CEQAT-DGHS Interlaboratory tests for methods validation and measurement uncertainty

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Motivation

Safety experts, carriers or traders must be able to rely on the validity of the method and on correct results of safety tests and assessments in the laboratory.

Interlaboratory tests (round robin tests (RR)) play a decisive role in assessing the reliability of test results. Interlaboratory tests are also used to validate test methods. In addition, participation in interlaboratory tests is a crucial element of the quality assurance of laboratories; as such it is explicitly recommended in DIN EN ISO/IEC 17025.

Therefore, the Bundesanstalt für Materialforschung und -prüfung (BAM) continues to support the further development of the interlaboratory test programme of CEQAT-DGHS (Centre for quality assurance for testing of dangerous goods and hazardous substances, www.ceqat-dghs.bam.de), established in 2007. This programme is run by BAM in collaboration with the Physikalisch-Technische Bundesanstalt (PTB), Braunschweig and the QuoData Gesellschaft für Qualitätsmanagement und Statistik mbH, Dresden.

Specific reasons

Fire on MV „Rickmers Genoa“ 2005 [1]

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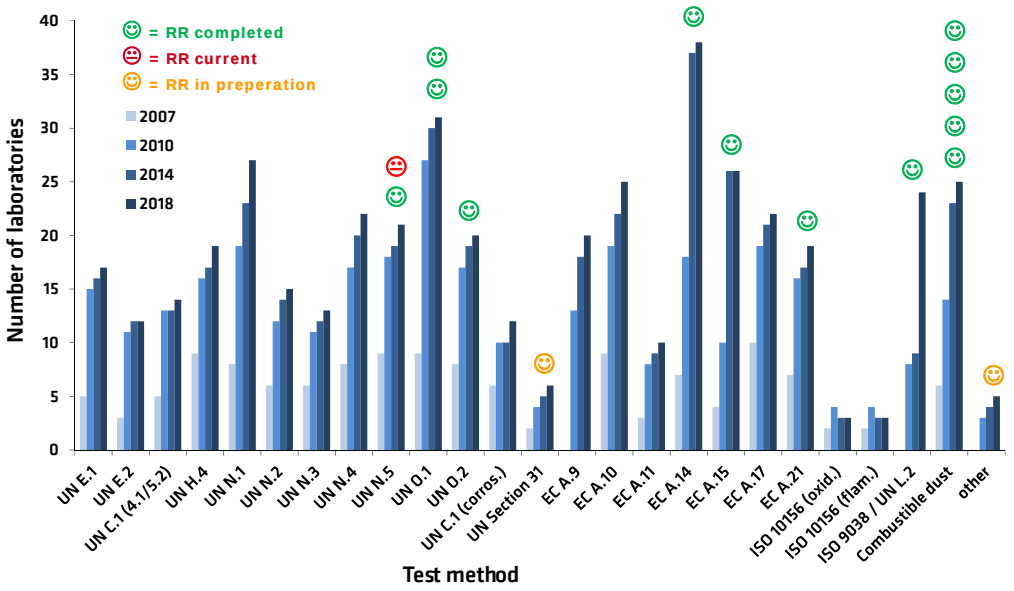
REACH, CLP...

Changes in chemical legislation



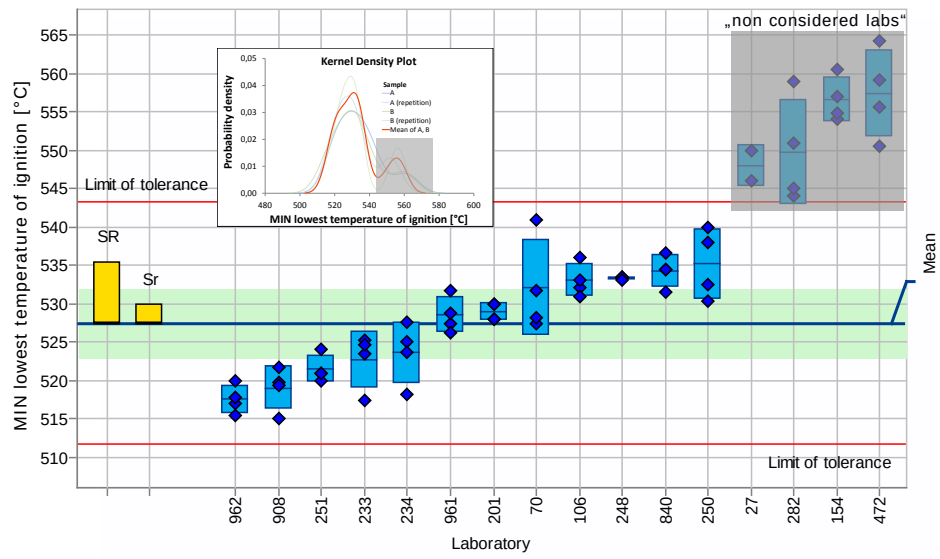
Number of laboratories with interest in CEQAT-DGHS interlaboratory tests

