

**Environmental emissions monitoring :**  
*VOCs, Sulfur and odors monitoring at ppb and ppm*

# Summary



*Online Gas and Liquid Analyzer Experts*

- **Different integration of CHROMATOTEC analyser**
- Industrial applications

**Rack mounted 19 inch**

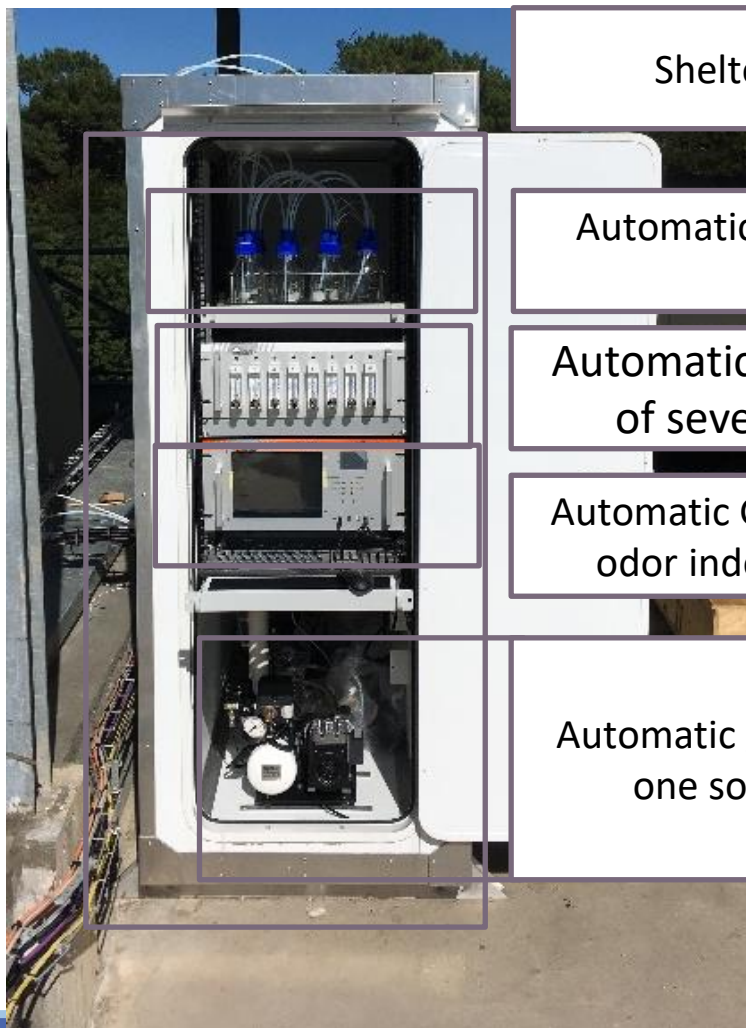


# Installation of compact shelter in safe area



Complete System integrated within compact shelter with air conditioning :  
Multiplexer 7 points with gas generator and condensation pots for sampling  
*Example with vigi e-nose*

# Installation of compact shelter in safe area



Shelter temp. regulated for external use

Automatic sampling line input with condensation evacuation

Automatic multiplexing system for monitoring of several ways with unique instrument

Automatic Gas chromatograph for VOC, Sulfurs and odor index monitoring and odor concentration

Automatic gas generators for standalone and all-in-one solution without gas cylinders needed

# Example of integration on mini cabinet hosted in room with stable temperature

18U or 22U transportable cabinet







**Wall mounted  
for industrial  
and harsh environment**

# Wall mounted autoGC

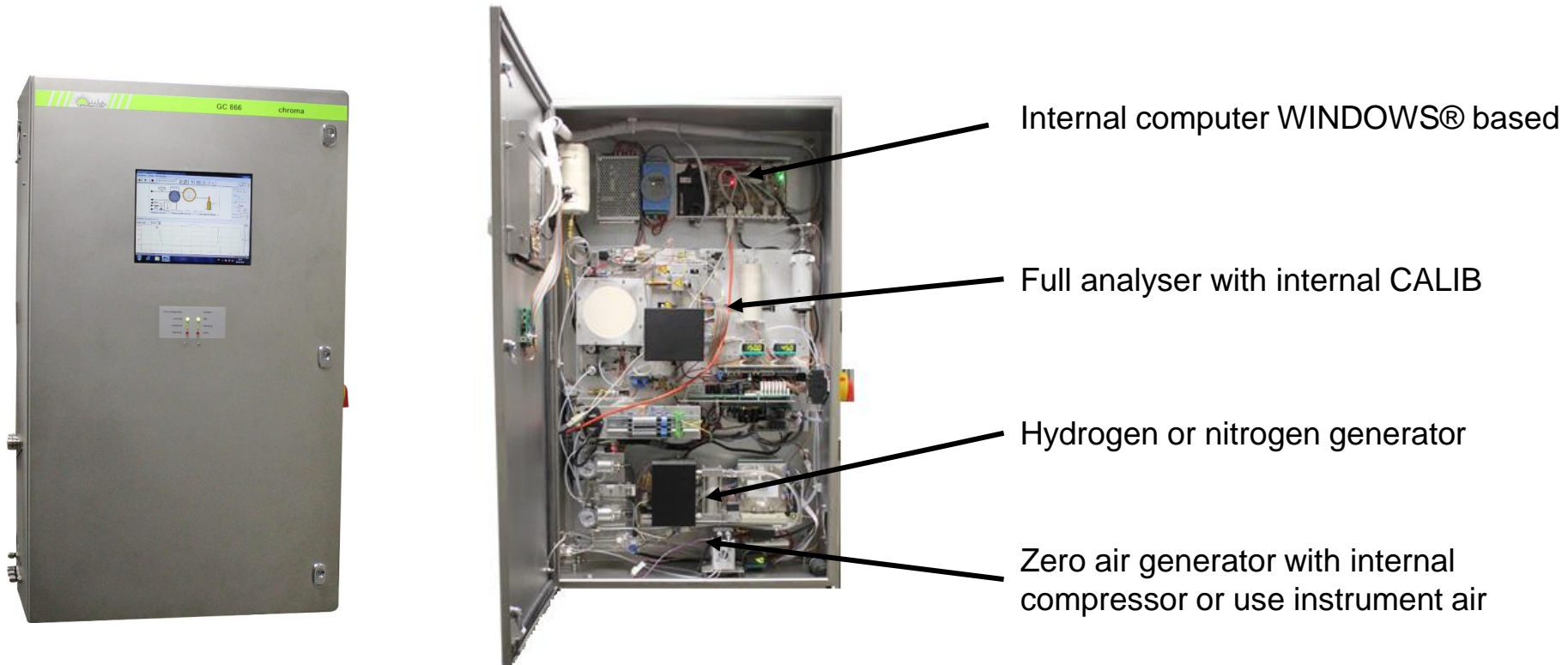
- From IP 54 to IP 66 enclosure in 316 stainless steel
- Colour touch screen
- Full remote control function
- Analyzer status LED
- Liquid sampling module in option
- Support frame in option
- Multiplexer capability up to 32 streams
- Internal AC in option for  $-20^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$



**Can be installed in industrial building or outside with temperature regulation option**



# Wall mounted autoGC



**Totally stand alone system with gas generator and internal CALIB !**

**Cylinder free autoGC !**

# Wall mounted autoGC

Dual GC integrated

Gas generator wall-mounted



Example of industrial installation in France



**Hazardous area with  
purged enclosure**

# Installation of autoGC in hazardous area

Exp cabinet for Zone 1 and Zone 2 : need instrument air



Installed outside with a gasket

Pressurised IP 66 cabinet for hazardous area with multiple analyser and/or rack

Colour touch screen for direct access of the internal computer: 10.6 inch

Exp available for MEDOR, chromaPID, chromaFID, airmoVOC, chromaTCD, DET NH3 products range

