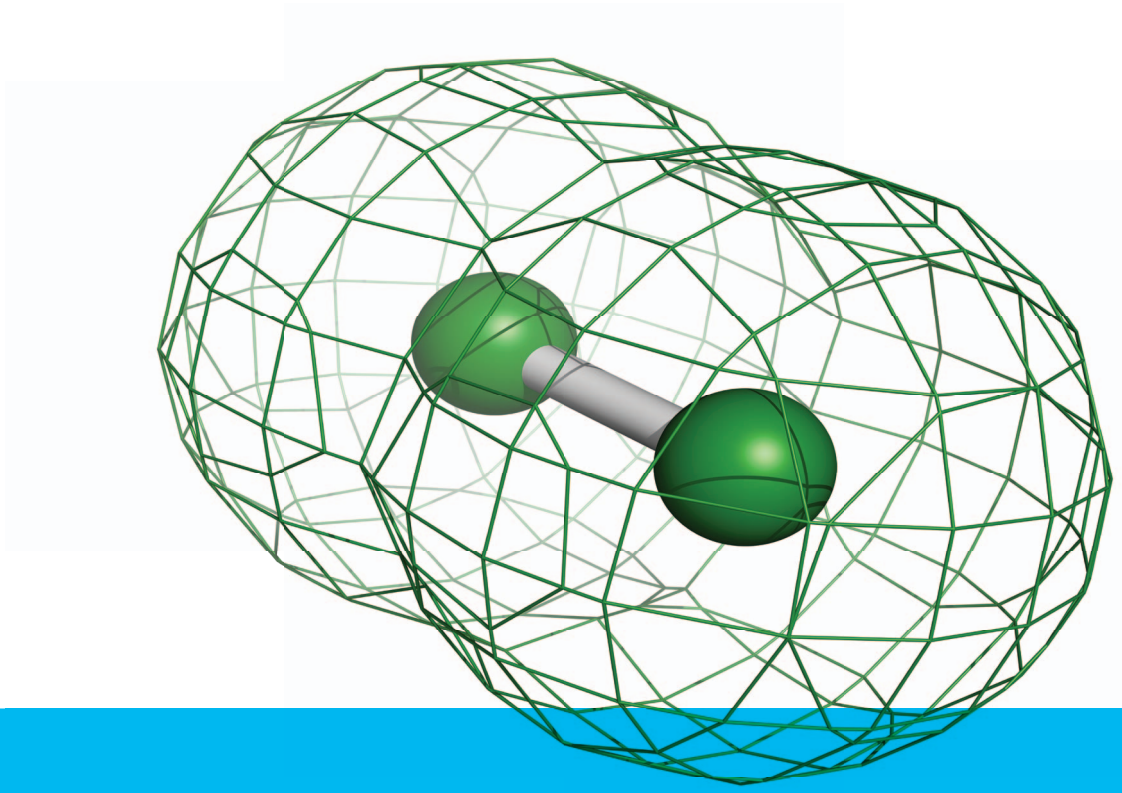


Impurities in chlorine analyser

- Highly corrosion resistent
- Flush valve for extended lifetime
- Benchtop or 19" concept

AN 230WA0117A

GAS offers custom configured GC analysers for many application fields since 40 years. GAS analysers are designed to meet many standardised methods from GPA, ASTM, UOP, ISO, EN and others. The efficient configurations are based on proven GC technology, resulting in robust instruments with an optimal return on investment.

Chlorine is used in a wide range of products like commercial bleaches and desinfectants. It is also used in organic chemicals such as polyvinyl chloride and many intermediates for the production of plastics and other end products. Due to the high oxidising potential, chlorine is extremely dangerous and poisonous.
To avoid corrosion special precautions are mandatory for chlorine analysers.

HIGHLY CORROSIVE

Due to its high oxidising potential, chlorine is highly corrosive and therefore extreme destructive. For analysing impurities in chlorine special precautions are mandatory to protect the analyser.
Therefore all parts that are in contact with the sample like valves, couplings, tubing and columns are manufactured of Hastelloy-C, which is well known for its corrosion resistiveness.

EXTRA FLUSH FACILITY

Despite the use of Hastelloy, it is known that corrosion will be seen in time, especially in the presence of water, which causes formation of hydrochloric and hypochlorous acid. Therefore GAS offers an extra flush valve with very high inertness to chlorine and acids, to purge the sample path immediately after sample injection. In this way contact with chlorine is minimised for the rest of the analyser, with increased lifetime as a result.

PRINCIPLE

Figure 1 shows the analyser diagram. O_2, N_2, CH_4, CO and CO_2 are analysed on the permanent gas channel, using TCD and helium carrier gas. These components are measured from low ppm to high %. A separate channel for analysing H_2 (and He) is shown using argon or nitrogen as carrier gas. This channel can be left out when H_2 is present in the range of 0.1 to 10%; in that case this component is analysed on the permanent gas channel.

