Materialprüfanstalt für Werkstoffe und Produktionstechnik
Hannover

INSPECTION CERTIFICATE

ACC. TO EN 10 204 - 3.2

Order No.: 20060894
Issue: MP-TA / Be

Applicant: Helmut Klumpf Technische Chemie KG
Industriestr. 15
45699 Herten

Date of Application: 24.04.2006
Your Reference No: U. Ellingen

Content of the Application: Type Testing acc. to DIN EN ISO Standard 9934 Part 2 dated March 2003 of Test Objects for the Magnetic particle Testing, and Determination of corrosive Components in acc. to ASME Code, Section V, Article 6, T-641, Addenda July, 1st 2004. On Demand of the Applicant no Long-Term-Test was carried out.

Test Objects: Untergrundfarbe DPM Batch 811
Magnetpulversuspension MPS-S Batch 604

PI-No.:
Date of reciept:
Supplied by / ~~Sampling by~~ *: Parcel Service
~~Data * of the test(s):~~

Scope of the test report: 10 pages incl. cover sheet

The test results will exclusively refer to the test objects.

This test report - not even as an extract or an abbreviated version – must not be published without the written consent of the Material-prüfanstalt.

* To be deleted if not applicable.

Landesbetrieb gem. § 26 Nieds. LHO
Vorstand:
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1. Subject:

The "Materialprüfanstalt" was asked by the applicant to test the magnetic particle testing products "Untergrundfabe DPM" and "Magnetpulversuspension MPS-S"3. On Demand of the Applicant no Long-Term-Test was carried out.

2. Test Objects:

Contrast aid Paint: **Untergrundfarbe DPM, batch 811**

Organic Suspension: **Magnetpulversuspension MPS-S, batch 604**

Organic Carrier Liquid: **for the Magnetpulversuspension MPS-S**

3. Test Method:

The Type Testing contains a statement about the displays of the magnetic particle testing products, as well as about the single qualities of the magnetic particle testing products. The realisation of the investigation concerning the determination of the displays as also the single qualities corresponds with regard to DIN EN ISO 9934 part 2, March 2003.

3.1 Reference Blocks:

Reference blocks 1 and 2 in acc. to DIN EN ISO 9934 part 2, annex B were used as test speciments.

The reference block 1 is a disk with two kinds of natural cracks. The coarse cracks are abrasive-cracks, the fine cracks are produced by grinding and stress corrosion. Because of a central conductor, the reference blocks is magnetizised in a remanently way and corresponds to the specifications of the DIN EN ISO 9934 part 2, annex B. The test block no 2, which is used for the investigation of the sensitiveness, is a self-holdig unit that does not need any external magnetization. This reference block contains two steel-blocks and two permanent magnets. The calibration is adjusted in a way, that the marker – 4 corresponds to a field strength of -100 A/m +/- 10 % and the marker + 4 corresponds to +100 A/m +/- 10 %.

3.2 Individual Properties of the Test Objects:

3.2.1. Performance

The determination of the Performance of the detection media for the magnetic particle inspection was carried out according to annex A of the DIN EN ISO 9934 part 2. For the removal of fluorescence dye, oxides, dirt and rust the reference blocks were cleaned free of residues. The application of the detection media (Spraying direction 90 ° ±10° to the surface under examination, Spraying duration: 3 to 5 sec.) was performed on the reference block being sloped around 45 ° ±10°. The subsequent visual inspection of the reference block corresponded to the determinations of the EN ISO 3059.

To the required comparsion of the magnetic testing material with a reference checking facility, plaease see annotation **** which is done at the end of this report at the tabular listing of the individual properties.
The cumulative length of the indications on the reference block 2 was measured.

The examination was repeated three times (visual or equivalent test method) and the mean value of the results employs.

3.2.2. Colour

The colour of the magnetic particle testing media was compared with the manufacturer's specifications.

3.2.3. Particle Size

The determination of the particle size of the magnetic particle testing media was carried out by the optical laser diffraction procedure.
The particle sizes of the magnetic particles are described as follows:
With magnetic inks the particle sizes shall be in the field

- Lower diameter d_l: less than 10 % of the particles are smaller than d_l
- Middle Diameter d_a: -/-
- Upper Diameter d_u: less than 10 % of the particles are larger than d_u.

