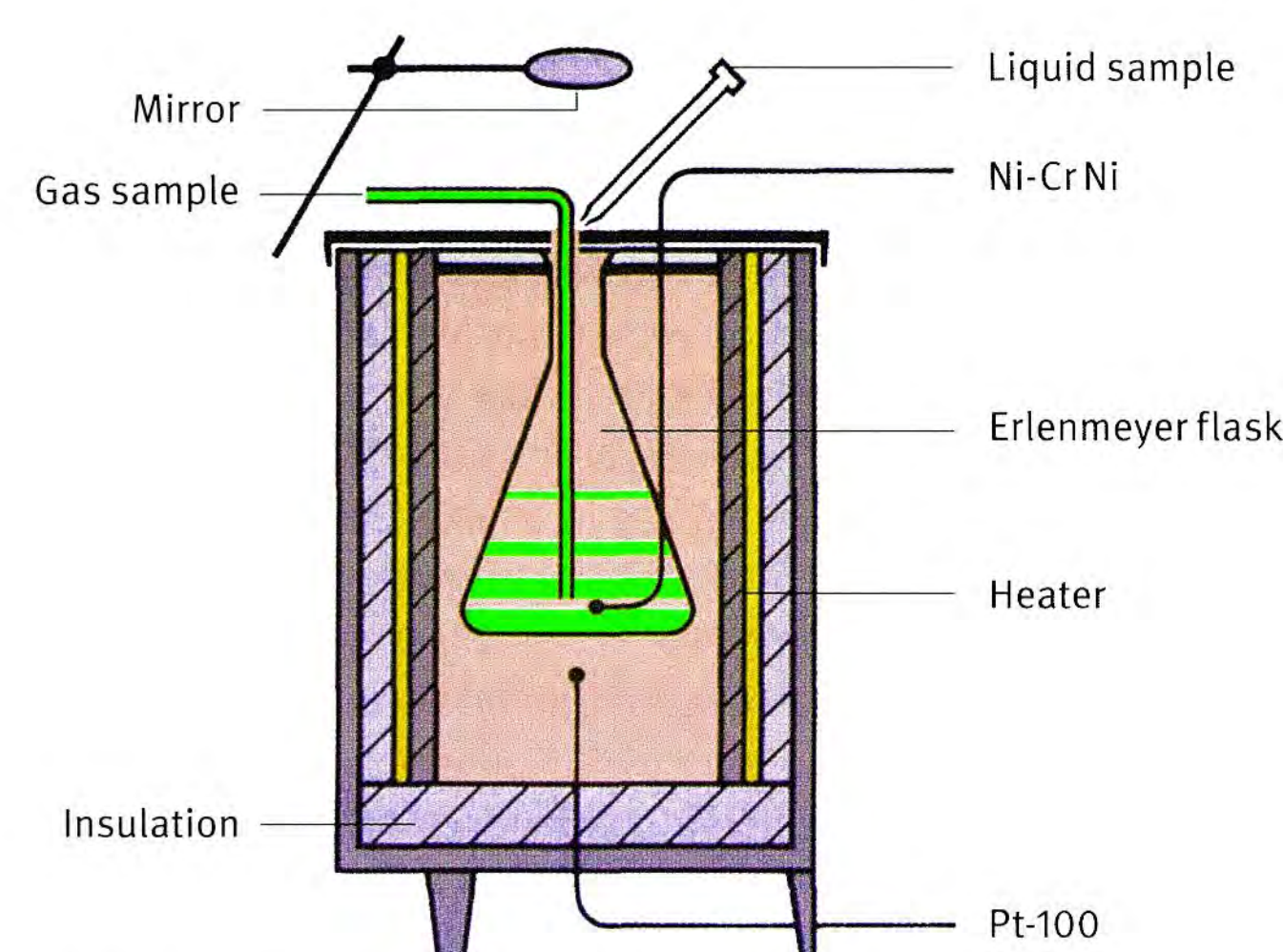


Minimum ignition temperature of hybrid mixtures

The minimum ignition temperature is an important safety value for handling gases, liquids and dust. The European regulation only provides standards to measure single substances and single-phase values. That poses a problem to industries where materials in different phases occur at the same time, as there is no way to prove that the mixture does not have an ignition temperature that is not below the single values.