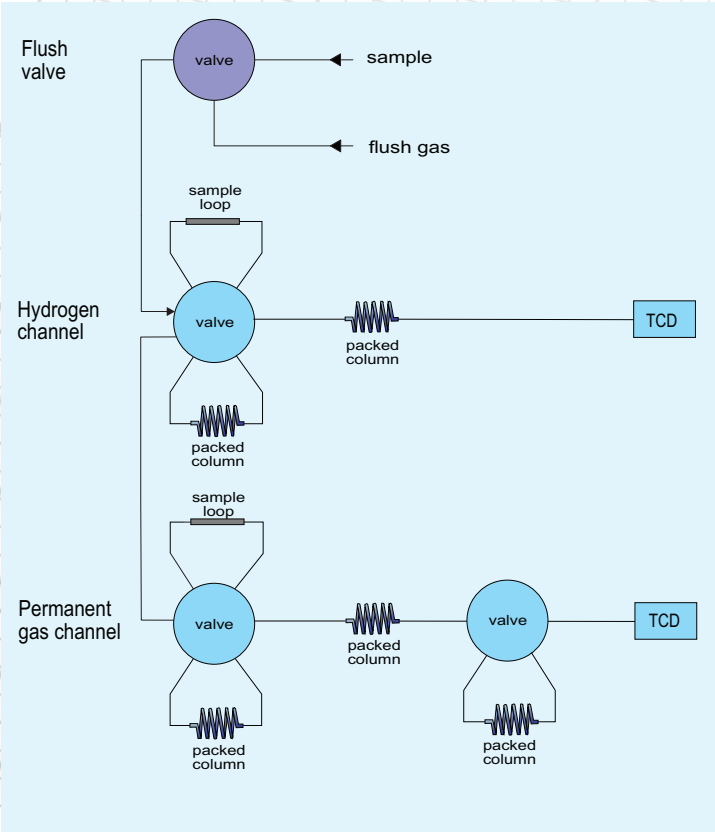


Figure 1. Analyser diagram with sample purge facility

Figure 2. Impurities in chlorine analyser based on Thermo Trace GC 1300

RESULTS

Figure 4 and 5 show chromatograms of impurities in chlorine (permanent gas channel and separate hydrogen channel). Figure 3 shows the excellent method repeatability.

The concentration is 1% for all shown components. The limit of detection is 0.001% using TCD. For low level ppm/ ppb detection, a High Purity Analyser based on Pulsed Discharge Detector is available.

Inj. No.	Injection Name Selected Peak:	Type	Area mV*min AuxLeftDetec CO2	H2	O2	N2	CH4
21	*GAS Permanent Gases*	*Unknown*	*1.2504*	*0.1262*	*0.5206*	*1.1328*	*0.9137*
22	GAS Permanent Gases	Unknown	1.2482	0.1258	0.5203	1.1304	0.9135
23	GAS Permanent Gases	Unknown	1.2459	0.1265	0.5195	1.1277	0.9122
24	GAS Permanent Gases	Unknown	1.2433	0.1262	0.5197	1.1271	0.9142
25	GAS Permanent Gases	Unknown	1.2433	0.1261	0.5182	1.1252	0.9156
26	GAS Permanent Gases	Unknown	1.2434	0.1261	0.5200	1.1277	0.9160
27	GAS Permanent Gases	Unknown	1.2433	0.1262	0.5199	1.1268	0.9154
28	GAS Permanent Gases	Unknown	1.2440	0.1258	0.5197	1.1258	0.9146
29	GAS Permanent Gases	Unknown	1.2409	0.1258	0.5188	1.1239	0.9150
30	GAS Permanent Gases	Unknown	1.2395	0.1260	0.5194	1.1251	0.9151
Maximum			1.2504	0.1265	0.5206	1.1328	0.9160
Average			**1.2442**	**0.1261**	**0.5196**	**1.1272**	**0.9145**
Minimum			1.2395	0.1258	0.5182	1.1239	0.9122
Standard Deviation			0.0032	0.0002	0.0007	0.0027	0.0011
Relative Standard Deviation			**0.26%**	**0.18%**	**0.13%**	**0.24%**	**0.12%**