# autoGC in hazardous area



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Exp cabinet for Zone 1 and Zone 2 : need instrument air

IP 66 enclosure in 316 stainless steel

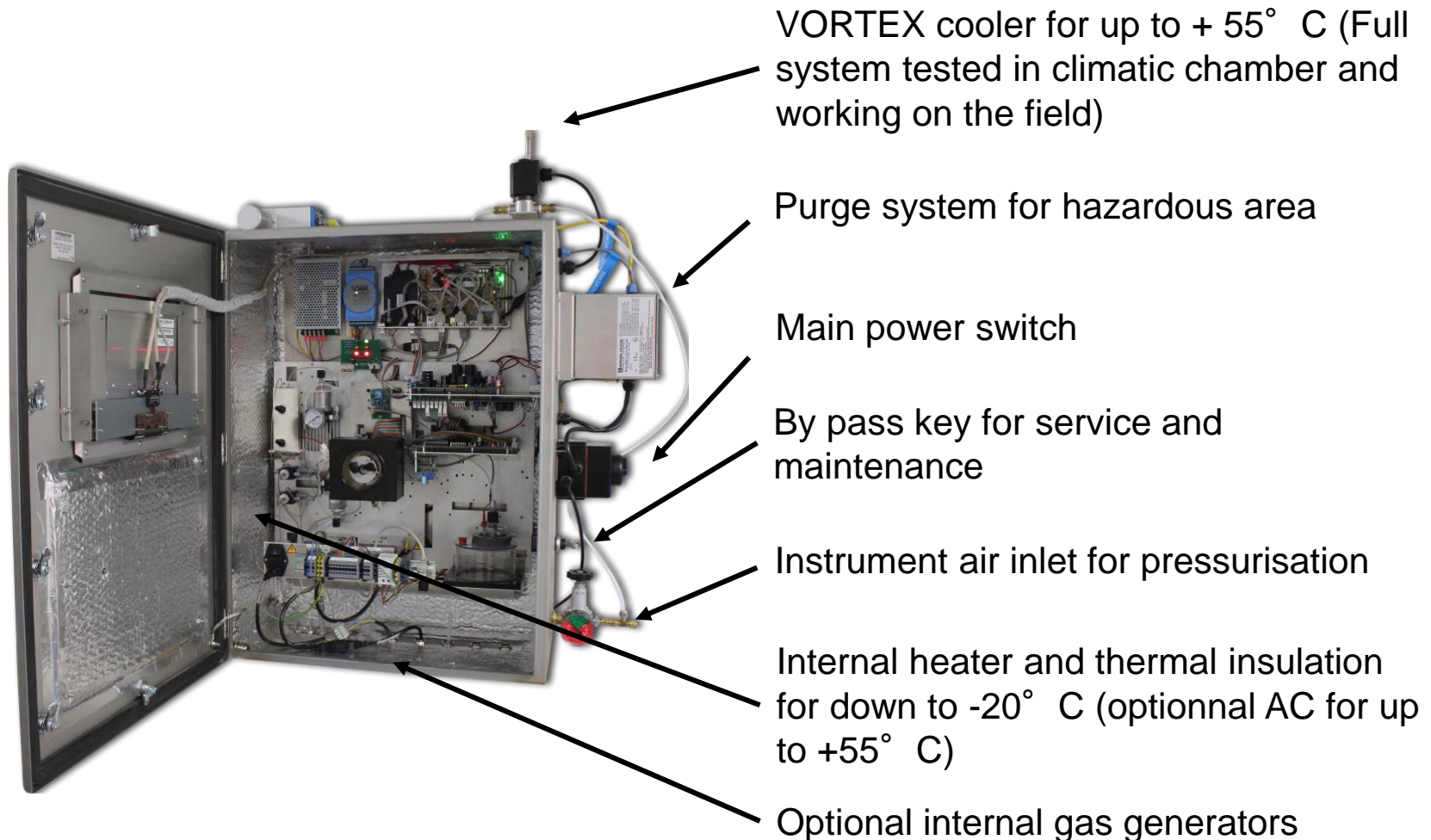
Colour touch screen

ATEX / IECEx or CSA certified

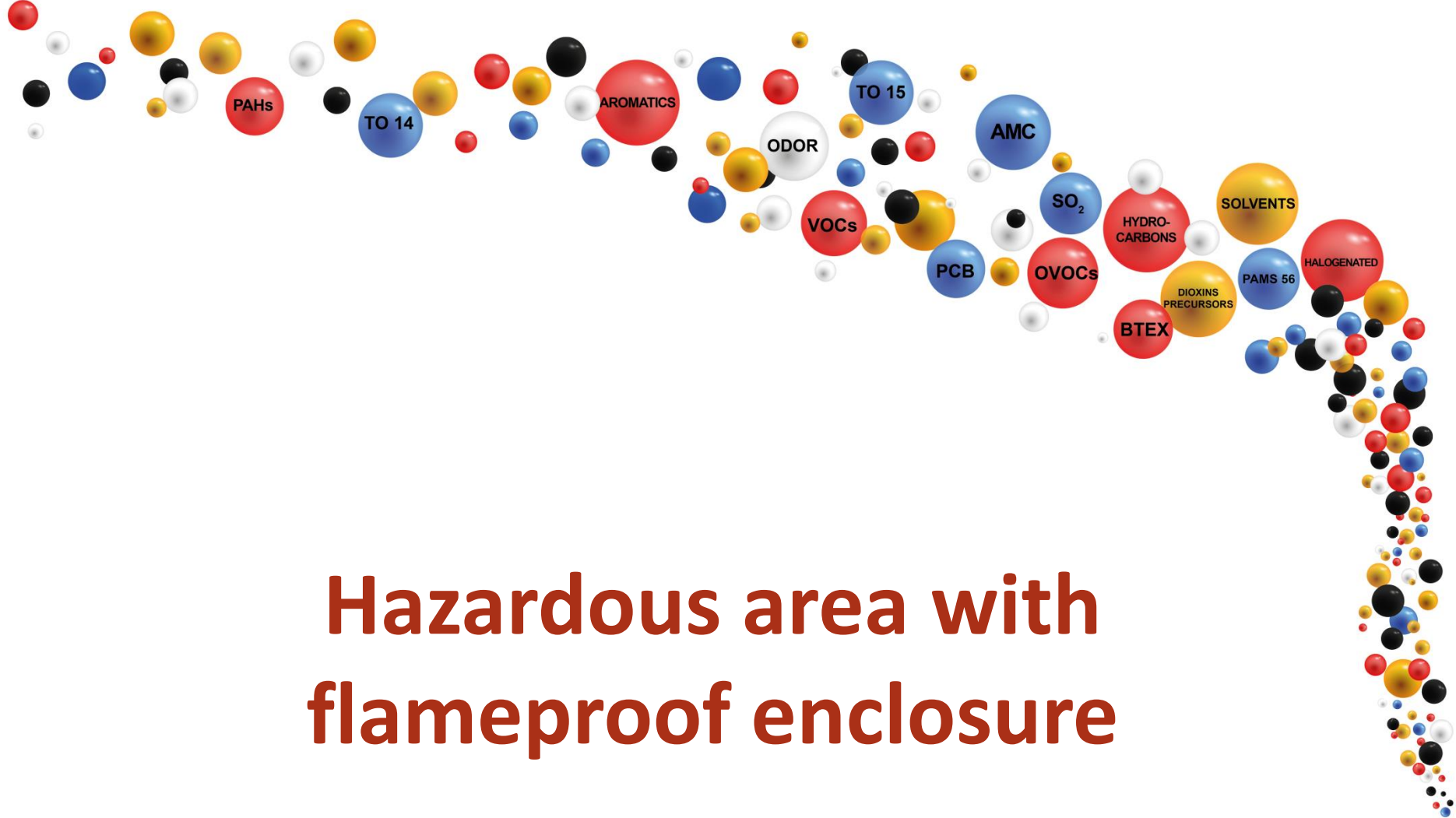


# autoGC in hazardous area

Exp cabinet for Zone 1 and Zone 2 : need instrument air







**Hazardous area with  
flameproof enclosure**

# autoGC in hazardous area



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Exd Flameproof GC866

Don't need any instrument air

Installed outside with gasket  
or weather protection

Exd available for MEDOR range and chromaTCD

# Single or dual GC in hazardous area

Supervisor including computer and electronic boards Exd

Colour screen with interface for local control of the analyser

Trackball or keyboard in option

autoGC analytical parts and optional gas generator in Exe enclosure

Optional temperature regulation for outdoor use -20° C to +55° C -  
VORTEX + heater for Zone 1  
- Electrical Peltier cooler for Zone 2



Main electrical switch

# Installation of compact shelter in hazardous area

- ATEX Air conditioned cabinet for analyzers integration
- Multiple analyzer can be installed
- Pressurised shelter for hazardous area

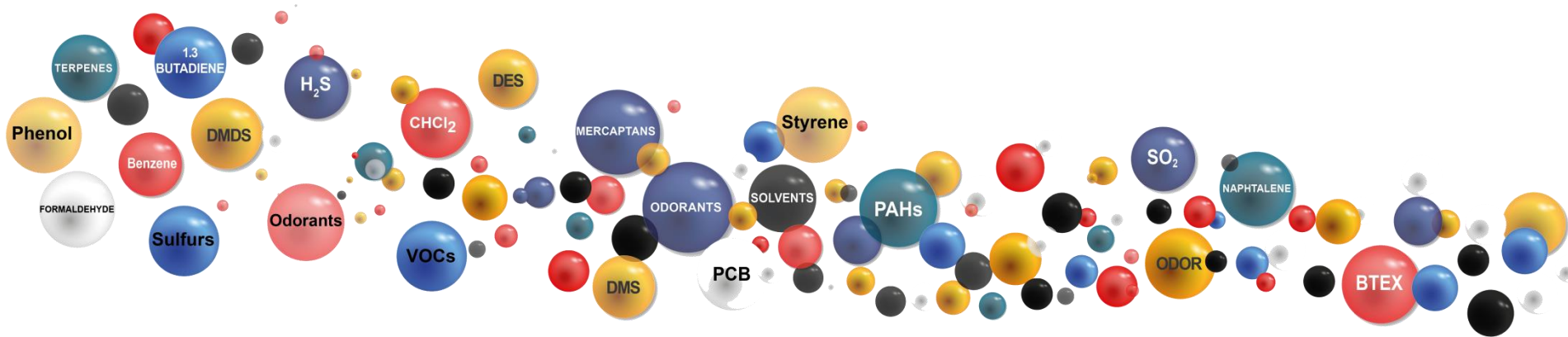


# Summary



*Online Gas and Liquid Analyzer Experts*

- Different integration of CHROMATOTEC analyser
- **Industrial applications**



**SPECIFIC VOCs**  
**auto GC ChromaFID & ChromaTHC**  
**THC and process chemical parameters**



# Specific VOCs

- API plant to manufacture ingredients for pharmaceutical industry
- Replacement of old GC lab solution to provide turnkey solutions to track 10 specific molecules at emissions in addition to THC and have direct access on web data for non experts
- High pressure from authorities and neighborhood for CMR molecules included on legislation as well as THC
- Capabilities to provide and access on all data anytime anywhere with Cloud secure solutions



