

## **SCHWEGO wett 6291, SCHWEGO eco wett 6295, SCHWEGO eco wett 8319**

### **Comparison in water - based pigment pastes**

SCHWEGO wett 6291, SCHWEGO eco wett 6295 and SCHWEGO eco wett 8319 are wetting- and dispersing agents developed special for the use in water – based formulations. But in some cases the use is also possible in solvent – based systems.

**SCHWEGO wett 6291** is a mixture from polymeric and anionic active substances. Application fields are water – based systems as pigment pastes, emulsion paints, industrial coatings and adhesives. SCHWEGO wett 6291 is also a trouble-shooter at rub-out problems. The use in solvent – based alkyd paints is also possible. SCHWEGO wett 6291 has no negative influence at the drying time compared with many other dispersing agents.

**SCHWEGO eco wett 6295 / SCHWEGO eco wett 8319** are dispersing agents based on different polymers. Both products are free of VOC and the active substance is 100%. They are so called green dispersing agents according the ASTM D 6886 resulting from the high content of renewable raw materials in the product.

Application field from both are water – based systems as wood coatings, industrial paints and pigment pastes. Both are nonionic and with no influence at the paint resistance as water resistance, salt spraying resistance and so on.

In this test series we compared the efficiency of these three products in water – based pigment pastes. We tested the viscosity of the pastes and particle size of the pigments after the grinding process. Furthermore the rheology profile of all pastes if possible and the achieved color after incorporation from 10% paste in a white paint.

The trials were done with different kind of inorganic, organic pigments and carbon black. We kept the parameter as grinding time (45 minutes with the Skandex; paste / beads ration 1/1) and dosage (product to product) constant.

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## Inorganic pigments

### Test results - titanium dioxide

Pigment – Kronos 2310; CI PW 7 (77891)

grinding parameter: Skandex 45 minutes; ratio beads: paste 1:1

viscosity: Rheometer cone / plate 1s-1, 10s-1, 100s-1

particle size: Grindometer - value

		1,5% additiv on pigment	1,5% additiv on pigment	1,5 % additiv on pigment
		1,0% active substance on pigment	1,5% active substance on pigment	1,5 % active substance on pigment
Water	21,0	20,1	20,1	20,1
Propylene glycol	18,18	18,18	18,18	18,18
SCHWEGO foam 8339	0,8	0,8	0,8	0,8
AMP 90	0,02	0,02	0,02	0,02
<b>SCHWEGO wett 6291</b>		0,9		
<b>SCHWEGO eco wett 6295</b>			0,9	
<b>SCHWEGO eco wett 8319</b>				0,9
Kronos 2310	60,0	60,0	60,0	60,0
Particle size [µm]	<b>50</b>	<b>7</b>	12,5	<b>10</b>
Viscosity [mPas]				
10 s-1	5337	11100	2364	2227
100 s-1	761	1603	319	318

SCHWEGO wett 6291, SCHWEGO eco wett 6295 and SCHWEGO eco wett 8319 achieve particle sizes from approx. 10 µm. Schwego wett 6291 with the finest quality.

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### Test results - iron oxide yellow

Pigment – Bayferrox 3920; CI PY 42 (77492)

grinding parameter: Skandex 45 minutes; ratio beads: paste 1:1

viscosity: Rheometer cone / plate 1s-1, 10s-1, 100s-1

particle size: Grindometer - value

colorimetry measurement geometry D65/10° ; 10% paste / paint

		10% additiv on pigment	10% additiv on pigment	10 % additiv on pigment	10% additiv on pigment
		6,7% active substance on pigment	10% active substance on pigment	10% active substance on pigment	8,7% active substance on pigment
Water	31,0	26,0	26,0	26,0	26,0
Propylene glycol	18,18	18,18	18,18	18,18	18,18
SCHWEGO foam 8339	0,8	0,8	0,8	0,8	0,8
AMP 90	0,02	0,02	0,02	0,02	0,02
<b>SCHWEGO wett 6291</b>		5,0			2,0
<b>SCHWEGO eco wett 6295</b>			5,0		3,0
<b>SCHWEGO eco wett 8319</b>				5,0	
Bayferrox 3920	50,0	50,0	50,0	50,0	50,0
Particle size [µm]	<b>&gt; 100</b>	<b>7</b>	30	30	10
Viscosity [mPas]					
1 s-1	n. m.	2338	57170	209800	3010
10 s-1	<b>n. m.</b>	<b>395</b>	14780	42040	<b>520</b>
100 s-1	n. m.	90	2527	6202	123
Colorimetry					
L*		77,9.			78,09
a*		10,06			9,84
b*		36,10			36,95