In Case of powders (dry testing media) d_l is in general ≥ 40 µm.

3.2.4. Temperature Resistance

The magnetic testing media was sputtered onto a metal bar that was heated up onto the temperature indicated by the supplier and stored 5 minutes at this temperature. After-

wards a visual inspection on harms (Colour modifications, appearance, dissolution, blistering) was made as well as a visual evaluation for the classification of the sensitiveness.

3.2.5. Flash Point

The determination of the flash point was carried out in the open crucible in accordance with Cleveland, DIN ISO 2592.

3.2.6. Viscosity of the Carrier Liquid

The Viscosity was determined to EN ISO 3104 (according to Ubbelohde) at 20°C. The value is specified into m Pa · s. The error of measurement is maximal 1 %.

3.2.7. Mechanical Stability

Short term test :

For the determination of the mechanical stability in accordance with a short-term test 1 liter of of detection media was stirred 2 hours with a stirrer in accordance to DIN EN ISO 9934. Afterwards the indications on reference blocks 1 and 2 caused from the stirred detection media were compared with the indications of the original sample. No discernible changes in the quality of the indications were allowed.

3.2.8. Foaming

The foaming was determined with the orders for the determination of the mechanical stability. No significant foaming was allowed to occur.

3.2.9. Storage Stability

It was checked, whether the original receptacles of the supplier were equipped with an expiration date.

3.2.10. Sulphur and Halogen Content

As proof of a sulfur content under 200 x 10^{-6} and a halogen content under 200 x 10^{-6}, the detection media was burnt using the bomb-method.

The subsequent determination of the total sulphur content was carried out photometrically in acc. to the ASTM Standard D 516-02, whereas the determination of the total content of halogen (chlorine and fluorine) was carried out in acc. to the ASTM Standard E 165-02, with regard to the chlorine photometrically in acc. to Annex 2, Method A, and with regard to the fluorine in acc. to ASTM 165-02, Annex 3 using an ion specific electrode.

The method described shows a maximum error of measurement of ± 10 x 10^{-6} in case of

a sulphur and halogen content of under 200 x 10^{-6} in liquids.

4. Investigation Results:

Please refer to pages 6 to 9 for the investigation results of the individual properties.

5. Summary:

In view of the investigation results, the requirements according to the DIN EN ISO 9934, Part 2, Issue March 2003, have been met by the magneting testing detection media.

The test objects

Untergrundfabe DPM and
Magnetpulversuspension MPS-S

can be identified as "free of corrosive ingredients according to the DIN EN ISO Standard 9934, Part 2".

Regarding the content of corrosive ingredients, the requirements of the ASME Code, Section V, Article 6, T-641, Addenda July, 1st 2004 have equally been met by the investigated test objects.

Hannover, 06.07.2006

Materialprüfanstalt für Werkstoffe und Produktionstechnik

For the Managing Board

Dr.-Ing. A. Kinzel

The Clerical Worker

Dipl.-Ing. H. Berger

Test Object: Contrast aid paint "UntergrundfarbeDPM" , batch 811

Individual Property	for*	Determination acc. to the DIN EN ISO 9934-2, Section:	Requirement	Results
Performance	QB*	7.1	Performance on reference block 1 Determination of the length of the indications on reference block 2.	see page 10 **** cumulative length of both indications: 2,6 cm
Colour	QBP*	7.2	Comparsion with manufacturers specificatios (Q) or the type test (B)	Colour identical
Temperature Resistance	Q	7.4	no specifications	R.T.
Flash Point	QB	7.7	no specifications	- 20°C
Storage Stability	Q	7.13	Control on note on the detection media by the producer	note is existing
Content of sulphur and halogenes**	Q reasonable B	7.15	- Sulphur Content $<200 \times 10^{-6}$ - Sum of halogene content (Cl/F) $<200 \times 10^{-6}$ (corresponds 0,02 % by weight each)	S: 0,019 % by weight Cl: 0,001 % by weight F: < 0,001 % by weight requirements met

* neccessary for type testing (Q), batch testing (B), in service testing (P)
** for detection media, that are caracterized with „Low sulphur and halogen content"
**** The comparsion of the indication lenghts with a reference checking facility, required in the DIN EN ISO 9934-2, is not possible at this time since such a reference checking facility is not defined. From that a database is built up in order to compare magnetic particle testing products which are commercially available. Since too few type testings were carried out up to now, no statistically protected evaluations are possible yet.