# Specific VOCs



## Molecules (solvents) - ppm range

THC

1-bromo-2-chloroéthane

1,4-Dioxane

Bromochloro propane

Chlorure de méthylène

Dichlorométhane

Diéthylamine

Diméthylformamide

Orthodichlorobenzène

R- Epichlorhydrine

Tétrahydrofurane

## ChromaTHC & ChromaFID



H2 and air gas  
generators

ChromaFID  
and ChromaTHC

*Report'Air Web platform on local PC / server or secure  
Cloud for easy results*

# VOCs in hazardous areas

- chromaPID for **refinery and petrochemical ambient air**

- Benzene only in 3 min
- BTEX
- 1-3 Butadiene
- All VOCs detected by PID



- Applications

- For Hygiene at ppm range : TWA
- Channel source for odor or legal purpose
- Air quality monitoring from low ppb

سابك  
sabic

# airTOXIC in hazardous areas

- airTOXIC for **refinery and petrochemical ambient air**

- Benzene only
- BTEX
- 1-3 Butadiene
- All VOCs detected by FID



- Applications

- For ambient air and/or odor from ppt to high ppb range
  - MCERTs certified and tested by US EPA

سابک  
sabik

# New : GC-FID in hazardous areas

- chromaFID and/or airmoVOC for:

- Benzene
- BTEX
- 1-3 Butadiene
- All VOCs detected by FID

- Applications

- Fenceline monitoring to detect air quality monitoring
- For Hygiene ppm range in refinery and/or petrochemical site
- For process at ppb or ppm even % with sampling valve
- For channel source for odor or environmental purpose
- For air quality monitoring from ppt to ppb



# NMTHC at emissions

- chromaNMT HC to analyse Non Methane Total Hydrocarbon in stationary sources:
  - Process GC-FID
  - 0 – 200 ppm in standard
    - Up to low % in option
  - Special application on demand

ATEX and IECEx version available







# Odor application

## Sulfur compounds analysis with only nitrogen !

- TRS MEDOR with loop for sampling
  - Detection range 1 ppb to 1 000 ppb
  - Extremely low maintenance

The instrument has:

- MEDOR MEDOR® Electrochemical wet cell Detector
- Loop
- Metallic capillary Column for speciation

