PRODUCT INFORMATION SHEET

Elements in Tattoo Dyes: As, Ba, Cd, Co, Cr, Cu, Hg, Ni, Pb, Sb, Se, Sn and Zn

PT originated REFERENCE MATERIAL (RM)

Description of the RM

Name / Material of related PT	*DLA ptCM05 (2024) – Elements in Tattoo Dyes: Analysis of 13 Elements (As, Ba, Cd, Co, Cr, Cu, Hg, Ni, Pb, Sb, Se, Sn, Zn) (2 samples 5 g each)*
Identifier / LOT	*RM 2024-CM05*
Expiry date	*September 2028*
Matrix	*Tattoo Dye*
Physical description	*Liquid*
Packaging / weight	*Glass vial / 5 g*
Storage conditions	*2 - 10°C (dry and dark)*
Name and address manufacturer	***DLA - Proficiency Tests GmbH*** *Hauptstr. 80, 23845 Oering, Germany* *Tel. ++49-(0)4532-9183358, Fax. ++49(0)4102-9944976* *eMail. pt@dla-lvu.de, website. www.dla-lvu.de*

Composition of Material

Ingredients	**Content ***
Tattoo dye (red) Tattoo Product (red) / ingredients: glycerin, distilled water, CI 12477 / 11740 / 211, Isopropanol, TEC, Sulfuric Acid, Hydrochloric Acid (and acidic solutions, see below)	100 g/100 g
As - Arsenic (standard solution)	3,5 mg/kg
Ba - Barium (standard solution)	7,0 mg/kg
Cd - Cadmium (standard solution)	0,35 mg/kg
Co - Cobalt (standard solution)	9,7 mg/kg
Cr - Chromium (standard solution)	0,35 mg/kg
Cu - Copper (standard solution)	7,0 mg/kg
Hg - Mercury (standard solution)	0,35 mg/kg
Ni - Nickel (standard solution)	5,2 mg/kg
Pb - Lead (standard solution)	1,9 mg/kg
Sb - Antimon (standard solution)	1,7 mg/kg
Se - Selenium (standard solution)	2,8 mg/kg
Sn - Tin (standard solution)	4,5 mg/kg
Zn - Zinc (standard solution)	5,2 mg/kg

Contents according to gravimetric mixture, additional amounts of the elements can be present in the basic matrix

Note: *The metrological traceability of temperature, mass and volume during production of the PT samples is ensured by DAkkS-compliant calibrated reference materials.*

Minimum Sample Size / Homogeneity
A minimum sample size of 5 g is recommended for sample preparation.

The calculation of the repeatability standard deviations S_r of the participants was used as an indicator of homogeneity. For all parameters, the repeatability standard deviation was < 4,1% (except for zinc it was 5,6%). Thus, they were similar to corresponding repeatability standard deviations of precision data of the standardized methods (e.g. ASU §64 / EN standard methods) (for more details see final report of PT).

Reference Values
All reference values were derived from the related PT round (for more details see final report).

Reference Values quantitative in mg/kg

Parameter	As – Arsenic	Ba – Barium	Cd – Cadmium
Numbers of results°	7	7	7
Number of outliers	0	0	0
Assigned Value (Xpt)	***3,64***	***8,22***	***0,379***
Robust standard deviation	0,296	0,336	0,035
Standard uncertainty	0,140	0,159	0,017
Target standard deviation σpt	0,479	0,958	0,070
Target range	***2,68 – 4,59***	***6,30 – 10,1***	***0,239 – 0,519***

Parameter	Co - Cobalt	Cr - Chromium	Cu - Copper
Numbers of results	7	7	7
Number of outliers	0	0	0
Assigned Value (Xpt)	***10,7***	***1,21***	***7,96***
Robust standard deviation	0,900	0,131	0,849
Standard uncertainty	0,425	0,062	0,401
Target standard deviation σpt	1,20	0,188	0,932
Target range	***8,33 – 13,1***	***0,83 – 1,59***	***6,09 – 9,82***

Parameter	Hg – Mercury	Ni – Nickel	Pb – Lead
Numbers of results	6°	7	7
Number of outliers	1	0	0
Assigned Value (Xpt)	***0,365***	***6,11***	***2,11***
Robust standard deviation	0,0469	0,592	0,275
Standard uncertainty	0,0239	0,280	0,130
Target standard deviation σpt	0,0680	0,744	0,302
Target range	***0,229 – 0,501***	***4,62 – 7,60***	***1,51 – 2,71***

° without outlier

Parameter	Sb – Antimony	Se - Selenium	Sn - Tin
Numbers of results	7	6	6°
Number of outliers	0	0	1
Assigned Value (Xpt)	***1,81***	***2,94***	***4,91***
Robust standard deviation	0,126	0,329	0,0868
Standard uncertainty	0,0595	0,168	0,0443
Target standard deviation σpt	0,264	0,400	0,618
Target range	***1,28 – 2,33***	***2,14 – 3,74***	***3,67 – 6,14***

° without outlier

Parameter	Zn - Zinc
Numbers of results	6
Number of outliers	0
Assigned Value (Xpt)	***6,53***
Robust standard deviation	1,48
Standard uncertainty	0,754
Target standard deviation σpt	0,787
Target range	***4,95 – 8,10***

Intended Use

- for laboratory use only, no food!
- validation of analytical methods
- control sample for quality control charts
- test material for inter-laboratory comparisons
- no medical use

Storage Instructions and Handling Information

The material should be stored as stated on page 1. Before use of the material should be warmed up to room temperature. The content should be mixed thoroughly prior to subsampling (see minimum sample size above). The material should be weighed immediately after opening of the foil pouche/bottle and closed again afterwards in order to avoid uptake of moisture. Frequent freezing and thawing should be avoided as this can lead to changes in the properties of the material. The expiry date of this RM is based on the current knowledge and applies only for proper storage conditions in the originally closed foil pouche/bottle.

Safety Precautions

The usual laboratory safety precautions should be applied when working with the RM considering the type of ingredients, parameters and its concentration.

Data Source

The material was analyzed by 7 laboratories within the related proficiency test (PT). Different analytical methods have been used.

Various

The user must determine the suitability of this RM for its particular purpose. DLA makes no warranty of any kind, expressed or implied, other than its products meet all quality control standards set by DLA. We do not guarantee this product can be used for a special application.

approved (PT-Coordinator)	updated
Alexandra Scharf, PhD	Ulrike Vorreiter
signed A. Scharf	*signed U. Vorreiter*
17 April 2025	6 October 2026