "Green" (Part 5)

α	β1	β2	Colour Sample ε	Green 1	2	3
0,33	5	0	-75	13,9	15,2	14,6
			-50	14,7	15,3	15,1
			-25	14,3	14,3	14,6
			0*	13,7	13,6	14,2
			25	15,2	15,6	16,0
			50	16,3	17,3	17,2
			Ratio	**1,19**	**1,27**	**1,21**

* Rotational symmetry started at ε=0° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Green 1	2	3
0,33	5	0	-75	14,0	13,8	14,2
			-50	14,4	14,3	14,7
			-25	15,9	16,5	16,7
			0*	16,3	17,4	17,1
			25	14,7	16,0	15,4
			50	13,8	14,9	14,3
			Ratio	**1,18**	**1,26**	**1,20**

* Rotational symmetry started at ε=60° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Green 1	2	3
0,33	5	0	-75	14,9	15,3	15,3
			-50	14,1	14,0	14,4
			-25	14,0	14,0	14,6
			0*	15,5	16,0	16,3
			25	16,4	17,4	17,2
			50	15,0	16,5	15,8
			Ratio	**1,17**	**1,24**	**1,19**

* Rotational symmetry started at ε=30° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Green 1	2	3
0,33	5	0	-75	14,5	14,7	15,3
			-50	16,1	16,8	17,0
			-25	16,1	17,3	16,9
			0*	14,3	15,7	15,0
			25	14,0	15,0	14,5
			50	15,0	15,3	15,3
			Ratio	**1,15**	**1,18**	**1,17**

* Rotational symmetry started at ε=90° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Green 1	2	3
0,33	5	0	-75	14,6	14,8	15,0
			-50	13,7	13,6	14,1
			-25	14,9	15,1	15,6
			0*	16,2	17,1	17,0
			25	15,8	17,2	16,6
			50	14,1	15,3	14,7
			Ratio	**1,18**	**1,26**	**1,21**

* Rotational symmetry started at ε=45° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Coefficient of retro-reflection for "Brown" (Part 6)

Colour / Sample				Brown Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	0°	13,2	13,9	13,0	13,4	1,0
	30°			3,9	4,0	3,8	3,9	0,3
	40°			0,6	0,7	0,6	0,6	#
0,33°	5°			7,3	7,8	7,2	7,4	0,6
	30°			2,8	2,9	2,8	2,8	0,2
	40°			0,6	0,7	0,6	0,6	#
2°	5°			0,4	0,4	0,4	0,4	#
	30°			0,2	0,2	0,2	0,2	#
	40°			0,1	0,1	0,1	0,1	#

Coefficient of retro-reflection started at ε=0° [cd m^{-2} lx^{-1}]

Colour / Sample				Brown Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	30°	13,7	14,2	13,5	13,8	1,0
	30°			5,3	5,4	5,1	5,3	0,3
	40°			2,4	2,4	2,2	2,3	#
0,33°	5°			8,5	8,9	8,5	8,6	0,6
	30°			4,2	4,3	4,1	4,2	0,2
	40°			2,1	2,1	2,0	2,1	#
2°	5°			0,4	0,4	0,4	0,4	#
	30°			0,3	0,3	0,3	0,3	#
	40°			0,2	0,2	0,2	0,2	#

Coefficient of retro-reflection started at ε=30° [cd m^{-2} lx^{-1}]

Colour / Sample				Brown Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	45°	14,0	14,4	13,9	14,1	1,0
	30°			7,0	7,2	6,9	7,0	0,3
	40°			0,9	0,9	0,9	0,9	#
0,33°	5°			8,9	9,1	8,9	9,0	0,6
	30°			4,6	4,7	4,5	4,6	0,2
	40°			0,7	0,7	0,7	0,7	#
2°	5°			0,4	0,4	0,4	0,4	#
	30°			0,3	0,3	0,3	0,3	#
	40°			0,1	0,1	0,1	0,1	#

Coefficient of retro-reflection started at ε=45° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Coefficient of retro-reflection for "Brown" (Part 6 continued)

Colour / Sample				Brown Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	60°	14,1	14,5	14,0	14,2	1,0
	30°			5,7	5,9	5,7	5,8	0,3
	40°			2,5	2,6	2,5	2,5	#
0,33°	5°			9,0	9,1	8,9	9,0	0,6
	30°			4,2	4,3	4,2	4,2	0,2
	40°			2,1	2,2	2,1	2,1	#
2°	5°			0,4	0,4	0,4	0,4	#
	30°			0,3	0,3	0,3	0,3	#
	40°			0,2	0,2	0,2	0,2	#

Coefficient of retro-reflection started at ε=60° [cd m^{-2} lx^{-1}]