n. m. non mensurable

SCHWEGO wett 6291 achieve with this pigment a very good efficiency. Beside a good liquefying effect the particle sizes is 7 µm. The paste has a slightly structural viscosity and prevent so the settling of the pigments at storage.

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**Test results - iron oxide red**

Pigment – Bayferrox 110; CI PR 101 (77491)

grinding parameter: Skandex 45 minutes; ratio beads: paste 1:1

viscosity: Rheometer cone / plate 1s-1, 10s-1, 100s-1

particle size: Grindometer - value

colorimetry measurement geometry D65/10° ; 10% paste / paint

		10% additiv on pigment	10% additiv on pigment	10 % additiv on pigment
		6,7% active substance on pigment	10% active substance on pigment	10% active substance on pigment
Water	31,0	26,0	26,0	26,0
Propylene glycol	18,18	18,18	18,18	18,18
SCHWEGO foam 8339	0,8	0,8	0,8	0,8
AMP 90	0,02	0,02	0,02	0,02
<b>SCHWEGO wett 6291</b>		5,0		
<b>SCHWEGO eco wett 6295</b>			5,0	
<b>SCHWEGO eco wett 8319</b>				5,0
Bayferrox 110	50,0	50,0	50,0	50,0
Particle size [µm]	<b>45</b>	<b>&lt; 10</b>	<b>10</b>	<b>15</b>
Viscosity [mPas]				
1 s-1	47	17670	94	89
10 s-1	29	5435	54	61
100 s-1	18	711	36	42
Colorimetry				
L*	56,46	56,45	56,42	56,66
a*	27,16	26,69	27,18	27,0
b*	16,5	15,18	16,34	16,06

SCHWEGO eco wett 6295 and SCHWEGO eco wett 8319 reach a good liquefying and grinding effect. SCHWEGO wett 6291 has the lowest particle size.

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## Organic pigments

### Test results - benzimidazolone

Pigment – Hostaperm yellow H3G; CI PY 154

grinding parameter: Skandex 45 minutes; ratio beads: paste 1:1

viscosity: Rheometer cone / plate 1s-1, 10s-1, 100s-1

particle size: Grindometer - value

colorimetry measurement geometry D65/10° ; 10% paste / paint

		10% additiv on pigment	10% additiv on pigment	10 % additiv on pigment
		6,7% active substance on pigment	10% active substance on pigment	10% active substance on pigment
Water	36,0	31,5	31,5	31,5
Propylene glycol	18,18	18,18	18,18	18,18
SCHWEGO foam 8339	0,8	0,8	0,8	0,8
AMP 90	0,02	0,02	0,02	0,02
<b>SCHWEGO wett 6291</b>		4,5		
<b>SCHWEGO eco wett 6295</b>			4,5	
<b>SCHWEGO eco wett 8319</b>				4,5
Hostaperm yellow H3G	45,0	45,0	45,0	45,0
Particle size [µm]	<b>&gt;100</b>	<b>10</b>	<b>5</b>	<b>15</b>
Viscosity [mPas]				
1 s-1	872000	52000	65000	84000
10 s-1	134000	36000	50000	66000
100 s-1	7456	11000	8254	11000
Colorimetry				
L*	90,89	90,03	90,68	90,92
a*	1,10	1,38	1,15	1,12
b*	57,32	58,91	58,18	58,66

SCHWEGO eco wett 6295 is very effective to grind the pigment, but also SCHWEGO wett 6291 and Schwego eco wett 8319 works well with this pigment.

