



HyLab – a German Hydrogen Quality initiative (ZSW part)

HYDRAITE 1st OEM workshop

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Analytical skills H₂ ZSW today



	ISO 14687-2 (2018)	ZSW Analytics (preliminary LOQ with available calibration gas mixtures)
Analyt	in ppm _v	in ppm _v
H₂O	5	1 (Capazitve Sensor) Slow, High Drift
Hydrocarbons	2	no Σ-Determintation
CH₄ (new 2018)	(100)	0,2 (GC PDHID)
O₂	5	0,1 (GC PDHID) 1 (Micro GC TCD)
He	300	1 (Mikro GC TCD)
N₂ + Ar	100 (300)	0,5 (GC PDHID)
CO₂	2	0,9 (GC PDHID)
CO	0,2 (0,2)	0,2 (GC PDHID)
Total-Sulfur	0,004	no Σ-Det., H ₂ S 0,1 ppm _v (FPD, not used to date)
Formaldehyde	0,01 (0,2)	n/s
Formic Acid	0,2	n/s
Ammonia	0,1	n/s
Total Halides	0,05	n/s

- approx. 50 samples analysed for customers (HRS, other sources) -

Linde Qualitizer (owner: Daimler) for HRS



Flexible connection tube with flush valve



Aluminium cylinders + Sulfinert® Stainless Steel Containers

Analytics – ZSW configuration

extension ready Q IV / 2018

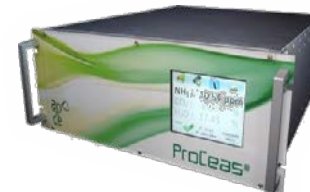
Impurity	prEN17124 [μmol/mol]	Analytical Method	Detection Limit [μmol/mol]
Water	5	Dew Point mirror *	0,1
		OFCEAS *	0,01
Total Hydrocarbons	2	GC-FID **	0,05
Methane	100	GC-PDHID	0,2
Oxygen	5	GC-PDHID	0,1
		GC-TCD	1
Helium	300	GC-TCD	1
Argon	300	GC-PDHID	0,5
		GC-TCD	5
Nitrogen	300	GC-PDHID	0,5
Carbon Dioxide	2	GC-PDHID	0,9
Carbon Monoxide	0,2	GC-PDHID	0,1
		GC-FID **	0,1
		OFCEAS *	0,001
Total sulphur compounds	0,004	GC-FPD * + Thermodesorber	0,001
Formaldehyde	0,2	OFCEAS *	0,001
Formic Acid	0,2	OFCEAS *	0,005
Ammonia	0,1	OFCEAS *	0,001
Halogenated compounds	0,05	GC-ECD**	0,02