Hannover, 06.07.06
Clerical Worker

Dipl.-Ing. H. Berger

Test Object: Organic Carrier Liquid

Individual Property	for*	Determination acc. to the DIN EN ISO 9934-2, Section:	Requirement	Results
Colour	QBP*	7.2	Comparsion with manufacturers specificatios (Q) or the type test (B)	Colour identical
Temperature Resistance	Q	7.4	testing on harm through warming (5min at max. temperature, specified by supplier)	no harm recognizable R.T.
Flash Point	QB	7.7	no specifications	62°C
Viscosity	Q	7.9 / ISO 3104	at 20°C < 5 m Pa • s	1,6 mPa s requirement met
Foaming	Q	7.11	No significant foaming was allowed to occur	requirement met
Storage Stability	QB	7.13	Control on note on the detection media by the producer	note is existing
Content of sulphur and halogenes**	Q reasonable B	7.15	- Sulphur Content <200 x 10^{-6} - Sum of halogene content (Cl/F) <200 x 10^{-6} (corresponds 0,02 % by weight each)	S: 0,004 % by weight Cl: 0,002 % by weight F: < 0,001 % by weight requirements met

* neccessary for type testing (Q), batch testing (B), in service testing (P)
** for detection media, that are caracterized with „Low sulphur and halogen content"

Hannover, 06.07.06
Clerical Worker

Dipl.-Ing. H. Berger

Test Object: Organic Suspension "MPS-S", batch 604, ready to use, black

Individual Property	for*	Determination acc. to the DIN EN ISO 9934-2, Section:	Requirement	Results
Performance	QB*	7.1	Performance on reference block 1 Determination of the length of the indications on ref.-block 2.	see page 10**** cumulative length of both indications: 2,6 cm
Colour	QBP*	7.2	Comparsion with manufacturers specificatios (Q) or type test (B)	Colour identical
Particle Size	QB	7.3	Analysis (Q) or comparsion with the type test (B) d ≥ 1,5µm and ≤ 40 µm	d_l(10 %)= 2,58 µm => 1,5 µm da = 6,11 µm d_u(90 %)= 13,20 µm=< 40µm Requirement to d_l not reasonable, see ***
Temperature Resistance	Q	7.4	testing on harm through warming (5min at max. temperature, specified by supplier)	no harm recognizable
Flash Point	QB	7.7	no specifications	61°C
Viscosity	Q	7.9 / ISO 3104	at 20°C < 5 m Pa • s	1,6 mPa s requirement met
Mechanic Stability: - short term test -	QB	7.10.	no decrease of the performance after the test	requirement met see photo page 10 cumulative length of both indications: 2,3 cm
Foaming	Q	7.11	No significant foaming was allowed to occur	requirement met
Storage Stability	QB	7.13	Control on note on the detection media by the producer	note is existing
Content of sulphur and halogenes**	Q reasonable B	7.15	- Sulphur Content <200 x 10^{-6} - Sum of halogene content (Cl/F) <200 x 10^{-6} (corresponds 0,02 % by weight each)	S: 0,004 % by weight Cl: 0,002 % by weight F: < 0,001 % by weight requirements met

* neccessary for type testing (Q), batch testing (B), in service testing (P)

** for detection media, that are caracterized with „Low sulphur and halogen content"

*** In the point "particle size" the EN 9934-2 requires a technically not reasonable and in a multiple way not lasting limit of the value for d_l. Due to from investigations, suitable magnetic particle testing products showed that they may have particle sizes in a lower range. The demand $d_l \geq 1,5$ µm as a boundary value can be underflowed. This is valid in particular for not fluorine magnetic particle testing products.

**** The comparsion of the indication lenghts with a reference checking facility, required in the DIN EN ISO 9934-2, is not possible at this time since such a reference checking facility is not defined. From that a database is built up in order to compare magnetic particle testing products which are commercially available. Since too few type testings were carried out up to now, no statistically protected evaluations are possible yet.