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**Test results - beta phthalocyanine blue**

Pigment – Heliogenblau L 7085; CI PB 15:3

grinding parameter: Skandex 45 minutes; ratio beads: paste 1:1

viscosity: Rheometer cone / plate 1s-1, 10s-1, 100s-1

particle size: Grindometer - value

colorimetry measurement geometry D65/10° ; 10% paste / paint

		15% additiv on pigment	15% additiv on pigment	15 % additiv on pigment
		10 % active substance on pigment	15% active substance on pigment	15% active substance on pigment
Water	46,0	40,75	40,75	40,75
Propylene glycol	18,18	18,18	18,18	18,18
SCHWEGO foam 8339	0,8	0,8	0,8	0,8
AMP 90	0,02	0,02	0,02	0,02
<b>SCHWEGO wett 6291</b>		5,25		
<b>SCHWEGO eco wett 6295</b>			5,25	
<b>SCHWEGO eco wett 8319</b>				5,25
Heliogenblau L 7085	35,0	35,0	35,0	35,0
Particle size [µm]	<b>n. m</b>	<b>15</b>	<b>10</b>	<b>10</b>
Viscosity [mPas]				
1 s-1	n. m	13530	124	88
10 s-1	<b>n .m.</b>	<b>2123</b>	<b>70</b>	<b>62</b>
100 s-1	n. m.	234	41	36
Colorimetry				
L*		54,37	53,98	53,42
a*		-16,58	-17,43	-17,82
b*		-34,42	-35,53	-36,35

n. m. non mensurable

SCHWEGO wett 6295 and SCHWEGO wett 8319 are very effective with this pigment.

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**Test results - phthalocyanine green**

Pigment – Heliogengrün L8605; CI PG 7

grinding parameter: Skandex 45 minutes; ratio beads: paste 1:1

viscosity: Rheometer cone / plate 1s-1, 10s-1, 100s-1

particle size: Grindometer - value

colorimetry measurement geometry D65/10° ; 10% paste / paint

		40% additiv on pigment	40% additiv on pigment	40% additiv on pigment
		26,8 % active substance on pigment	40% active substance on pigment	40% active substance on pigment
Water	46,0	32,0	32,0	32,0
Propylene glycol	18,18	18,18	18,18	18,18
SCHWEGO foam 8339	0,8	0,8	0,8	0,8
AMP 90	0,02	0,02	0,02	0,02
<b>SCHWEGO wett 6291</b>		14,0		
<b>SCHWEGO eco wett 6295</b>			14,0	
<b>SCHWEGO eco wett 8319</b>				14,0
Heliogengrün L 8605	35,0	35,0	35,0	35,0
Particle size [µm]	<b>&gt;100</b>	30	<b>10</b>	<b>12,5</b>
Viscosity [mPas]				
1 s-1	<b>178500</b>	20900	<b>1166</b>	<b>1210</b>
10 s-1	8007	5509	502	507
100 s-1	766	851	240	241
Colorimetry				
L*		61,67	61,21	61,19
a*		-40,89	-44,12	-44,77
b*		0,84	0,38	0,45

SCHWEGO eco wett 6295 and SCHWEGO eco wett 8319 are very effective with this pigment.

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**Test results - quinacridone**

**Pigment – Hostaperm Rosa E; CI PR 122 (73915)**

grinding parameter: Skandex 45 minutes; ratio beads: paste 1:1

viscosity: Rheometer cone / plate 1s-1, 10s-1, 100s-1

particle size: Grindometer - value

colorimetry measurement geometry D65/10° ; 10% paste / paint

		10% additiv on pigment	10% additiv on pigment	10 % additiv on pigment
		6,7% active substance on pigment	10% active substance on pigment	10% active substance on pigment
Water	46,0	42,5	42,5	42,5
Propylene glycol	18,18	18,18	18,18	18,18
SCHWEGO foam 8339	0,8	0,8	0,8	0,8
AMP 90	0,02	0,02	0,02	0,02
<b>SCHWEGO wett 6291</b>		3,5		
<b>SCHWEGO eco wett 6295</b>			3,5	
<b>SCHWEGO eco wett 8319</b>				3,5
Hostaperm Rosa E	35,0	35,0	35,0	35,0
Particle size [µm]	<b>n.m.</b>	<b>10</b>	<b>7</b>	<b>15</b>
Viscosity [mPas]				
1 s-1	n.m.	98130	4369	n. m.
10 s-1	<b>n.m.</b>	17600	<b>1415</b>	n. m
100 s-1	n.m.	2462	356	n. m.
Colorimetry				
L*		56,66	54,4	
a*		40,47	40,68	
b*		- 14,37	- 14,73	

n. m. non mensurable

SCHWEGO eco wett 6295 show the best properties with this pigment.