Typical results of the RRs 2004-2018 (examples) and measurement uncertainty of the test method

RR DIN EN 15188:2007 Self-ignition temperature . 2015, submitted data check

Parameter	Sum	Laboratory (anonymised)											
		x	x	x	x	x	x	x	x	x	x	x	x
Planned test period is not met: 1st tested sample	9	0	1	1	1	0	1	1	0	1	1	1	1
Planned test period is not met: 2nd tested sample	5	0	0	0	0	1	0	1	0	1	1	1	0
Planned test period is not met: RS 1	1	0	0	0	0	0	0	0	0	0	0	1	0
Planned test period is not met: RS 2	5	1	0	0	0	1	0	0	1	0	0	1	1
Different laboratory assistants within the tests	8	1	1	0	1	1	0	1	1	0	1	0	1
Bulk density of the sample not correct calculated	9	0	0	1	1	1	1	0	1	1	1	1	1
Bulk density of the sample does not comply with the requirements	9	1	1	0	1	1	0	1	1	0	1	1	1
Variation of bulk density > 2 % (related to mean value of all tests)	9	1	1	0	1	1	0	1	1	0	1	1	1
Variation of bulk density > 5 % (related to mean value of all tests)	5	1	1	0	0	1	0	0	0	0	0	1	1
Wrong distance of the sensor T1 and T2 to the sample basket	3	1	0	0	0	0	0	0	0	0	1	1	0
Difference(s) between sensor T1 und T2 > 2 K	3	1	0	0	0	0	0	1	0	0	0	1	0
Difference(s) between "go" and "no go" temperature > 2 K	11	1	1	1	1	1	0	1	1	1	1	1	1
Difference(s) between "go" and "no go" temperature > 2.5 K	6	0	0	1	1	1	0	1	0	0	0	1	1
Difference(s) between "go" and "no go" temperature > 3 K	2	0	0	0	1	0	0	0	0	0	0	0	1
Missing calibration (sensor or whole measuring chain)	0	0	0	0	0	0	0	0	0	0	0	0	0
Missing calibration of the whole temperature test chain	2	0	1	0	0	0	0	1	0	0	0	0	0
Missing calibration document	2	0	0	0	0	0	0	1	0	0	0	0	1
	Sum	8	7	4	8	9	2	11	5	4	8	12	11

red field = deviation from the test method or RR-instruction



RR A.15 Ignition temperature, liq. 2012, RR-evaluation with reproducibility sd SR

‘Lab result’ = ‘test result ’ ± U , whereby the expanded measurement uncertainty U = k * u with u = SR from validation RR

see: Hässelbarth W (2004) BAM-Leitfaden zur Ermittlung von Messunsicherheiten bei quantitativen Prüfergebnissen. Forschungsbericht 266, BAM, Berlin, ISBN 3-86509-212-8

Conclusions

- A need for improvement is demonstrated for all examined test methods. Thus, the interlaboratory tests shall initially aim at the development, improvement and validation of the test methods and not on proficiency tests.
- To avoid any discrepancies in classification and labelling of chemicals validation of the test methods used should become state of the art and test results should be accompanied by the measurement uncertainty.
- The laboratory management and the practical execution of the tests need to be improved in many laboratories.
- The term "experience of the examiner" must be seen critically: A "long experience with many tests" is not necessarily a guarantee for correct results.

Reference

[1] China Shipping Service (CNSS), photo: http://www.cnss.com.cn/html/2016/currentevents_0422/206860.html (downloaded on 18.04.2016)