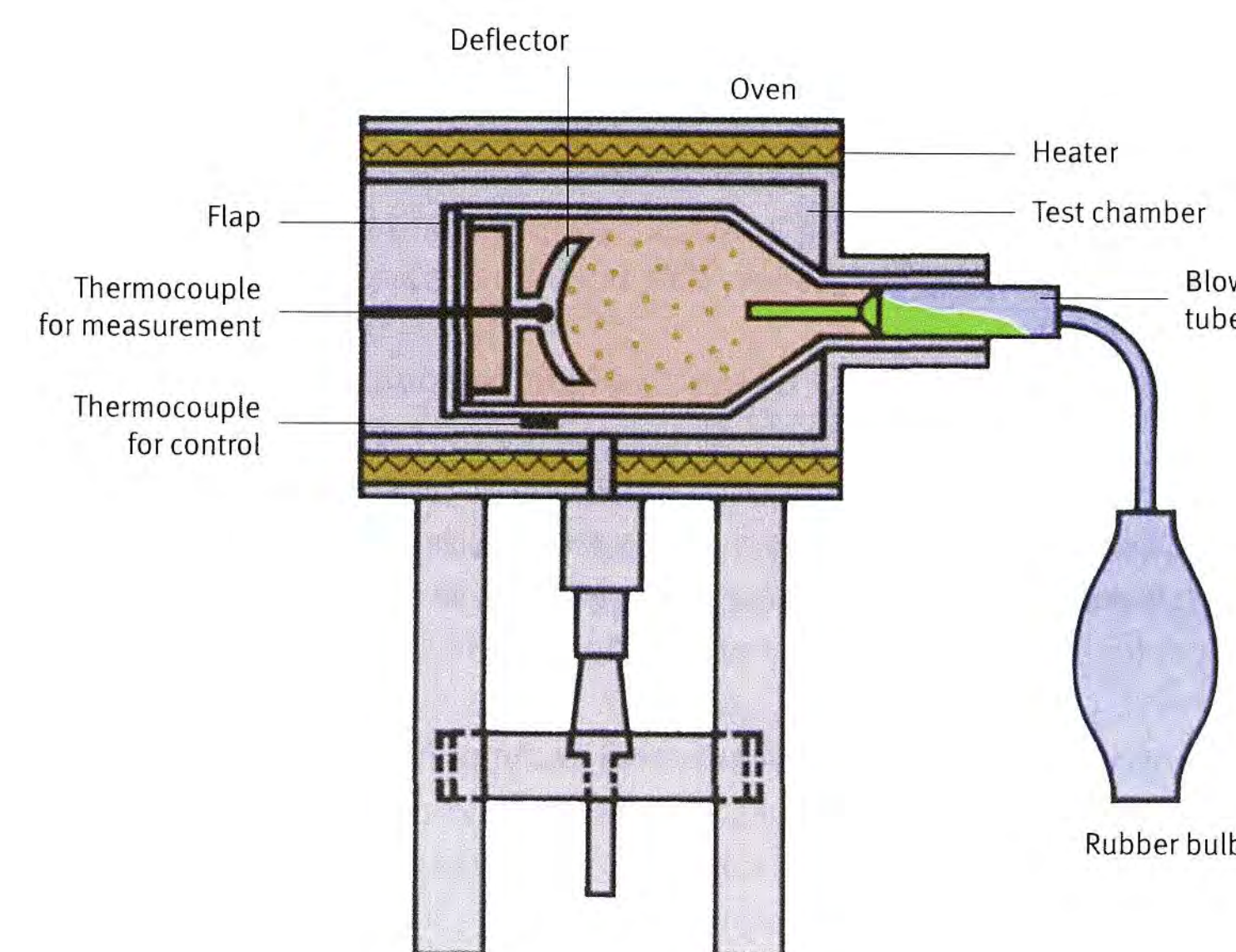
Aim of a research project is to provide an extension to the standard for the minimum ignition temperature of dusts (IEC 80079-20-2). Therefore, the Godbert-Greenwald oven is modified to allow testing dust, liquid and gas alone and in mixture with each other.