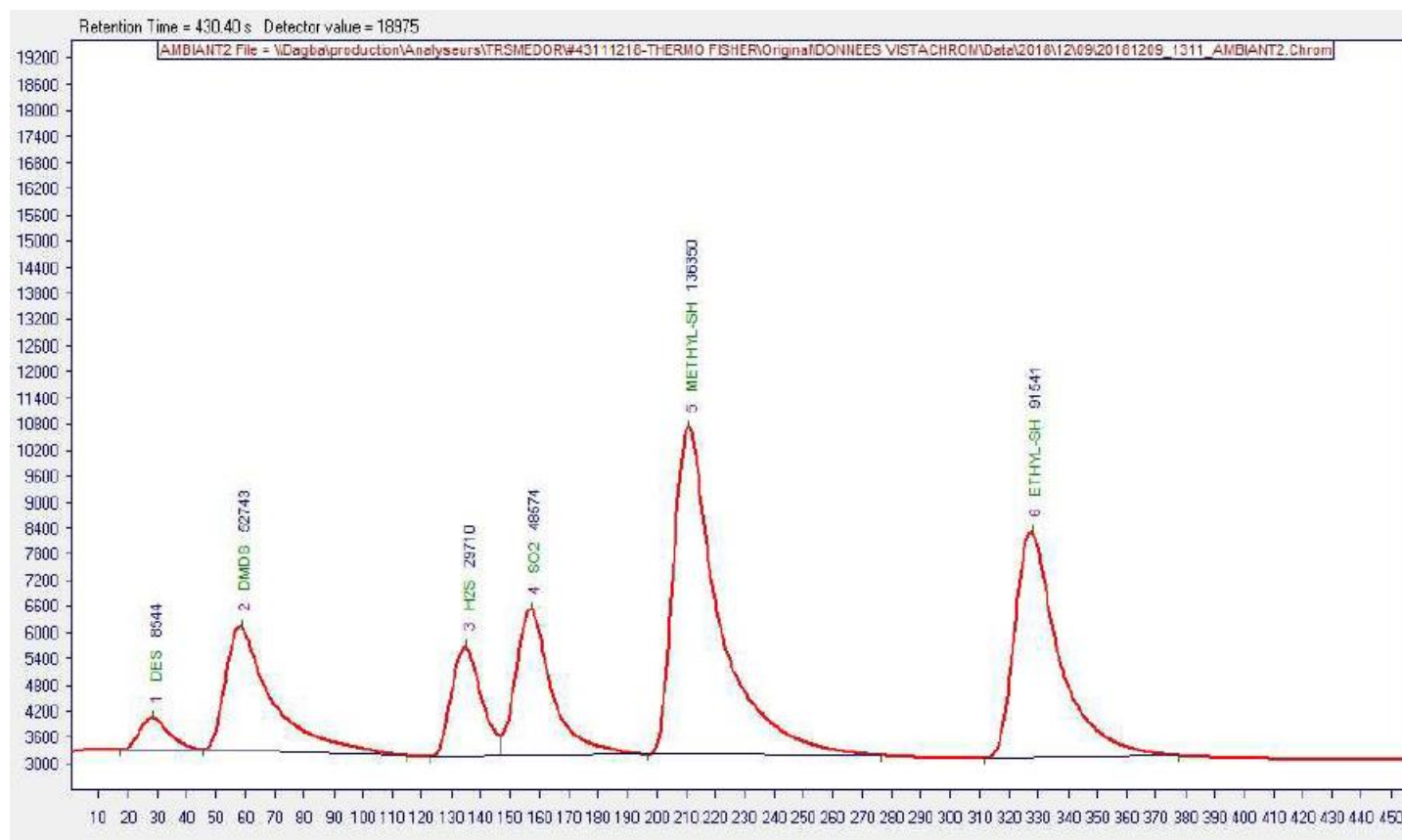


7 sulfurs compounds analyzed in standard

14 sulfur compounds analyzed with special application

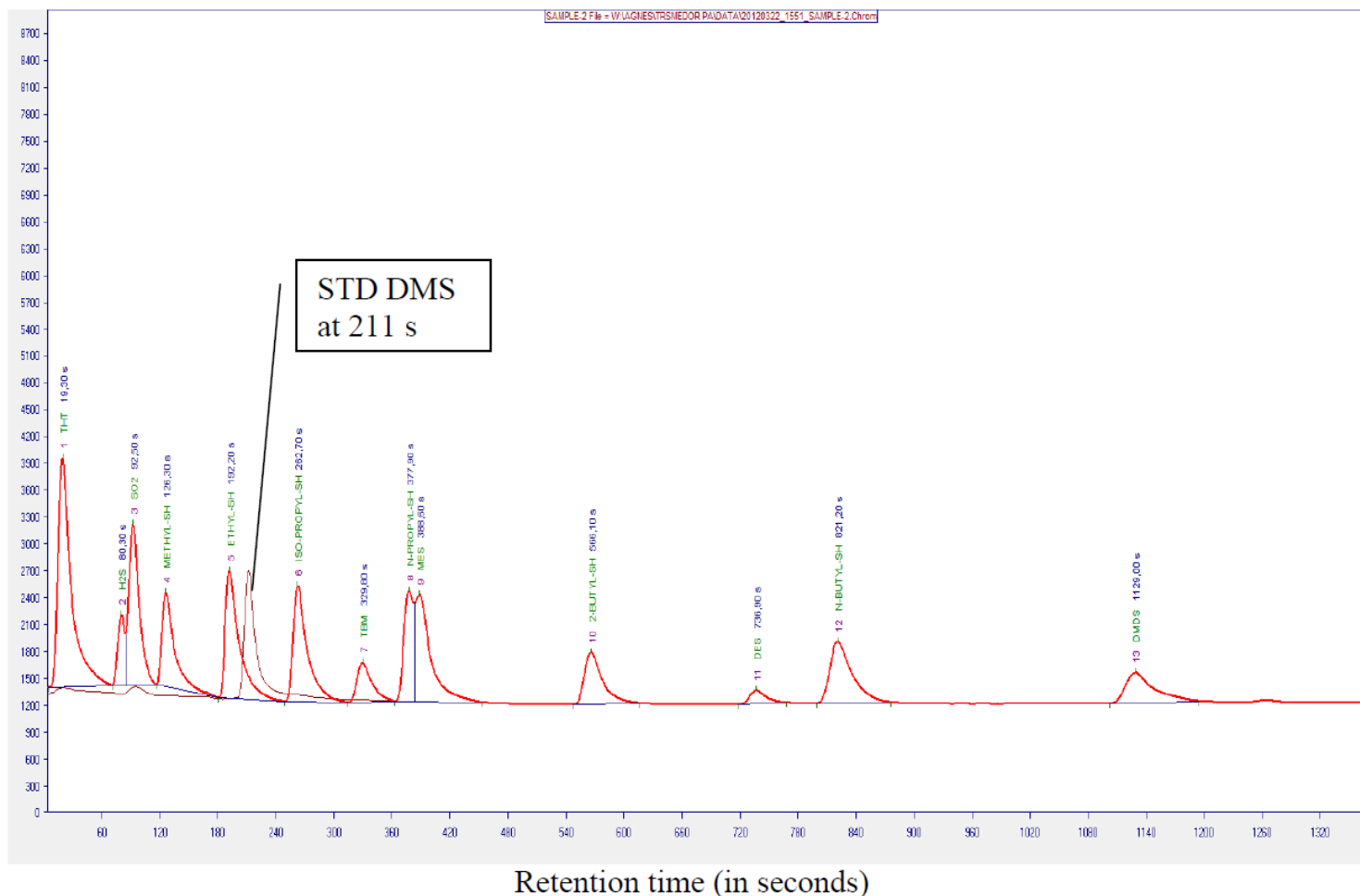
# External sample analysis

7 compounds application: H<sub>2</sub>S / SO<sub>2</sub> / MM / EM / DMS / DMDS / DES



# External sample analysis

14 compounds application: H<sub>2</sub>S / SO<sub>2</sub> / MM / EM / DMS / DMDS / DES  
IPM / TBM / NPM / MES / 2BM / IBM / NBM / THT



- MEDOR for trace of sulfurs and odor analysis
  - H<sub>2</sub>S only
  - H<sub>2</sub>S and total sulfur
  - H<sub>2</sub>S, mercaptans with speciation(EM, MM, PM, BM...) and sulfides DMS, DMDS, DES, THT and total sulfurs
  - Other sulfurs on demand
- Applications
  - For ambient air and/or odor from ppt to high ppm range
  - Pulp and paper mill
  - Odor filtering systems inlet and outlet with single unit
  - Waste water treatment plant



