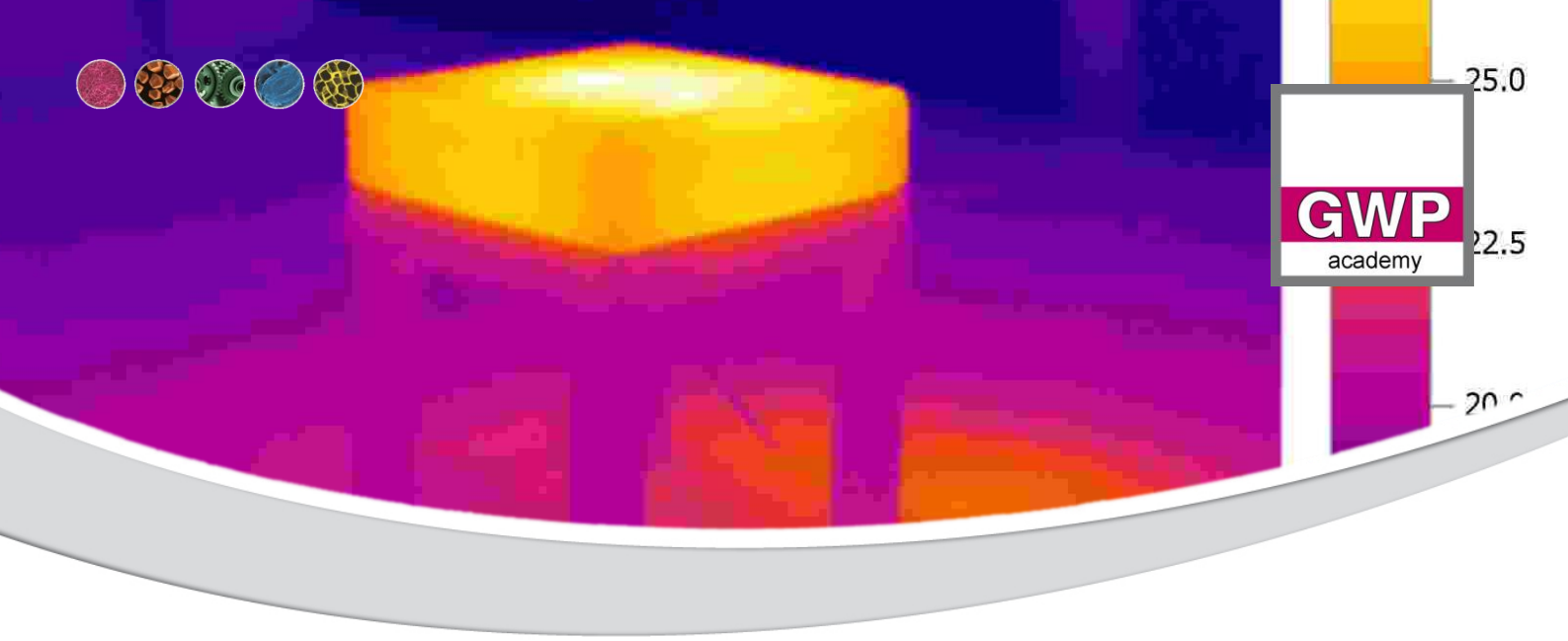

› Wissen schafft Fortschritt®

» Thermal analysis of six heat-reflective exterior paints on concrete under irradiation