MIT of Gases and Liquids



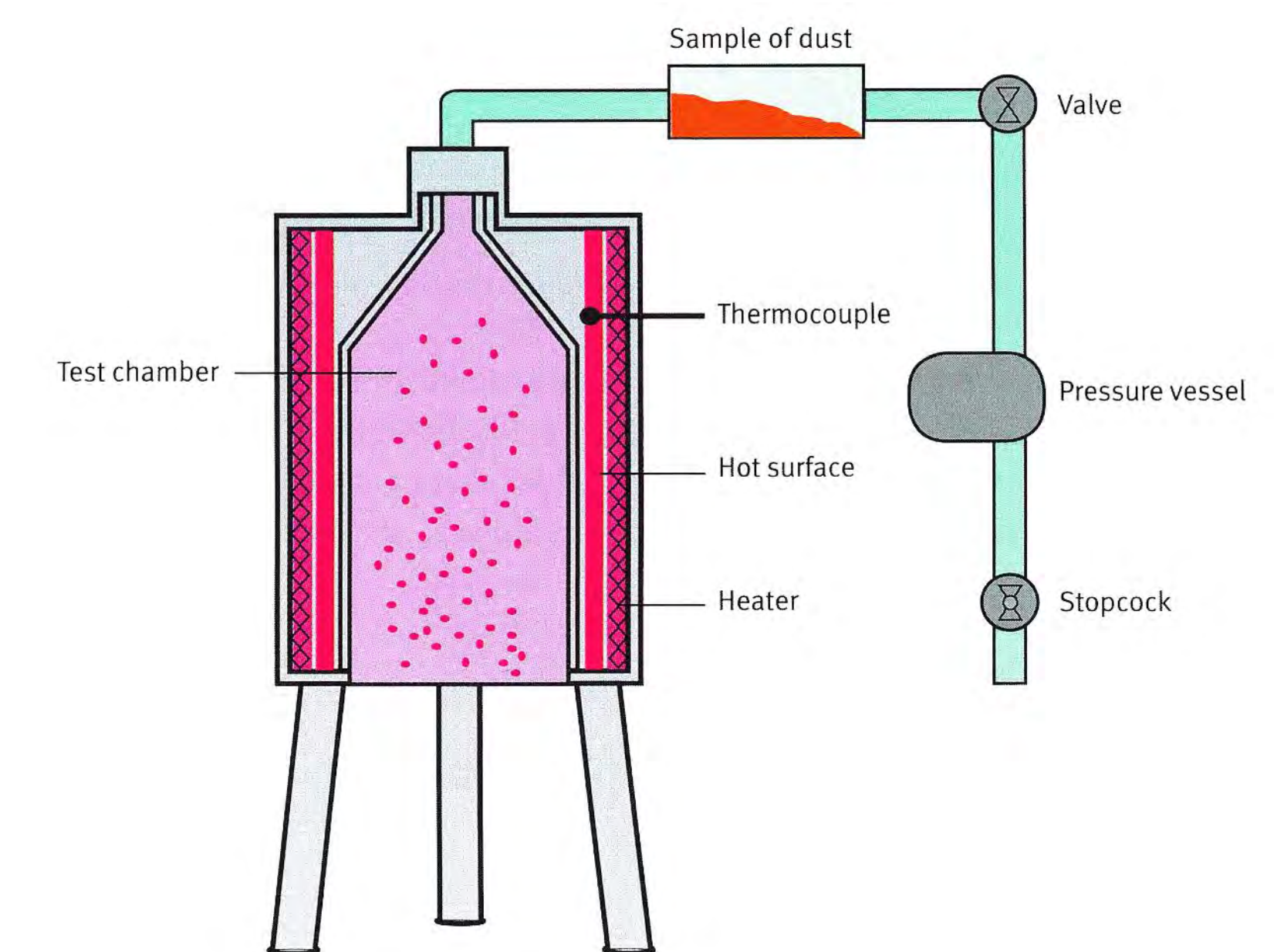
Graphic modified from BG RCI R003e - DGUV Information 312-066