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**Test results - diketopyrrolo- pyrrole**

Pigment – Irgazin Red L 3660 HD ( old: Irgazin DPP Red BO); CI PR 254  
grinding parameter: Skandex 45 minutes; ratio beads: paste 1:1  
viscosity: Rheometer cone / plate 1s-1, 10s-1, 100s-1  
particle size: Grindometer - value  
colorimetry measurement geometry D65/10° ; 10% paste / paint

		15% additiv on pigment	15% additiv on pigment	15 % additiv on pigment
		10 % active substance on pigment	15% active substance on pigment	15% active substance on pigment
Water	41,0	35,0	35,0	35,0
Propylene glycol	18,18	18,18	18,18	18,18
SCHWEGO foam 8339	0,8	0,8	0,8	0,8
AMP 90	0,02	0,02	0,02	0,02
<b>SCHWEGO wett 6291</b>		6,0		
<b>SCHWEGO eco wett 6295</b>			6,0	
<b>SCHWEGO eco wett 8319</b>				6,0
Irgazin Red L 3660 HD	40,0	40,0	40,0	40,0
Particle size [µm]	<b>&gt;100</b>	<b>10</b>	<b>&lt; 5</b>	<b>7,5</b>
Viscosity [mPas]				
1 s-1	n. m.	8290	1020	900
10 s-1	n. m.	1036	219	189
100 s-1	n. m.	203	74	66
Colorimetry				
L*		58,09	57,98	57,93
a*		43,68	44,24	44,45
b*		11,29	11,3	11,3

SCHWEGO eco wett 6295, SCHWEGO wett 6291 and SCHWEGO eco wett 8319 are effective with this pigment.

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## Carbon Black

### Test results

Pigment Carbon Black FW 200; CI PB 6

grinding parameter: Skandex 45 minutes; ratio beads: paste 1:1

viscosity: Rheometer cone / plate 1s-1, 10s-1, 100s-1

particle size: Grindometer - value

colorimetry measurement geometry D65/10° ; 10% paste / paint

		100% additiv on pigment	100% additiv on pigment	100 % additiv on pigment
		67% active substance on pigment	100% active substance on pigment	100% active substance on pigment
Water	66,0	51,0	51,0	51,0
Propylene glycol	18,18	18,18	18,18	18,18
SCHWEGO foam 8339	0,8	0,8	0,8	0,8
AMP 90	0,02	0,02	0,02	0,02
<b>SCHWEGO wett 6291</b>		15,0		
<b>SCHWEGO eco wett 6295</b>			15,0	
<b>SCHWEGO eco wett 8319</b>				15,0
Carbon Black FW 200	15,0	15,0	15,0	15,0
Particle size [µm]	<b>&gt;100</b>	<b>&gt;100</b>	<b>7,5</b>	<b>5</b>
Viscosity [mPas]				
1 s-1	100000	258000	200000	962
10 s-1	7517	98000	28000	694
100 s-1	2406	9939	1653	321
Colorimetry				
L*				43,32
a*				-0,74
b*				-3,81

SCHWEGO eco wett 8319 is very effective with this pigment.

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## Starting formulations with SCHWEGO wett 6295

	<b>PW 7 White</b> Kronos 2310	<b>PY 42 Yellow</b> Bayferrox 3920	<b>PY154 Yellow</b> Hostaperm Yellow H3G	<b>PR 101 Red</b> Bayferrox 110
<b>Water</b>	<b>20,1</b>	<b>26,0</b>	<b>31,5</b>	<b>26,0</b>
<b>Propylene glycol</b>	<b>18,18</b>	<b>18,18</b>	<b>18,18</b>	<b>18,18</b>
<b>SCHWEGO foam 8339</b>	<b>0,8</b>	<b>0,8</b>	<b>0,8</b>	<b>0,8</b>
<b>AMP 90</b>	<b>0,02</b>	<b>0,02</b>	<b>0,02</b>	<b>0,02</b>
<b>SCHWEGO eco wett 6295</b>	<b>0,9</b>	<b>3,0</b>	<b>4,5</b>	<b>5,0</b>
<b>SCHWEGO wett 6291</b>		<b>2,0</b>		
<b>SCHWEGO eco wett 8319</b>				
<b>Pigment</b>	<b>60,0</b>	<b>50,0</b>	<b>45,0</b>	<b>50,0</b>
<b>Paste</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>