› White Paper 20130730

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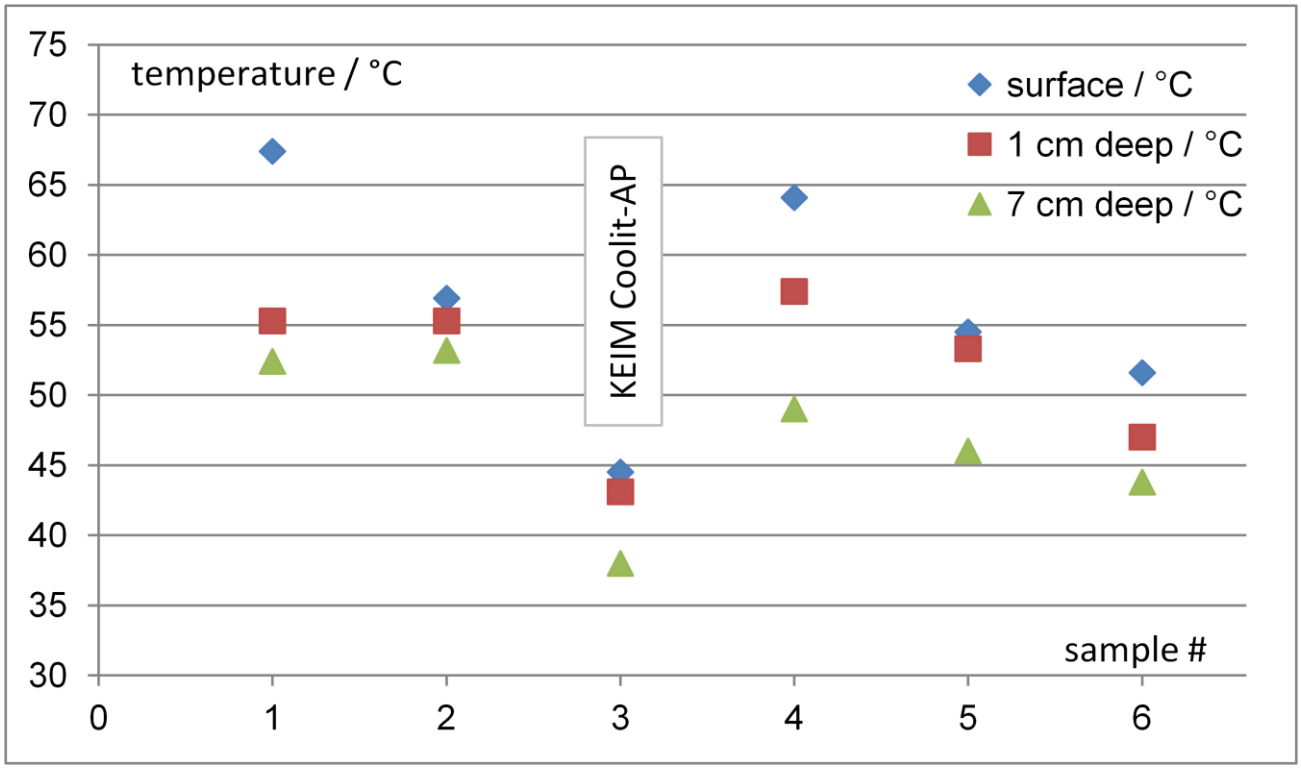
1. Abstract

Temperature measurements with six different exterior paints were performed with coated concrete bodies under standardized conditions.

- The tested KEIM product achieved in comparison with the other samples the lowest surface temperature:
- and the lowest temperature in the concrete body.

Some of the paints tested have less of an effect, some have virtually no influence compared to the uncoated concrete, some heat the surface of the concrete faster than in comparison with the untreated concrete.



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2. Task

KEIMFARBEN GmbH, manufacturer of mineral paints, developed heat-reflective facade coatings and commissioned the GWP institute to perform an independent comparison of their paints with other available products.

3. Samples

The following samples were made available to GWP.

Table 1: Samples received for the tests.