MIT of Dusts: BAM Oven



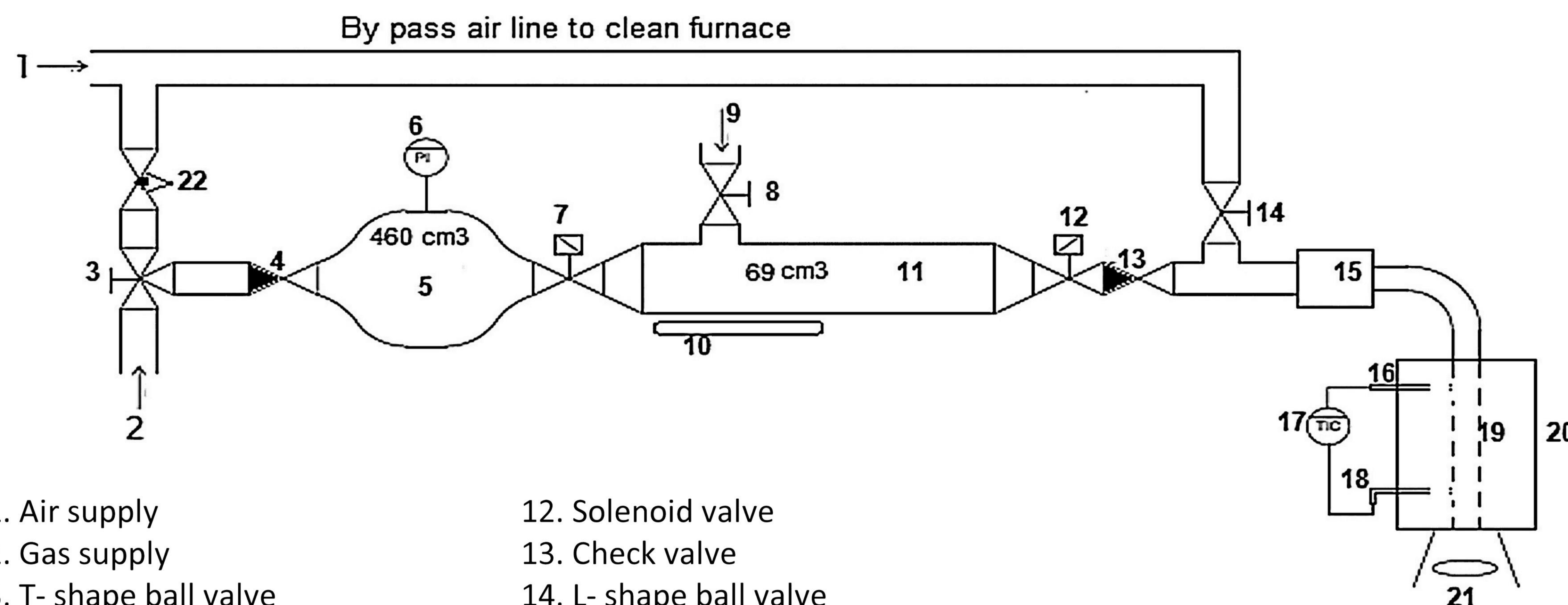
Graphic modified from BG RCI R003e - DGUV Information 312-066