* Manufacturer Specification

** Manufacturer guaranteed - potential lower



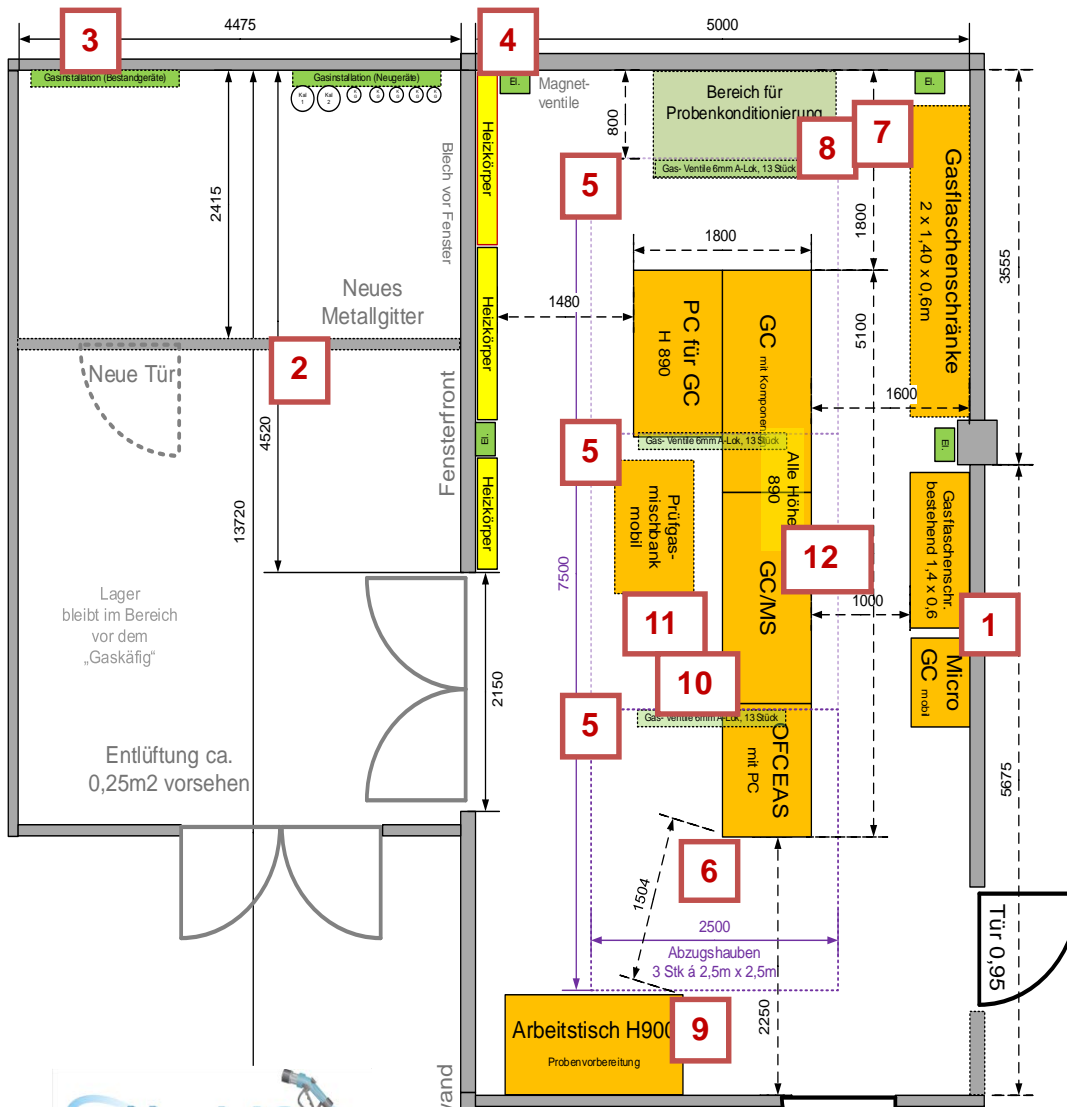
GC with Pulsed Discharge Helium Ionization Detector (PDHID), Flame Photometric Detector (FPD), Thermo desorption (TD)
w/o picture: GC-ECD, GC-FID with Methaniser, GC-MS



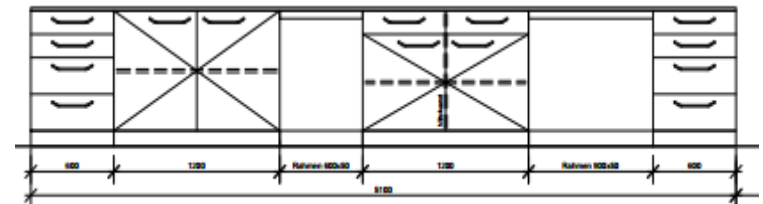
Optical feedback cavity-enhanced absorption spectroscopy (OF-CEAS)



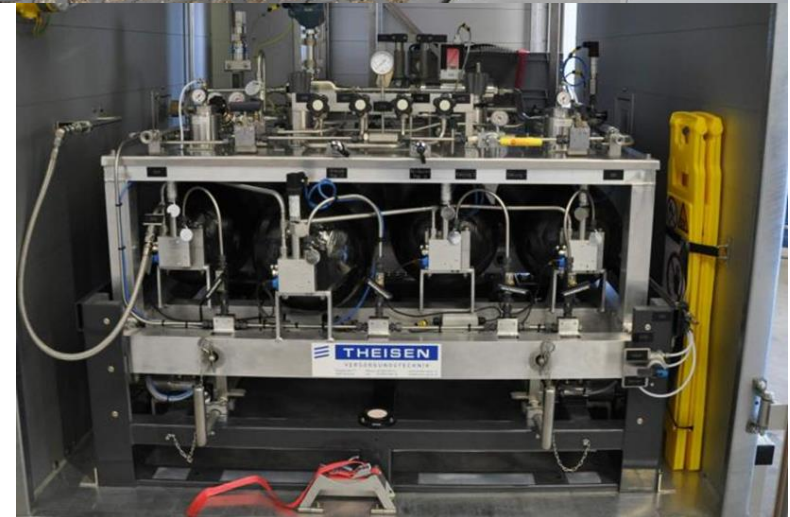
Dew Point Mirror



1. Partition wall
2. Barrier protection area
3. Media provision outdoor area
4. Media transfer
5. Media provision in the laboratory
6. Ventilation: suction hood
7. Gas cylinder cabinets
8. Devices for sample conditioning
9. Fire detector in the exhaust pipe
10. Ambient air monitoring (3x)
11. Gas mixing unit, portable
12. Laboratory Tables / Analyzers



- Acceptance Tests HRS according to SAE J 2601
- H₂-Sampling
- Amount of Hydrogen





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Thank you for your attention

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