Received	GWP #	Description	Colour shade
29.08.2012	1-01 bis 1-10	Concrete slabs	./.
29.08.2012	2	Acrylic exterior paint B	RAL 7043
29.08.2012	3	Acrylic exterior paint B + TSR	RAL 7043
09.11.2012	5	KEIM Coolit AP	RAL 7043
09.11.2012	7	Acrylic exterior paint A with IR	RAL 7043
09.11.2012	8	Acrylic exterior paint N with IR	RAL 7043
09.11.2012	9	Acrylic exterior paint S with IR	RAL 7043

4. Experiments

GWP has built up a suitable test facility and used the following method:

- Concrete slabs 30 x 30 x 8 cm
- The paint coat application was performed according to manufacturer's instructions.
- The surface was irradiated by a 250 W infrared lamp OSRAM SICCATHERM so that the surface of the untreated concrete surface had a temperature of about 55 ° C.
- Central distance of the lamp from the concrete surface: 60 cm.
- Measurement at room temperature of 21 ° C
- The radiation maximum is in the near infrared region, between 800 - 1800 nm.
- The temperature measurements were carried out I) immediately under the coating, at the contact surface coating / concrete, II) in 10 mm depth and III) in 70 mm depth.
- The surface temperature sensors are embedded in notches directly on the surface by filler.
- NiCr / Ni thermocouples
- Temperature-recording every 60 seconds via logger
- The measurements were conducted in each case over a period of 12 h hours.

5. Measurements

Identical concrete blocks were coated with a paint layer as uniform as possible of the paints to be tested to measure the equilibrium temperature.

After a drying time of 2 days, the painted concrete blocks were exposed to the infrared light and recorded via thermocouples temporal temperature gradients in different depths.

The investigations were carried out from September 01, 2012 to March 01, 2013.

6. Results

Table 2: Results of the temperature measurements after 12 h

GWP # 12975	Sample No.	RT / °C	**Surface / °C**	**1 cm / °C**	**7 cm / °C**	Description
div.	1	21.7	**53.6**	**52.7**	**50.6**	Uncoated concrete slabs
-1-02	2	20.0	**67.4**	**55.3**	**52.4**	Acrylic exterior paint B
-1-03	3	20.0	**56.9**	**55,3**	**53.2**	Acrylic exterior paint B + TSR
-1-02	5	20.4	**44.5**	**43.1**	**38.0**	KEIM Coolit-AP
-1-04	7	19.6	**64.1**	**57.4**	**42.4**	Acrylic exterior paint A with IR
-1-05	8	20.0	**54.5**	**53.3**	**44.0**	Acrylic exterior paint N with IR
-1-06	9	19.7	**51.6**	**47.0**	**43.8**	Acrylic exterior paint S with IR