	<b>PR 254 RED</b> Irgazin Red LH 3660 HD	<b>PR 122 Pink</b> Hostaperm Rosa E	<b>PG7 Green</b> Heliogengrün L8605	<b>PB 15:3 Blue</b> Heliogenblau L7085	<b>PB6 Black</b> Carbon Black FW 200
<b>Wasser</b>	<b>35,0</b>	<b>42,5</b>	<b>32,0</b>	<b>40,75</b>	<b>51,0</b>
<b>Propylenglykol</b>	<b>18,18</b>	<b>18,18</b>	<b>18,18</b>	<b>18,18</b>	<b>18,18</b>
<b>SCHWEGO foam 8339</b>	<b>0,8</b>	<b>0,8</b>	<b>0,8</b>	<b>0,8</b>	<b>0,8</b>
<b>AMP 90</b>	<b>0,02</b>	<b>0,02</b>	<b>0,02</b>	<b>0,02</b>	<b>0,02</b>
<b>SCHWEGO eco wett 6295</b>	<b>6,0</b>	<b>3,5</b>	<b>14,0</b>	<b>5,25</b>	<b>7,5</b>
<b>SCHWEGO wett 6291</b>					
<b>SCHWEGO eco wett 8319</b>					<b>7,5</b>
<b>Pigment</b>	<b>40,0</b>	<b>35,0</b>	<b>35,0</b>	<b>35,0</b>	<b>15,0</b>
	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>

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## SCHWEGO wett - recommendation on pigment

Colour Index	Pigment	Recommendation 1	Recommendation 2	Recommendation 3
PW 7	Kronos 2310	SCHWEGO wett 6291	SCHWEGO eco wett 8319	SCHWEGO eco wett 6295
PY 42	Bayferrox 3920	SCHWEGO wett 6291	SCHWEGO eco wett 6295	SCHWEGO eco wett 8319
PY 154	Hostaperm Yellow H3G	SCHWEGO eco wett 6295	SCHWEGO wett 6291	SCHWEGO eco wett 8319
PR 101	Bayferrox 110	SCHWEGO eco wett 6295	SCHWEGO wett 6291	SCHWEGO eco wett 8319
PR 254	Irgazin Red LH 3660 HD	SCHWEGO eco wett 6295	SCHWEGO eco wett 8319	SCHWEGO wett 6291
PR 122	Hostaperm Rosa E	SCHWEGO eco wett 6295	SCHWEGO wett 6291	SCHWEGO eco wett 8319
PG 7	Heliogengrün L8605	SCHWEGO eco wett 6295	SCHWEGO eco wett 8319	SCHWEGO wett 6291
PB 15:3	Heliogenblau L 7085	SCHWEGO eco wett 6295	SCHWEGO eco wett 8319	SCHWEGO wett 6291
PB 6	Ruß FW 200	SCHWEGO eco wett 8319	SCHWEGO eco wett 6295	

One wetting additive for all pigments is not available at the market. But SCHWEGO eco wett 6295 shows good effectiveness with a lot of different pigments. A combination with other wetting agents is also possible. Examples are in iron oxide yellow with SCHWEGO eco wett 6291 or in carbon black with SCHWEGO eco wett 8319.

SCHWEGO eco wett 8319 achieve similar properties as SCHWEGO eco wett 6295. Advantage offers SCHWEGO eco wett 8319 with carbon black and with titan dioxide. In the formulations with the other pigments SCHWEGO eco wett 6295 bid advantages in our test.

