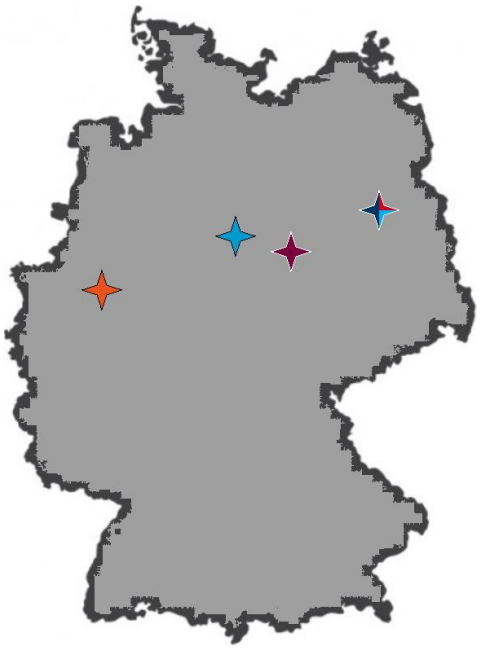
Berlin, 6th of November 2021

Round Robin Test for Hybrid Mixtures

Hybrid mixtures consist of more than one combustible phase (gaseous, liquid and solid) mixed with air. Their safety characteristics are unpredictable and until now, there has been no broadband screening of various gases and dusts. In the modern industry hybrid mixtures play an increasing role. With progressively faster, specialized and overlapping production methods the production can not be separated in unit operations of every single substance anymore, in some processes this is not possible at all, because the step of operation comprises several phases. For single substances and single aggregates standards exist to determine the safety characteristics. For hybrid mixture there is no existing standard [1] or method, even though the first observations are more than 200 years old.

In a new project called "Nex-Hys" five institutions are developing a new standard for the determination of safety characteristics of hybrid mixtures to have comparable and reliable results with the test methods.



The five institutions:

BAM - Bundesanstalt für Materialforschung und -prüfung

DIN – Deutsches Institut für Normung

PTB - Physikalisch-Technische Bundesanstalt

Otto-von-Guericke-Universität Magdeburg

Inburex Consulting

To have a connection to databases of single-phase safety characteristics it was tried to adopt most of the parameters. In a first step all the parameters and technical devices were checked and suggestions were given for a new standard [2,3,4,5].

To get a better overview of the feasibility of the new standard and the deviation and scattering of the results an international round robin test was started. So far the following countries are participating:

- Germany (4 institutions)
- France (2)

- Italy (1)
- Czechia (1)
- USA (2)
- Canada (1)

The results will have an impact on the development of the new standard and we would like to have contributors in the USA and Canada to participate in the round robin test. Whether you are a university or a company, in the end everyone will profit from reproducible results and the knowledge, how resilient they are.

If you have any questions or anything remains unclear feel free to contact us via email or phone: Stefan.spitzer@bam.de - +49 30 8104 4285

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Yours sincerely, stay healthy and thanks for your help

Stefan H. Spitzer

Project Website from BAM (german):

https://www.bam.de/Content/DE/Projekte/laufend/Nex-Hys/nex-hys.html

Project Website from OVGU (german):

http://www.nex-hys.de/

Overview Poster from PTB:

http://www.nex-hys.de/images/DAT/PDF_Download/1906_Zakel.pdf

[1] EN 26184-3:1991 is deprecated and ISO 6184-3:1985 is officialy under review since 2005. Both are only 4 Pages long and thereby too short and imprecise to be applicable.

[2] Comparative study on standardized ignition sources used for explosion testing; 2021 *Journal of Loss Prevention in the Process Industries* ;Preprint available on ResearchGate DOI: https://doi.org/10.1016/j.jlp.2021.104516

[3] Influence of pre-ignition pressure rise on safety characteristics of dusts and hybrid mixtures

FUEL 2021

DOI: https://doi.org/10.1016/j.fuel.2021.122495

[4] Influence of the mixing procedure on safety characteristics of hybrid mixtures

Preprint available on ResearchGate

DOI: https://dx.doi.org/10.13140/RG.2.2.18025.62561

[5] Nex-Hys: minimum ignition temperature of hybrid mixtures; published in Journal of Loss Prevention in the Process Industries

DOI: https://doi.org/10.1016/j.jlp.2021.104502