Zorneding, May 02, 2013

Dr. Julius Nickl
Reporter

7. Image attachment

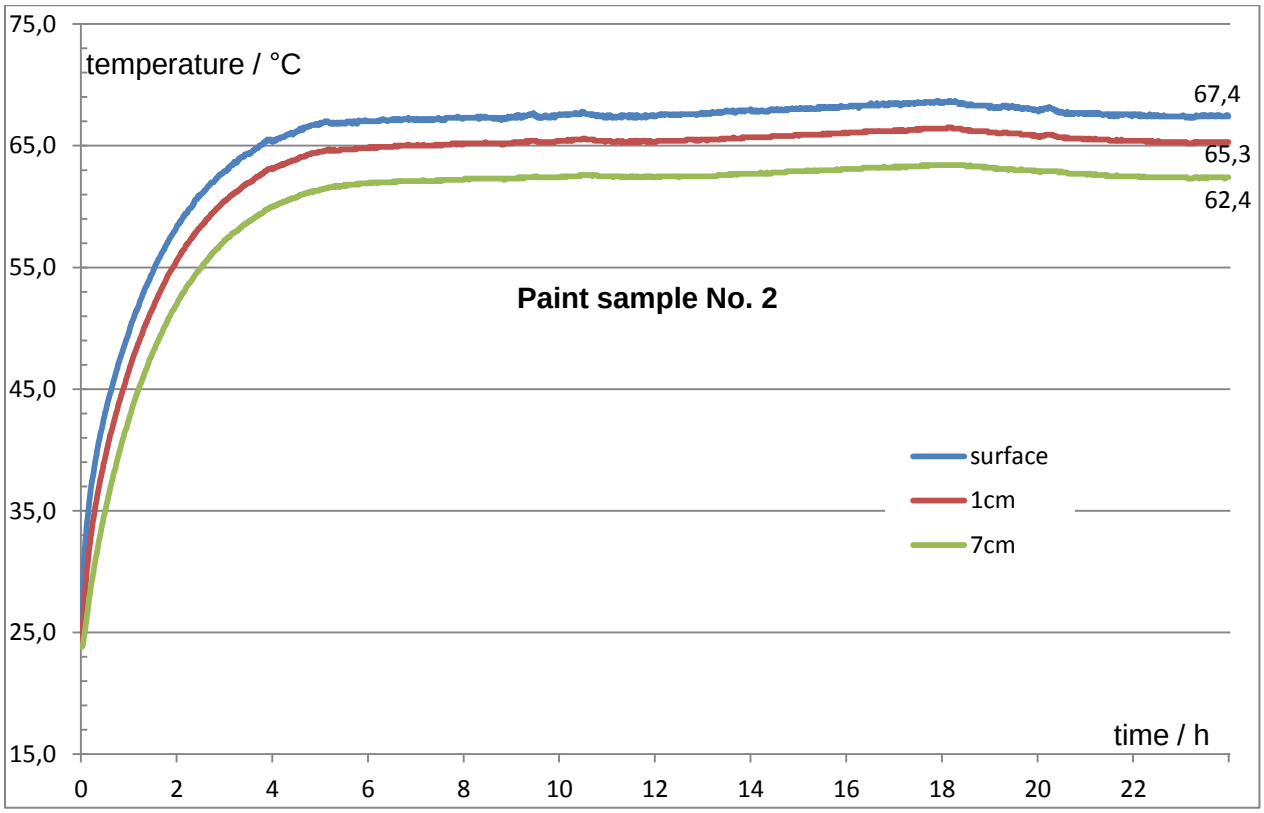

Figure 1: Acrylic exterior paint B

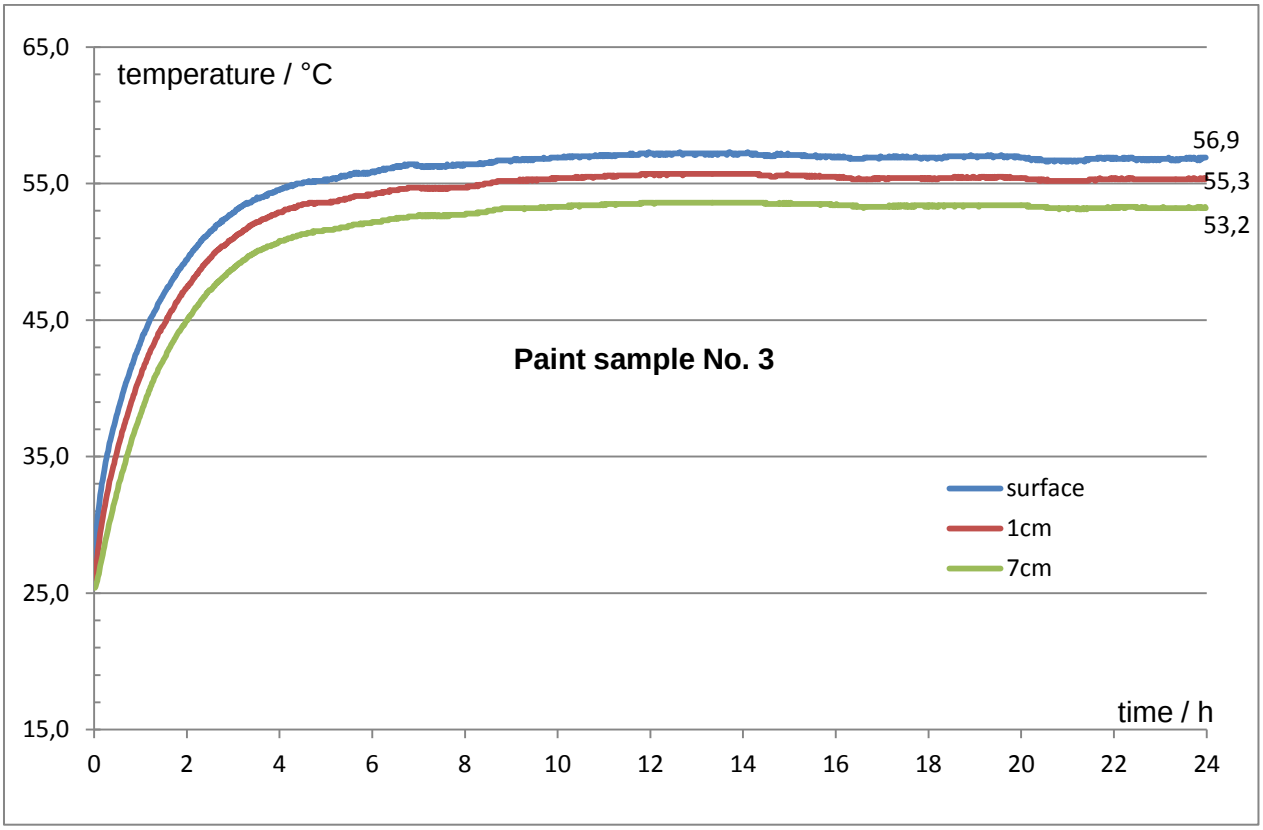