# References



Online Gas and Liquid Analyzer Experts

Company	Country	Location	Purchase
ARPA MARCHE	Italy	Marche	TRS MEDOR Calib
DEGREMONT SUEZ	FRANCE	CROISSY SUR SEINE	TRS MEDOR
DEGREMONT SUEZ	FRANCE	RUEIL MALMAISON	TRS MEDOR
ECOSERDIANA S.P.A. - SARDINIA	ITALY	SARDINIA	TRS MEDOR
ENI SPA	ITALY	TARANTO	TRS MEDOR X 3
ENVIRONMENTAL PROTECTION INDUSTRIAL CONSORTIUM (C.I.P.A.) - SIRACUSA (SICILY)	ITALY	SIRACUSA	TRS MEDOR
ENVIRONMENTAL PROTECTION INDUSTRIAL CONSORTIUM (C.I.P.A.) - SIRACUSA (SICILY)	ITALY	SIRACUSA	TRS MEDOR X 2
GOBIERNO BASCO : PULP & PLANT FACTORY	SPAIN	BILBAO	TRS MEDOR
IRH ENVIRONNEMENT	FRANCE	GENNEVILLIERS	TRS MEDOR
IRH ENVIRONNEMENT	FRANCE	VANDOEUVRE LES NANCY	TRS MEDOR
MONDI PAPER MILL	POLAND	ŚWIECIE	TRS MEDOR
REGIONAL ENVIRONMENTAL PROTECTION AGENCY - CALABRIA	ITALY	CALABRIA	TRS MEDOR
SIAAP (DIFFERENT WASTE WATER PLANTS AROUND PARIS)	FRANCE	PARIS	MORE THAN 20 MEDOR SYSTEMS
SUEZ ENVIRONNEMENT CIRSEE	FRANCE	LE PECQ	TRS MEDOR
Dubai Municipality	UAE	Dubai	TRS MEDOR
Sohar Port	OMAN	Sohar	TRS MEDOR
USDA	USA	Washington	TRS MEDOR
Chevron Australia	Australia	Perth	TRS MEDOR
GASMAR	CHILE	Quintero	TRS MEDOR Exd
Prefecture of central Macedonia	GREECE	ATHENS	TRS MEDOR
Bharat Petroleum Corp	INDIA	KOCHI	TRS MEDOR
EIL	INDIA	Pune	TRS MEDOR





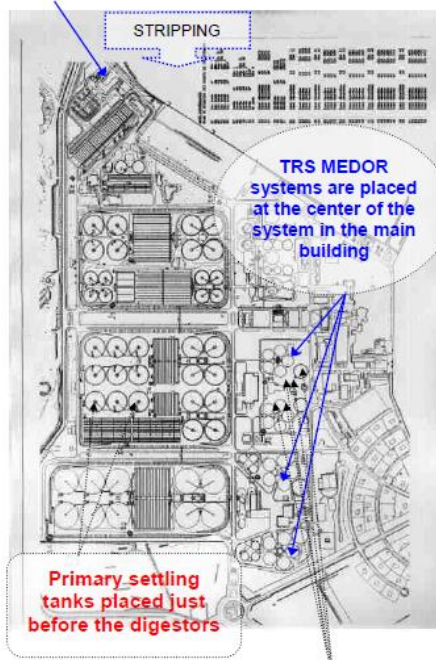
# Some customer reference

Odor in ambient air in Chile at LPG odorization station: GASMAR



TRS MEDOR Exd for odor  
in ambient air at ppb level

Analyzers at the STRIPPING



  
SIAAP  
Service public de l'assainissement francilien

## Sulfur compounds and total VOCs or NH<sub>3</sub>

- TRS MEDOR with loop for sampling
  - Detection range 1 ppb to 100 ppb
  - Extremely low maintenance
- Total VOCs with PID detector
  - Less than 10 ppb detection limit
- NH<sub>3</sub> with FTUV integrated in the wall mounted version in option



# References

Company	Country	Location	Purchase
URBASER	France	Biarritz	Vigi e nose 7 streams
CAS	USA	Cincinnati	Vigi e nose
EPS WATERLOO	Canada	Calgary	Vigi e nose
DMSTP JEBEL ALI	UAE	DUBAI	Vigi e nose
GUANGZHOU industrial zone	China	Guangzhou city	Vigi e nose
Al Serkal ENVIROL	UAE	Dubai	Vigi e nose
ARPA LAZIO	Italy	Lazio	Vigi e nose
A STAR Singapore	Sing.	Sing	Vigi e nose



# Odor Control Units

- Monitoring of VOCs, Sulfurs, odorants or odor
- Odor control performances efficiency
- Concentration levels surveillance
- Automatic warnings for media support replacement or Process variation
  - 3/4G module
    - SMS
    - Internet

Odor control units



Scrubbers



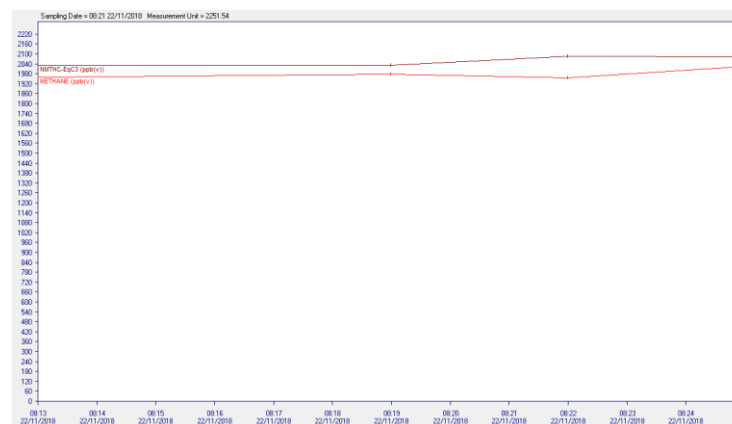
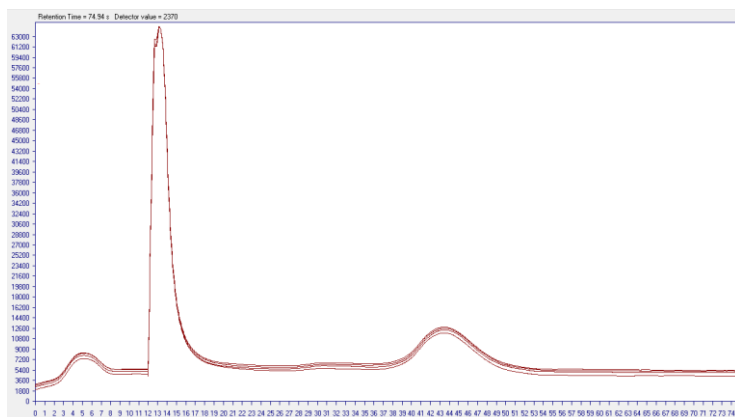
Charcoal filters