Colour / Sample				Brown Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	90°	14,0	14,2	13,8	14,0	1,0
	30°			4,5	4,6	4,5	4,5	0,3
	40°			2,0	2,0	1,9	2,0	#
0,33°	5°			8,1	8,1	7,9	8,0	0,6
	30°			3,6	3,7	3,6	3,6	0,2
	40°			1,5	1,5	1,6	1,5	#
2°	5°			0,3	0,4	0,4	0,4	#
	30°			0,3	0,3	0,3	0,3	#
	40°			0,2	0,2	0,2	0,2	#

Coefficient of retro-reflection started at ε=90° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Deutsches Institut für Bautechnik DIBt

Rotational symmetry for "Brown" (Part 6)

α	β1	β2	Colour Sample ε	Brown 1	2	3
0,33	5	0	-75	7,7	7,8	7,6
			-50	7,4	7,6	7,2
			-25	7,1	7,5	7,0
			0*	7,3	7,7	7,2
			25	8,3	8,7	8,3
			50	8,9	9,2	8,9
			Ratio	**1,25**	**1,23**	**1,27**

* Rotational symmetry started at ε=0° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Brown 1	2	3
0,33	5	0	-75	7,1	7,5	7,1
			-50	7,7	8,2	7,8
			-25	8,6	9,0	8,7
			0*	9,0	9,1	8,9
			25	8,2	8,3	8,2
			50	7,4	7,5	7,2
			Ratio	**1,27**	**1,21**	**1,25**

* Rotational symmetry started at ε=60° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Brown 1	2	3
0,33	5	0	-75	7,4	7,6	7,3
			-50	7,1	7,5	7,0
			-25	7,5	7,9	7,5
			0*	8,5	8,9	8,5
			25	9,0	9,2	8,9
			50	8,5	8,5	8,3
			Ratio	**1,27**	**1,23**	**1,27**

* Rotational symmetry started at ε=30° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Brown 1	2	3
0,33	5	0	-75	7,9	8,3	7,9
			-50	8,8	9,1	8,8
			-25	9,0	9,0	8,9
			0*	8,1	8,1	7,9
			25	7,3	7,4	7,2
			50	7,3	7,6	7,2
			Ratio	**1,23**	**1,23**	**1,24**

* Rotational symmetry started at ε=90° [cd m^{-2} lx^{-1}]

α	β1	β2	Colour Sample ε	Brown 1	2	3
0,33	5	0	-75	7,3	7,6	7,2
			-50	7,2	7,6	7,2
			-25	8,1	8,5	8,1
			0*	8,9	9,1	8,9
			25	8,8	8,9	8,8
			50	7,9	7,9	7,7
			Ratio	**1,24**	**1,20**	**1,24**

* Rotational symmetry started at ε=45° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Coefficient of retro-reflection and rotational symmetry according to clause 2.2.3 of the EAD

Annex 2

Annex 3

Visibility after accelerated artificial weathering according to clause 2.2.6 of the EAD:

Acc. to ISO 4892-2:1994 samples 2000 hours artificially weathered by using a non-insulated black panel thermometer

Daylight chromaticity and luminance factors after accelerated artificial weathering

Colour	Sample	x	y	β
White	**1**	0,309	0,327	0,49
	2	0,309	0,327	0,49
	3	0,309	0,326	0,49
Yellow	**1**	0,530	0,464	0,34
	2	0,531	0,463	0,33
	3	0,531	0,463	0,33
Orange	**1**	0,556	0,373	0,23
	2	0,556	0,373	0,23
	3	0,558	0,373	0,23
Blue	**1**	0,139	0,125	0,06
	2	0,139	0,127	0,06
	3	0,139	0,126	0,06
Green	**1**	0,140	0,453	0,10
	2	0,140	0,452	0,10
	3	0,141	0,452	0,10
Brown	**1**	0,506	0,402	0,05
	2	0,505	0,401	0,05
	3	0,505	0,400	0,05

Coefficients of retro-reflection after accelerated artificial weathering

Coefficient of retro-reflection after accelerated artificial weathering for "White"

Colour / Sample				White Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	0°	289	280	277	282	56
	30°			86	78	83	82	24
0,33°	5°			154	151	148	151	40
	30°			68	64	67	66	19,2

Coefficient of retro-reflection after accelerated artificial weathering started at ε=0° [cd m^{-2} lx^{-1}]

Deutsches Institut für Bautechnik DIBt

Coefficient of retro-reflection after accelerated artificial weathering for "Yellow"

Colour / Sample				Yellow Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	0°	136	139	139	138	40
	30°			46	45	47	46	17,6
0,33°	5°			73	75	75	74	28
	30°			31	31	32	31	12,8

Coefficient of retro-reflection after accelerated artificial weathering started at ε=0° [cd m^{-2} lx^{-1}]

Coefficient of retro-reflection after accelerated artificial weathering for "Orange"

Colour / Sample				Orange Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	0°	68	71	72	70	20
	30°			22	23	24	23	8,0
0,33°	5°			37	39	40	39	16,0
	30°			15,3	15,0	16,8	15,7	6,4

Coefficient of retro-reflection after accelerated artificial weathering started at ε=0° [cd m^{-2} lx^{-1}]