Figure 2: Acrylic exterior paint B + TSR

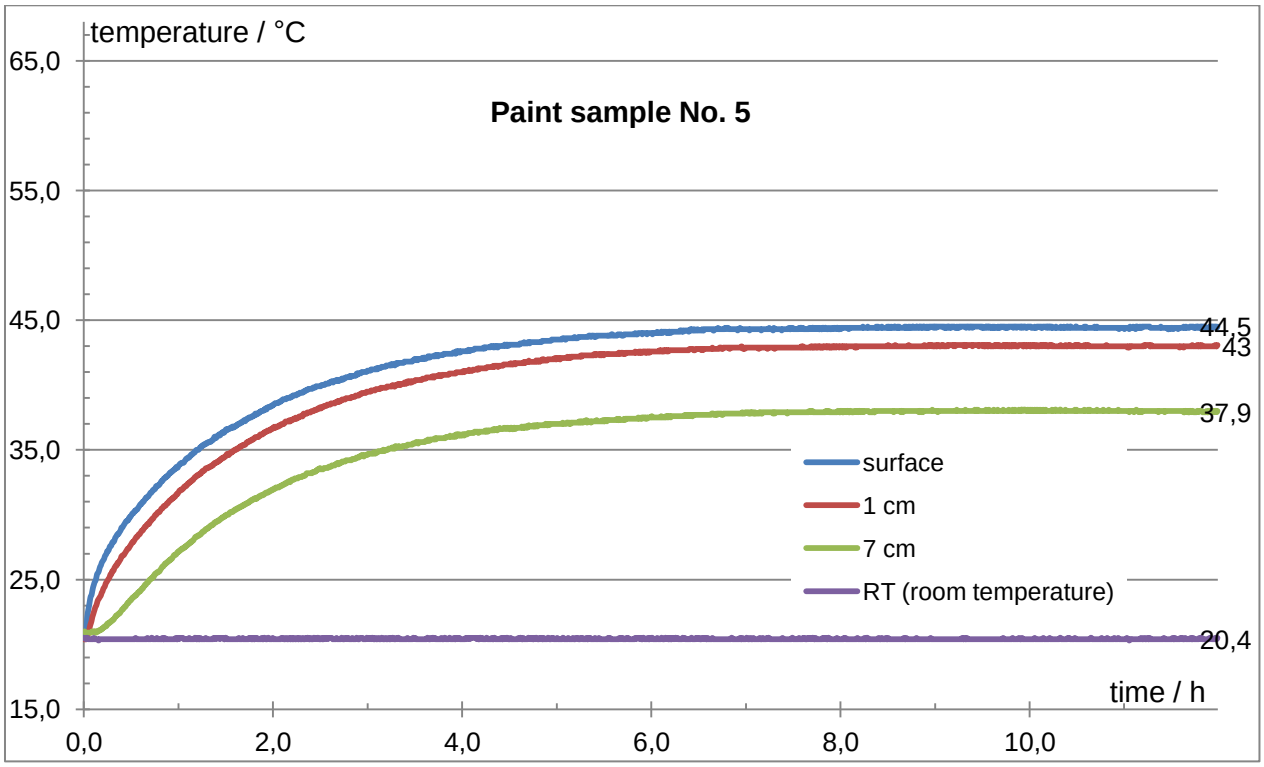

Figure 3: KEIM Coolit-AP

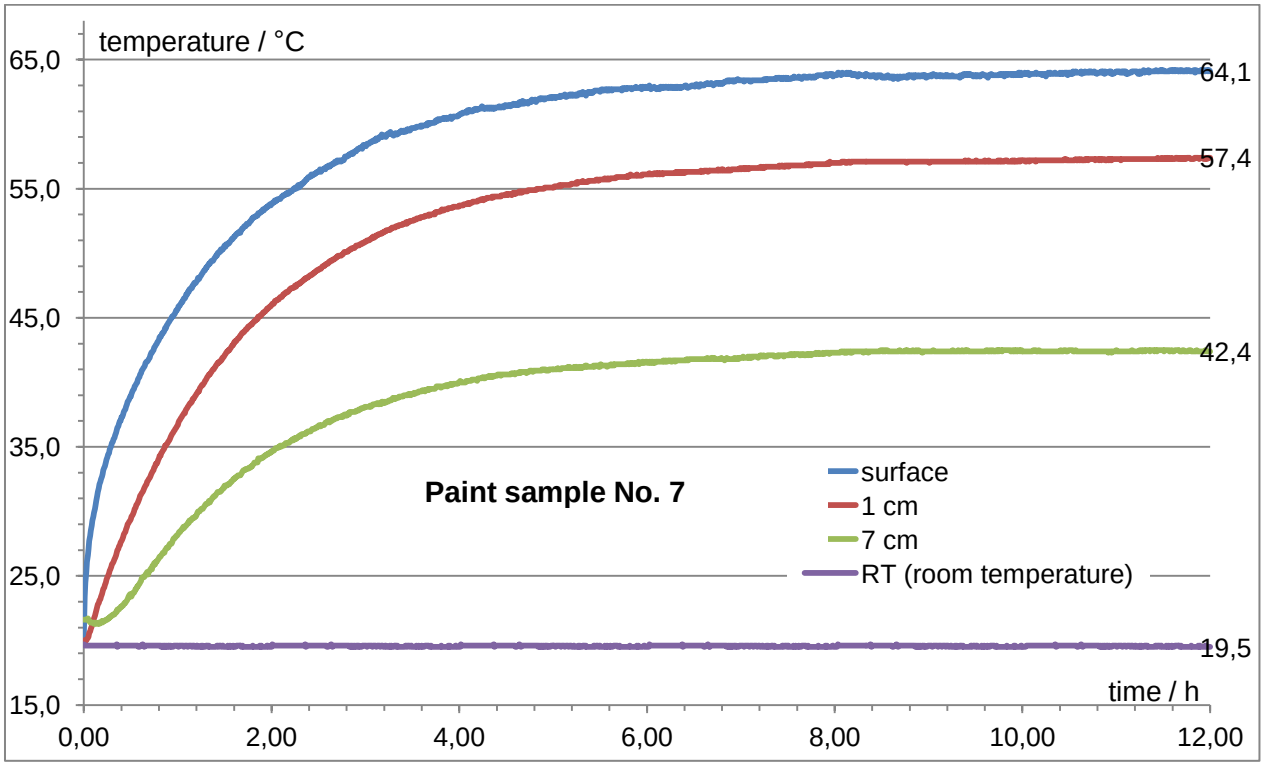