Figure 3. Method repeatability

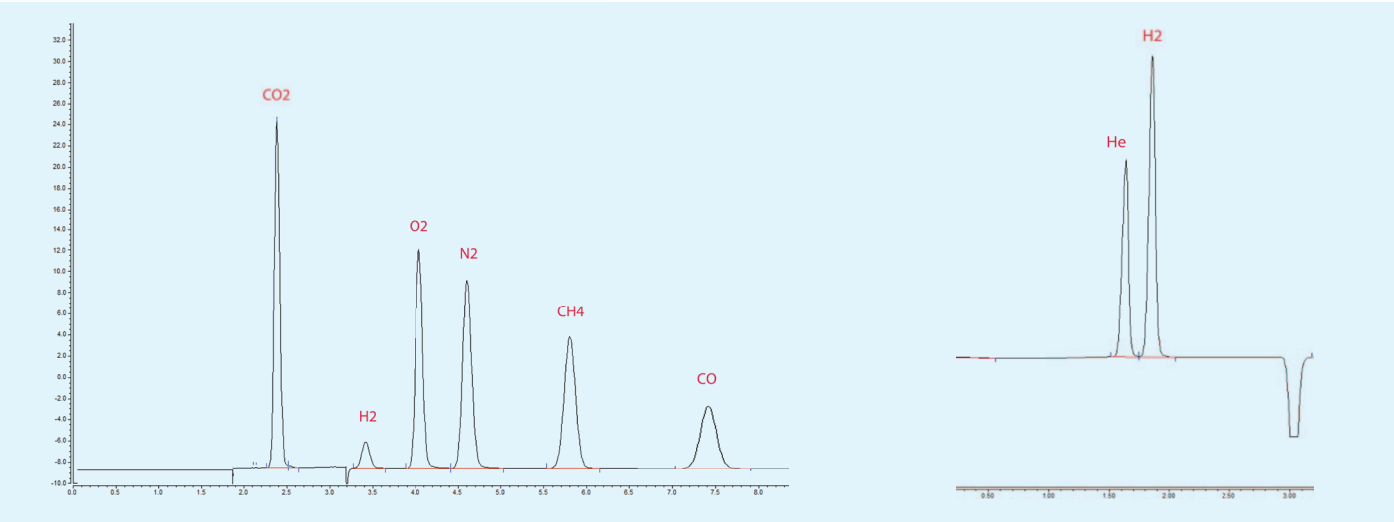
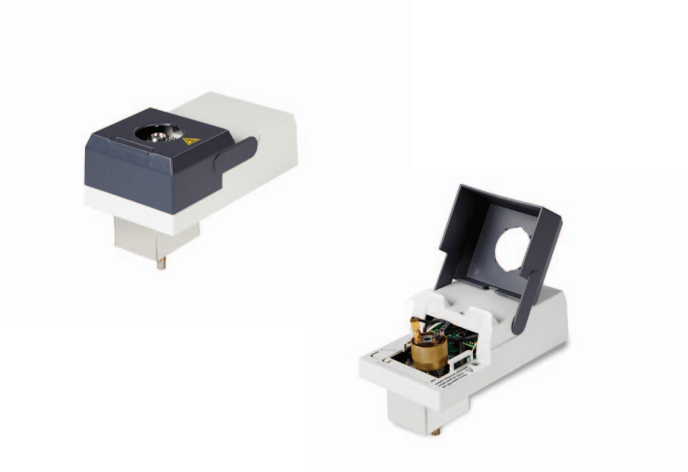


Figure 4. Permanent gas channel

Figure 5. He / H2 channel

Figure 6. Impurities in chlorine analyser based on CompactGC4.0



ANALYSER CONCEPT

The analyser concept features an optimised design with:

- all wetted parts in Hastelloy-C or polymer
- user-friendly operation
- independent heated valve oven
- easy accessibility
- small footprint
- robust design
- Chromeleon or OpenLab data system

MODULAR INJECTOR AND DETECTOR

Thermo Trace GC 1300: User-installable InstantConnect modules place the expertise and control in the hands of the operators without the requirement for special training, dedicated tools, or on-site service engineers. This unique modular design offers many advantages to the analytical laboratory when compared to traditional GC systems.

SPECIFICATION

Configuration:	1 or 2 channel instrument based on Thermo Trace 1300 GC with InstantConnect TCD, or based on CompactGC$^{4.0}$
Optional:	Heated Perma Pure sample dryer Pulsed Discharge Detector for low ppm/ppb detection
Sample path:	Hastelloy-C and polymer Corrosion free sample purge valve for extended lifetime
Application:	H_2, O_2, N_2, CH_4, CO and CO_2 in (wet) Chlorine gas, using 1 or 2 TCDs
Range	10 ppm to 50% for all components 0.1-10% for H_2 when analysed on the permanent gas channel (see text)
Repeatability	< 1% RSD
Sample requirements:	See our pre-installation guide for additional requirements
Analysis time:	8 minutes
Chromatography	
Data system:	Chromeleon / OpenLab

USERS

Solvay, RusVinyl, Technical University Eindhoven, Vynova (Ineos, Tessenderlo Group)

GLOBAL™ ANALYSER SOLUTIONS G·A·S

GAS is an Interscience company

MADE IN HOLLAND

GAS is the preferred solution partner of Thermo SCIENTIFIC