MIT of Dust: GG Oven



Graphic modified from BG RCI R003e - DGUV Information 312-066

Proposal of a modified GG oven



1. Air supply
2. Gas supply
3. T- shape ball valve
4. Check valve
5. Air / gas reservoir or gas.
6. Digital pressure gauge
7. Solenoid valve
8. L- shape ball valve (two port)
9. Solvent or liquid supply
10. Heating filament.
11. Solvent reservoir
12. Solenoid valve
13. Check valve
14. L- shape ball valve
15. Dust Chamber / reservoir
16. Thermocouple
17. Temperature controller
18. Electric power supply
19. Steel furnace tube
20. Furnace shell and insulation materials
21. Mirror
22. Air regulating valve

Single MIT values

dust	MIT [°C]	gas	MIT [°C]	solvent	MIT [°C]
Wood	460	Hydrogen	540	Toluene	535
HD-PE	340	Methane	600	Hexane	225
Starch	380				

Preliminary results

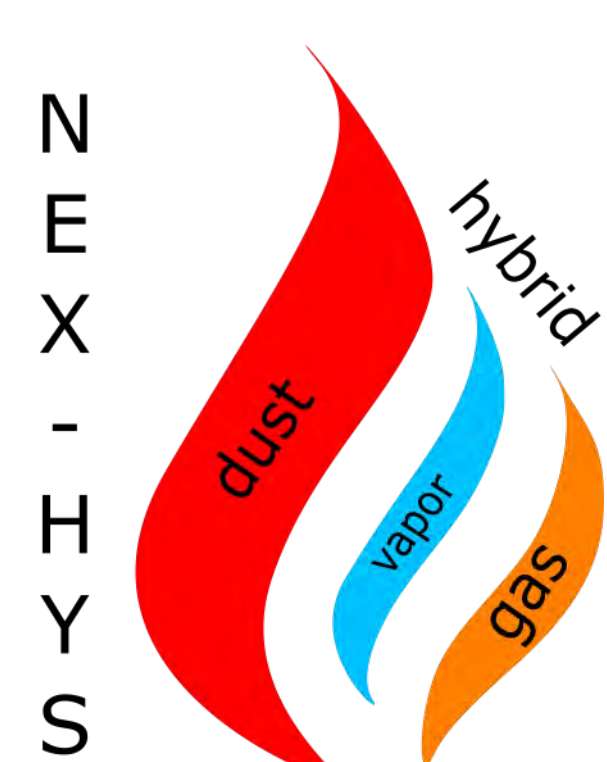
Reduction of the MIT of dust due to the admixture of gas or solvent

dust	ΔMIT by adding 0.8 vol% Hexane [K]	ΔMIT by adding 0.6 vol% Toluene [K]	ΔMIT by adding 3.0 vol% Hydrogen [K]	ΔMIT by adding 2.0 vol% Methane [K]
Wood	20	0	0	0
HD-PE	15	0	0	0
Starch	5	0	0	0

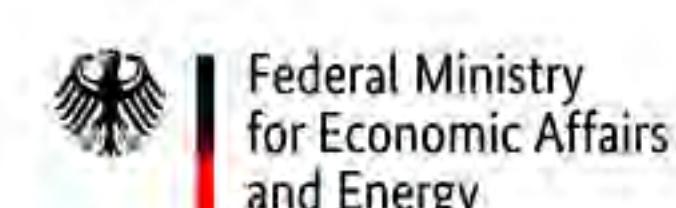
Reduction of the MIT of gas or solvent due to the admixture of dust

dust	ΔMIT by adding 87 g/m ³ HD-PE [K]	ΔMIT by adding 82 g/m ³ Starch [K]	ΔMIT by adding 97 g/m ³ Wood [K]
Methane	30	15	10
Hydrogen	35	30	0
Hexane	0	0	0
Toluene	25	15	0

Nex-Hys Partners and Funding



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