Figure 4: Acrylic exterior paint A with IR

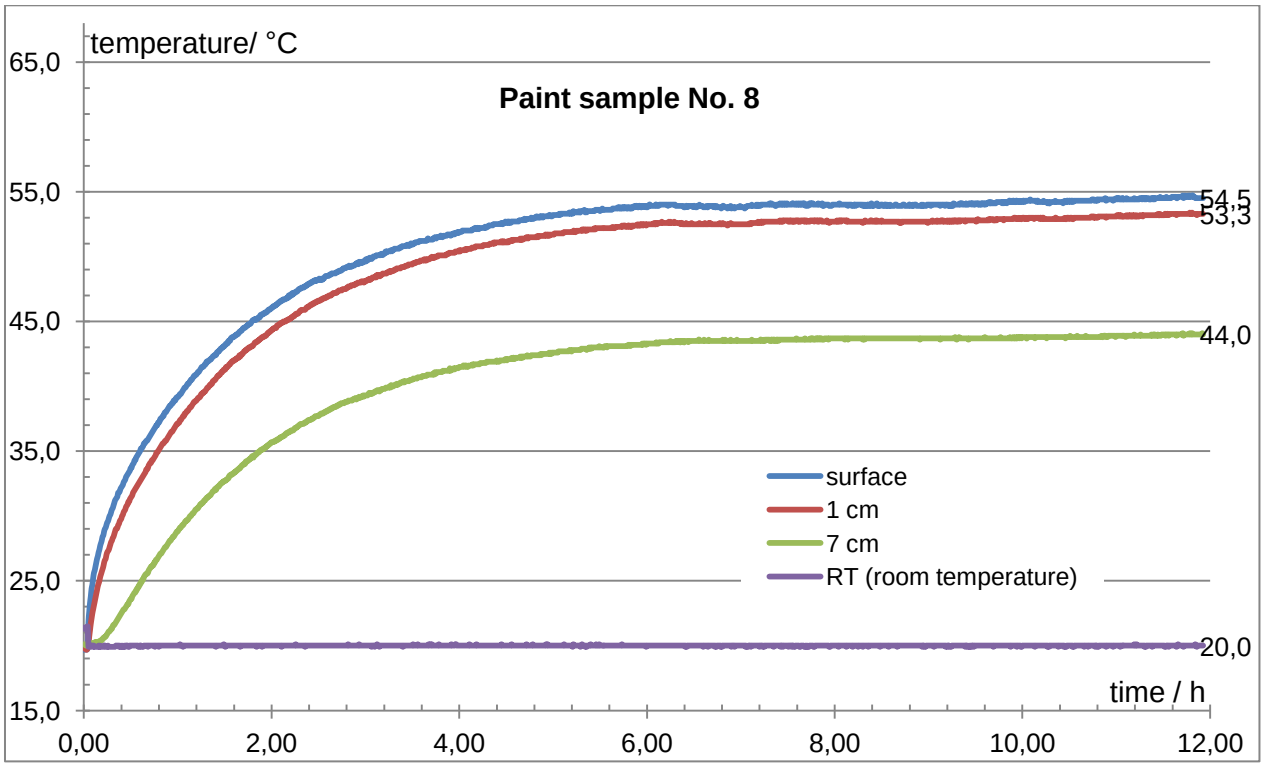

Figure 5: Acrylic exterior paint N with IR

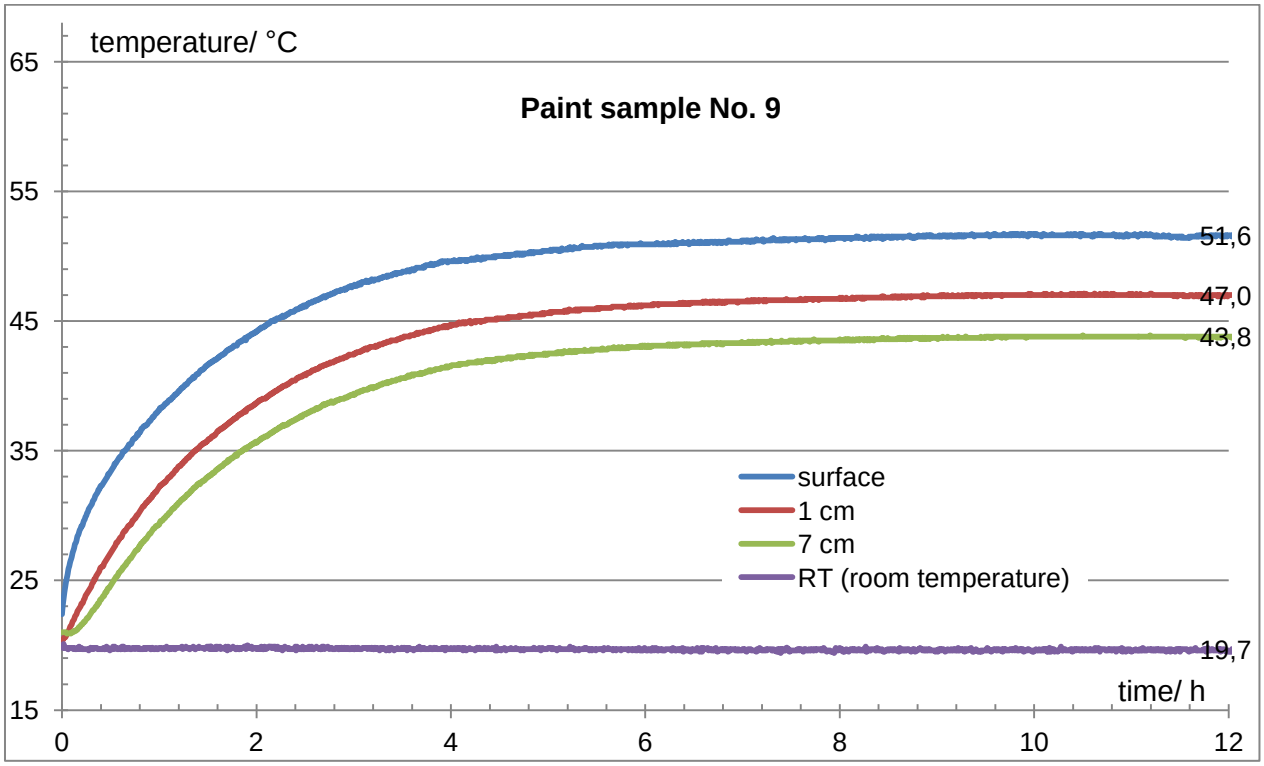

Figure 6: Acrylic exterior paint S with IR

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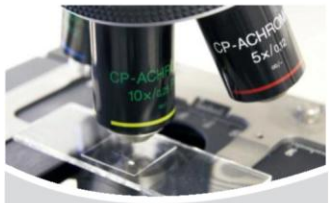
› Analytik

› Werkstoffprüfung



› Materialografie

› Qualitätssicherung

› Schadensanalyse

› Entwicklung

› Laborservices

› Analytikum
› Chemie & Korrosionslabor
› Elektroniklabor
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