Hannover, 06.07.2006
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Corrosive components of the contrast aid paint DPM, batch 811 in accordance to the ASME Code, Section V, Article 6, T-641, July, 1st 2004:

Total dissolved solids: (60 min at 90–100 °C)	18,41 g (Starting mass: 50 g)	Demand of ASME Code
Content of Cl:	0,003 % by Weight	Sum of Cl and Fluor < 1,0 % by Weight
Content of S:	0,050 % by Weight	< 1,0 % by Weight
Content of F:	0,001 % by Weight	Sum of Cl and Fluor < 1,0 % by Weight

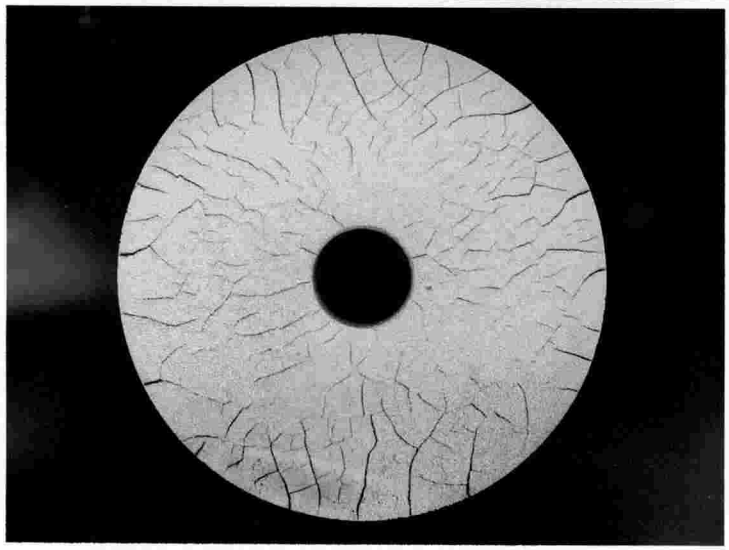
Corrosive components of the organic suspension MPS-S, batch 604 in accordance to the ASME Code, Section V, Article 6, T-641, July, 1st 2004:

Total dissolved solids: (60 min at 90–100 °C)	37,10 g (Starting mass: 50 g)	Demand of ASME Code
Content of Cl:	0,001 % by Weight	Sum of Cl and Fluor < 1,0 % by Weight
Content of S:	0,007 % by Weight	< 1,0 % by Weight
Content of F:	0,001 % by Weight	Sum of Cl and Fluor < 1,0 % by Weight

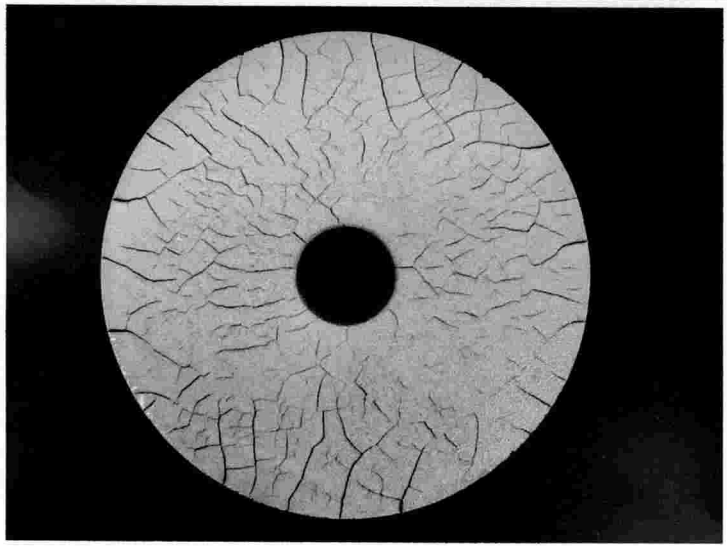
With regard to the content of corrosive components, the examined test objects fullfill the demands of the mentioned ASME-Code.

Hannover, 06.07.2006
Clerical Worker

Dipl.-Ing. H. Berger



Picture 1: Original (Enlarged illustration)



Picture 2: Short term test (Enlarged illustration)