Biofilters

# Analytical performances – external calibration

Injection of certified cylinder containing Methane and propane at 2 ppm

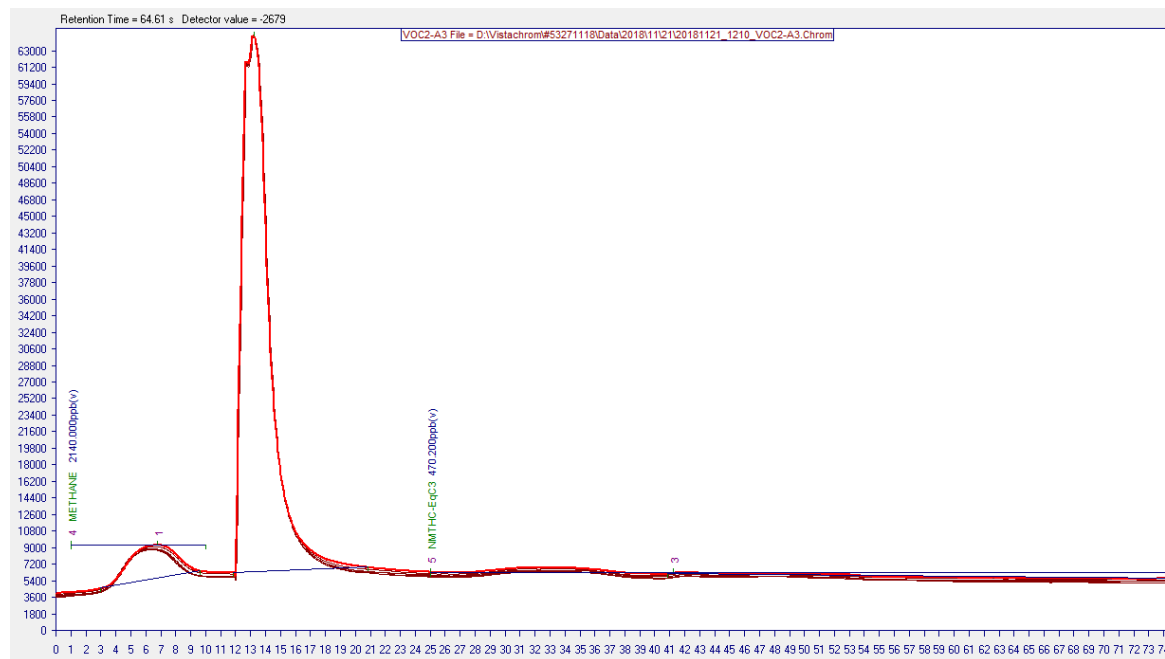


Analysis down to 2 minutes  
< 50 ppb LDL in standard  
Internal calibration  
Benzene

RSD < 2% for methane  
and propane

# Analytical performances – Air sample

## Injection of unknown air sample







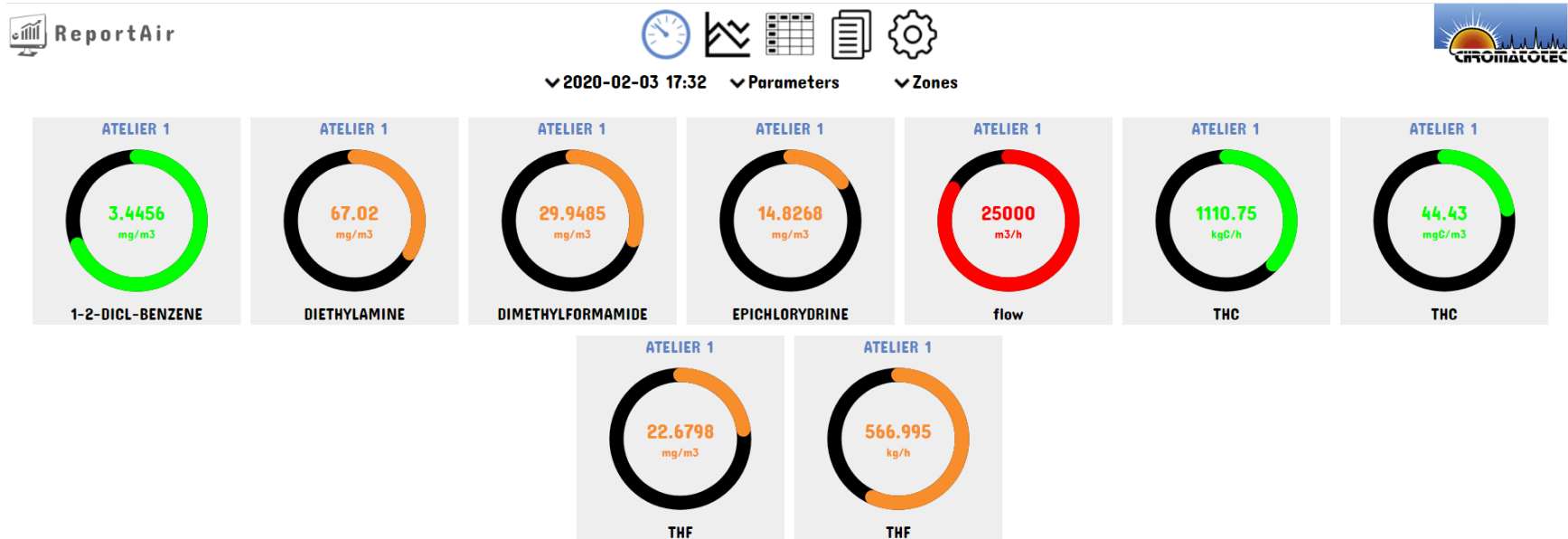
**Data report :  
automatic data export**

# Report'Air Web platform



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- New report'air platform for web data access



- Results at a glance with gauge visualization and color code to be warned when exceeding values
- Integration of dynamic flow to monitor concentration flow

# Report'Air Web platform



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Report'Air

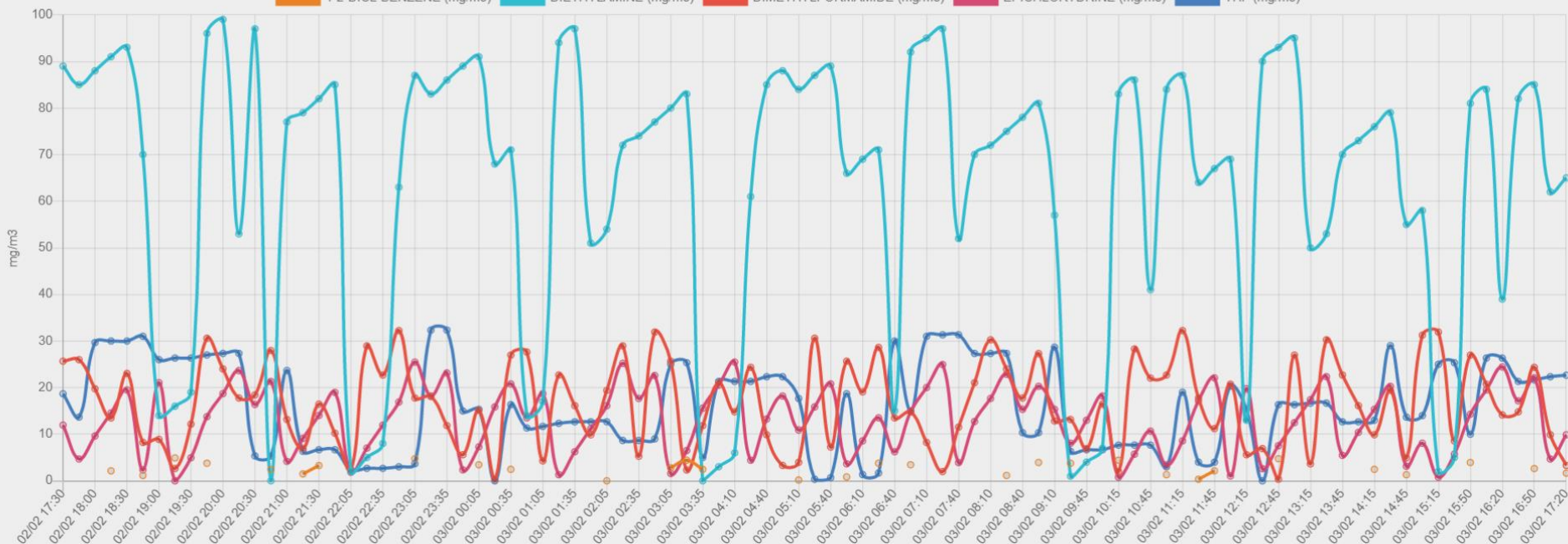


▼ 2020-02-02 17:30 to ▼ 2020-02-03 17:30 ▼ Parameters ▼ Zones



ATELIER 1

1-2-DICL-BENZENE (mg/m3) DIETHYLAMINE (mg/m3) DIMETHYLFORMAMIDE (mg/m3) EPICHLORYDRINE (mg/m3) THF (mg/m3)