SCHWEGO wett 6291 differentiate clearly in their efficiency in comparison with SCHWEGO eco wett 6295 and SCHWEGO eco wett 8319. Especially in iron oxide pigments SCHWEGO wett 6291 offers advantages in the particle size and in the liquefying effect with iron oxide yellow. Pastes with SCHWEGO wett 6291 build slightly structural viscosity and reduce so the settling of the pigments at storage. SCHWEGO wett 6291 shows also good efficiency in transparent iron oxide pigments.

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**SCHWEGO wett 6291 with transparent iron oxide pigments**

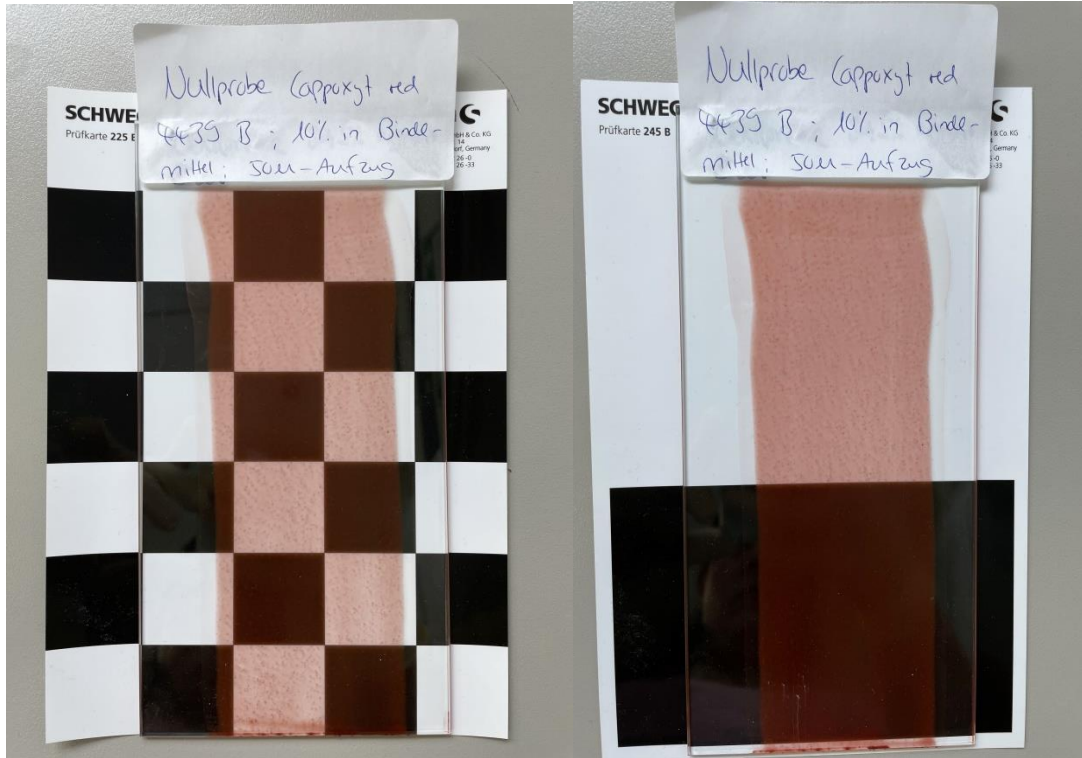
Pigment Cappoxyt RED 4439B , CI PR101 (77491)  
grinding parameter: Skandex 45 minutes; ratio beads: paste 1:1  
viscosity: Rheometer cone / plate 1s-1, 10s-1, 100s-1  
particle size: Grindometer - value

		34,4% additiv on pigment	44,8% additiv on pigment
		23% active substance on pigment	30% active substance on pigment
Water	64,4	53,7	50,6
Cappoxyt Red 4439B	31,7	31,7	31,7
SCHWEGO eco foam 8336	1,0	1,0	1,0
SCHWEGO wett 6291		10,9	14,2
AMP 90- solution 10% in water pH-value ca. 8,5	2,9	2,7	2,5
Particle size [µm]	35	< 10	< 10
Viscosity [mPas]			
1 s-1	3222	120	885
10 s-1	743	45	236
100 s-1	222	21	126

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We incorporated 10% from the paste in an acrylic emulsion and coat the samples with 50 µm wet on glass. Above the samples are without SCHWEGO wett 6291, down with SCHWEGO wett 6291 (23% active substance on pigment).



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