Coefficient of retro-reflection after accelerated artificial weathering for "Blue"

Colour / Sample				Blue Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	0°	14,4	14,3	14,5	14,4	3,2
	30°			5,1	4,6	4,7	4,8	1,4
0,33°	5°			7,2	6,7	6,8	6,9	1,6
	30°			3,9	3,1	3,1	3,4	0,8

Coefficient of retro-reflection after accelerated artificial weathering started at ε=0° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed

Visibility after accelerated artificial weathering according to clause 2.2.6 of the EAD

Annex 3

Deutsches Institut für Bautechnik DIBt

Coefficient of retro-reflection after accelerated artificial weathering for "Green"

Colour / Sample				Green Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	0°	26	26	27	26	7,2
	30°			8,1	8,6	8,7	8,5	2,8
0,33°	5°			12,3	12,1	12,8	12,4	5,6
	30°			5,3	4,9	5,3	5,2	2,4

Coefficient of retro-reflection after accelerated artificial weathering started at ε=0° [cd m^{-2} lx^{-1}]

Coefficient of retro-reflection after accelerated artificial weathering for "Brown"

Colour / Sample				Brown Single test result of each sample			Average of the three samples tested	Minimum values acc. to the specification of the manufacturer
α	β_1	β_2	ε	1	2	3		
0,2°	5°	0°	0°	13,2	13,1	12,7	13,0	0,8
	30°			3,8	3,8	3,5	3,7	0,2
0,33°	5°			7,3	7,2	6,9	7,1	0,5
	30°			2,8	2,6	2,4	2,6	0,2

Coefficient of retro-reflection after accelerated artificial weathering started at ε=0° [cd m^{-2} lx^{-1}]

ORALITE® 6710 Engineer Prismatic Grade - originally dyed	Annex 3
Visibility after accelerated artificial weathering according to clause 2.2.6 of the EAD	

Annex 4

Essential specifications concerning manufacturing, packaging, transport and storage according to manufacturer's instruction:

Application

The envisaged substrates are aluminium, galvanized steel, polycarbonate or other.

Surfaces to which the material will be applied must be thoroughly cleaned from dust, grease or any contamination, which could affect the adhesion of the material. Freshly lacquered or painted surfaces should be completely cured. The compatibility of selected lacquers and paints should be tested by the user, prior to application of the material.

For the application of the retro-reflective film and its additional components described in Chapter 1 detailed information have been published by the manufacturer. In the following only the most important aspects of the application are given:

Cutting, die cutting, plotting

The product can be cut by means of a commercial stack cutter. The holding-down clamp should be set to very low pressure and, as an additional measure, the film be protected from compression. It is recommended to limit the stacking height 40 sheets to 50 sheets.

Commercial cutting plotters with tangential blades, preferably of the flatbed type, should be used as plotter systems.

Adhesive bonding and laminating

The self-adhesive retro-reflective material can only be used for dry application.

Bonding should not be carried out at air and material temperatures of less than 15 ºC. The optimum bonding temperature is about 21 ºC. The films should be stored for a period of at least 48 hours in the premises designated for their processing.

In order to achieve good adhesion of the films, the substrate must be dry and free of dust, oil, fats, silicon or other contamination. If the substrate needs to be treated with a solvent, the next processing step cannot be carried out until the solvent is completely evaporated. When bonding films to metallic substrate, slight grinding of the surfaces is advantageous.

When several film webs need to be bonded side by side, they should always overlap. Depending on the format, the overlap should be 3 mm to 5 mm. Please make sure that a right side of the film web is always bonded to a left side, thus ensuring the uniform orientation of the film's honeycomb structure.

Packaging, transport and storage

The product should be stored in a cool and dry place (temperature range from 20 ºC to 24 ºC; relative air humidity of 40 % to 60 %) that is protected from direct sunlight.

Rolled material should be handled and stored in the original carton. The rolls have standard spacers that prevent contact between the roll surface and the carton and thus the formation of pressure marks and surface damage. Please make sure that partly processed rolls, too, are never stored or handled without spacer.

When making the rolls available for processing, it is advisable to use a horizontal suspension system (such as a paternoster system or a rack). Even if the rolls are stored in a vertical, freestanding position, a negative influence on the film's characteristics is generally not expected. Here again, it is crucial to place the roll on the spacer so as to avoid breakage of the edges. In practice it was shown, however, that this type of storage complicates the handling of the films.

Blank or printed film sheets are supplied in cartons that have been designed especially for the sheet dimensions, 50 sheets per carton. If the sheets are stored outside the carton, please make sure to put individual sheets on a flat and stable support so that they do not adjoin or overlap at the edges. Sheets may be stacked. In order to limit the weight load, not more than 40 sheets to 50 sheets should be stacked.

ORALITE® 6710 Engineer Prismatic Grade - originally dyed	Annex 4
Essential specifications concerning manufacturing, packaging, transport and storage according to manufacturer's instruction	