- Curves access from gauges and easy click molecule selection

# Report'Air Web platform



Online Gas and Liquid Analyzer Experts



▼ 2020-02-02 17:30 to ▼ 2020-02-03 17:30 ▼ Parameters ▼ Zones



	ATELIER 1 1-2-DICL-BENZENE (mg/m3)	ATELIER 1 DIETHYLAMINE (mg/m3)	ATELIER 1 DIMETHYLFORMAMIDE (mg/m3)	ATELIER 1 EPICHLORYDRINE (mg/m3)	ATELIER 1 flow (m3/h)	ATELIER 1 THC (kgC/h)	ATELIER 1 THC (mgC/m3)	ATELIER 1 THF (kg/m3)	ATELIER 1 THF (kg/h)
02/02/2020 17:30	-	89.02	25.6729	11.968	25000	635.75	25.43	18.6793	466.981
02/02/2020 17:45	-	85.02	26.0018	4.691	25000	1105.75	44.23	13.6786	341.964
02/02/2020 18:00	-	88.02	19.753	9.629	25000	1505.75	60.23	29.6808	742.019
02/02/2020 18:15	2.1374	91.02	13.5041	14.5669	25000	1445.75	57.83	30.0142	750.354
02/02/2020 18:30	-	93.02	23.0418	19.5049	25000	865.75	34.63	30.0142	750.354
02/02/2020 18:45	1.1562	70.02	8.2419	2.352	25000	1080.75	43.23	31.0143	775.357
02/02/2020 19:00	-	14.02	8.8997	21.0642	25000	1320.75	52.83	26.0136	650.34
02/02/2020 19:15	4.9174	16.02	2.6508	0.013	25000	1795.75	71.83	26.347	658.675
02/02/2020 19:30	-	19.02	12.1886	4.9509	25000	835.75	33.43	26.347	658.675
02/02/2020 19:45	3.7727	96.02	30.6062	13.7873	25000	825.75	33.03	27.0137	675.344
02/02/2020 20:00	-	99.02	24.0285	18.7252	25000	1295.75	51.83	27.3471	683.678
02/02/2020 20:15	-	53.02	17.7796	23.6632	25000	1765.75	70.63	27.3471	683.678
02/02/2020 20:30	-	97.02	18.4374	16.3862	25000	1490.75	59.63	5.3441	133.602
02/02/2020 20:45	2.4644	0.02	27.9751	21.3241	25000	1175.75	47.03	5.3441	133.602
02/02/2020 21:00	-	77.02	13.1752	4.1713	25000	955.75	38.23	23.68	591.999
02/02/2020 21:15	1.4832	79.02	6.9264	9.1092	25000	1280.75	51.23	6.3442	158.605
02/02/2020 21:30	3.2821	82.02	16.4641	14.0472	25000	1000.75	40.03	6.6776	166.94
02/02/2020 21:50	-	85.02	10.2152	18.9851	25000	695.75	27.83	6.6776	166.94
02/02/2020 22:05	-	2.02	2.3219	1.8322	25000	1165.75	46.63	2.3437	58.5915
02/02/2020 22:20	-	5.02	28.9618	7.0301	25000	1400.75	56.03	2.677	66.9259
02/02/2020 22:35	-	8.02	22.7129	11.968	25000	1735.75	69.43	2.677	66.9259
02/02/2020 22:50	-	63.02	32.2507	16.906	25000	665.75	26.63	3.0104	75.2604
02/02/2020 23:05	4.7539	87.02	17.7796	25.4824	25000	910.75	36.43	3.6772	91.9294
02/02/2020 23:20	-	83.02	18.1085	18.2054	25000	1375.75	55.03	32.3478	808.695
02/02/2020 23:35	-	86.02	11.8597	23.1434	25000	1840.75	73.63	32.3478	808.695
02/02/2020 23:50	-	89.02	5.6108	2.352	25000	710.75	28.43	15.0121	375.302
03/02/2020 00:05	3.4456	91.02	15.1485	7.29	25000	920.75	36.83	15.3455	383.637
03/02/2020 00:20	-	68.02	0.3486	15.8664	25000	895.75	35.83	0.01	0.25
03/02/2020 00:35	2.4644	71.02	26.9885	20.8043	25000	1360.75	54.43	16.3456	408.64
03/02/2020 00:50	-	14.02	27.6462	13.5274	25000	555.75	22.23	11.3449	283.623
03/02/2020 01:05	-	17.02	4.2953	18.7252	25000	770.75	30.83	11.6783	291.957
03/02/2020 01:20	-	94.02	22.7129	1.3125	25000	1090.75	43.63	12.345	308.626
03/02/2020 01:35	-	97.02	16.1352	6.2504	25000	1110.75	44.43	12.6784	316.961

Données de la page 2020 - Document de CHROMATOTEC

- Table results with data export functions

# Report'Air Web platform



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▼ 2020-01-01 00:00 to ▼ 2020-02-01 00:00 ▼ Parameters ▼ Zones



## ATELIER 1

Parameter	Availability	Minimum	Maximum	Average	Exceedences
1-2-DICL-BENZENE	492 / 2976 (16.5%)	0.01 mg/m <sup>3</sup>	4.92 mg/m <sup>3</sup>	2.48 mg/m <sup>3</sup>	≥ 10 mg/m <sup>3</sup> : 0 (0%) ≥ 15 mg/m <sup>3</sup> : 0 (0%) ≥ 20 mg/m <sup>3</sup> : 0 (0%)
DIETHYLAMINE	1556 / 2976 (52.3%)	0.02 mg/m <sup>3</sup>	99.02 mg/m <sup>3</sup>	50.89 mg/m <sup>3</sup>	≥ 50 mg/m <sup>3</sup> : 821 (52.8%) ≥ 100 mg/m <sup>3</sup> : 0 (0%)
DIMETHYLFORMAMIDE	1556 / 2976 (52.3%)	0.02 mg/m <sup>3</sup>	32.58 mg/m <sup>3</sup>	16.24 mg/m <sup>3</sup>	≥ 20 mg/m <sup>3</sup> : 599 (38.5%) ≥ 30 mg/m <sup>3</sup> : 118 (7.6%)
EPICHLORYDRINE	1556 / 2976 (52.3%)	0.01 mg/m <sup>3</sup>	25.74 mg/m <sup>3</sup>	12.84 mg/m <sup>3</sup>	≥ 10 mg/m <sup>3</sup> : 949 (61%) ≥ 20 mg/m <sup>3</sup> : 356 (22.9%)
flow	1556 / 2976 (52.3%)	25000 m <sup>3</sup> /h	25000 m <sup>3</sup> /h	25000 m <sup>3</sup> /h	≥ 10000 m <sup>3</sup> /h : 1556 (100%) ≥ 20000 m <sup>3</sup> /h : 1556 (100%)
THC	1556 / 2976 (52.3%)	395.75 kgC/h	2090.75 kgC/h	1224.17 kgC/h	≥ 1500 kgC/h : 407 (26.2%) ≥ 2000 kgC/h : 17 (1.1%)
THC	1556 / 2976 (52.3%)	15.83 mgC/m <sup>3</sup>	83.63 mgC/m <sup>3</sup>	48.97 mgC/m <sup>3</sup>	≥ 50 mgC/m <sup>3</sup> : 735 (47.2%) ≥ 80 mgC/m <sup>3</sup> : 17 (1.1%)
THF	1556 / 2976 (52.3%)	0.01 mg/m <sup>3</sup>	33.01 mg/m <sup>3</sup>	16.5 mg/m <sup>3</sup>	≥ 20 mg/m <sup>3</sup> : 629 (40.4%) ≥ 30 mg/m <sup>3</sup> : 161 (10.3%)
THF	1556 / 2976 (52.3%)	0.25 kg/h	825.37 kg/h	412.43 kg/h	≥ 500 kg/h : 629 (40.4%) ≥ 800 kg/h : 67 (4.3%)

- Automatic data report with PDF export according to tunable report

# Report'Air Web platform



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- Mail warnings
- User profile management
- Easy configurations

Parameter	Displayed	Validity range	Gauge thresholds	Chart line color	Mail threshold	
1-2-DICL-BENZENE (kg/h)	<input type="checkbox"/>	0 10	200 350	<span style="color: green;">■</span> #17FF00	200	e-mails separated by commas
1-2-DICL-BENZENE (mg/m3)	<input checked="" type="checkbox"/>	0 5	10 15	<span style="color: orange;">■</span> #E88327	20	<a href="mailto:louis.vivola@chromatotec.com">louis.vivola@chromatotec.com</a>
1-4 DIOXANE (kg/h)	<input type="checkbox"/>	0 1000	350 600	<span style="color: purple;">■</span> #868286	600	e-mails separated by commas
1-4 DIOXANE (mg/m3)	<input type="checkbox"/>	0 100	20 30	<span style="color: purple;">■</span> #90579C	30	e-mails separated by commas
DICHLOROMETHANE (mg/m3)	<input type="checkbox"/>	0 100	15 25	<span style="color: green;">■</span> #31C690	25	e-mails separated by commas
DICHLOROMETHANE (kg/h)	<input type="checkbox"/>	0 1000	300 700	<span style="color: green;">■</span> #6504AB	700	e-mails separated by commas
DIETHYLAMINE (kg/h)	<input type="checkbox"/>	0 3000	1500 2000	<span style="color: blue;">■</span> #65C0DE	2000	e-mails separated by commas
DIETHYLAMINE (mg/m3)	<input checked="" type="checkbox"/>	0 200	50 100	<span style="color: blue;">■</span> #308D02	100	e-mails separated by commas
DIMETHYLFORMAMIDE (mg/m3)	<input checked="" type="checkbox"/>	0 100	20 30	<span style="color: red;">■</span> #E75243	30	e-mails separated by commas
DIMETHYLFORMAMIDE (kg/h)	<input type="checkbox"/>	0 1000	350 600	<span style="color: red;">■</span> #E07E73	600	e-mails separated by commas
EPICHLORYDRINE (kg/h)	<input type="checkbox"/>	0 1000	350 600	<span style="color: pink;">■</span> #E17898	600	e-mails separated by commas
EPICHLORYDRINE (mg/m3)	<input checked="" type="checkbox"/>	0 100	10 20	<span style="color: pink;">■</span> #D64A75	20	e-mails separated by commas
flow (m3/h)	<input checked="" type="checkbox"/>	0 30000	10000 20000	<span style="color: black;">■</span> #444444	20000	e-mails separated by commas
THC (kg/h)	<input checked="" type="checkbox"/>	0 3000	1500 2000	<span style="color: green;">■</span> #92C076	2000	e-mails separated by commas
THC (mgC/m3)	<input checked="" type="checkbox"/>	0 200	50 80	<span style="color: green;">■</span> #608B46	80	e-mails separated by commas
THF (mg/m3)	<input checked="" type="checkbox"/>	0 100	20 30	<span style="color: blue;">■</span> #477FBE	30	e-mails separated by commas
THF (kg/h)	<input checked="" type="checkbox"/>	0 1000	500 800	<span style="color: blue;">■</span> #769FCF	800	e-mails separated by commas

# About web solution

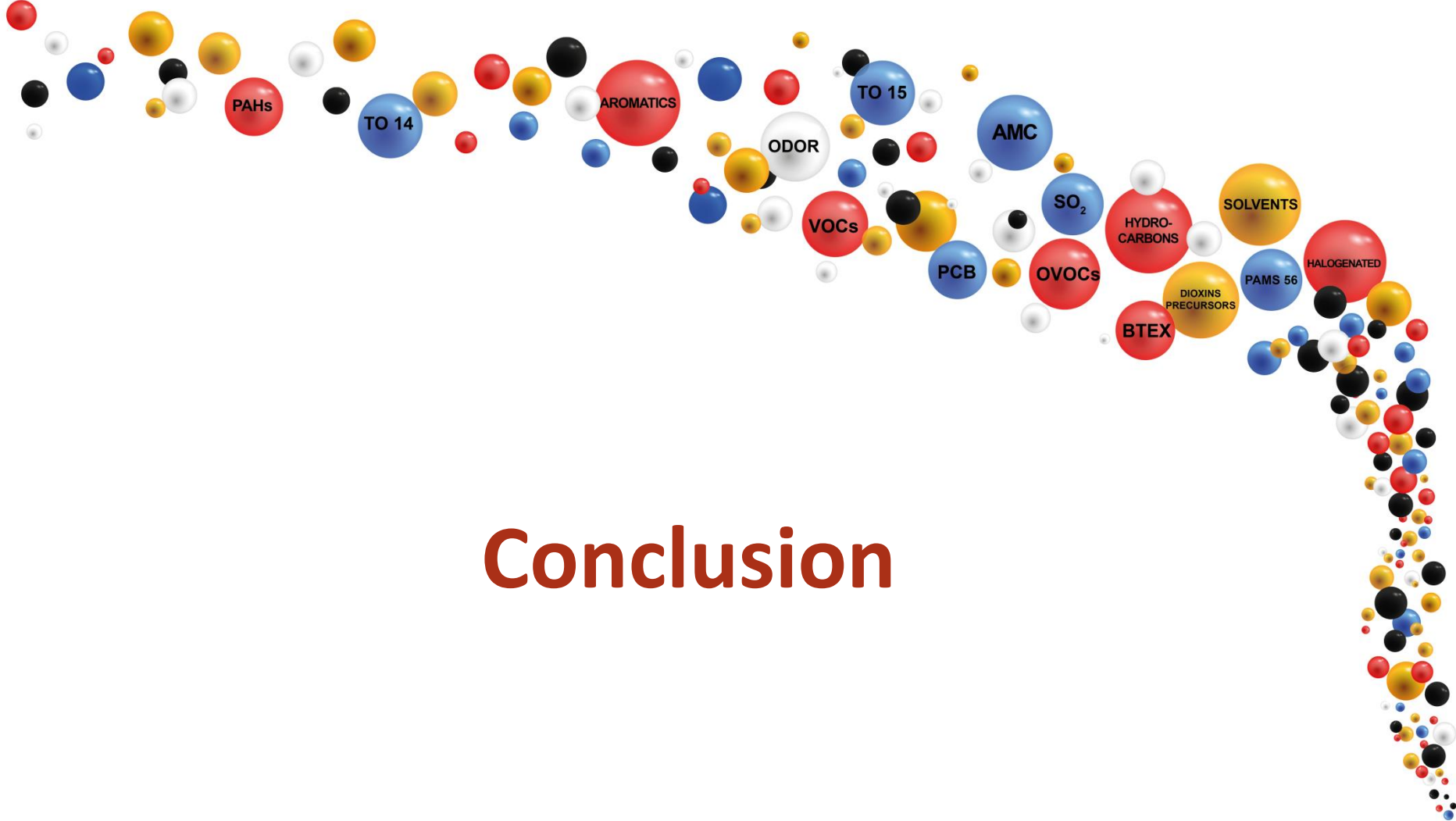


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- Report'air web platform can integrate external data as flow to calculate flow concentration
- Report'air is transformed in vigiODOR solution when chemical or odor impact of site on neighborhood is requested
- Software interface valid for all Chromatotec product line

Of course, VISTA CHROM Software is always hosted in embedded PC and Report'air and vigiODOR are options when people want shared data and easy interface





**Conclusion**

# Conclusions



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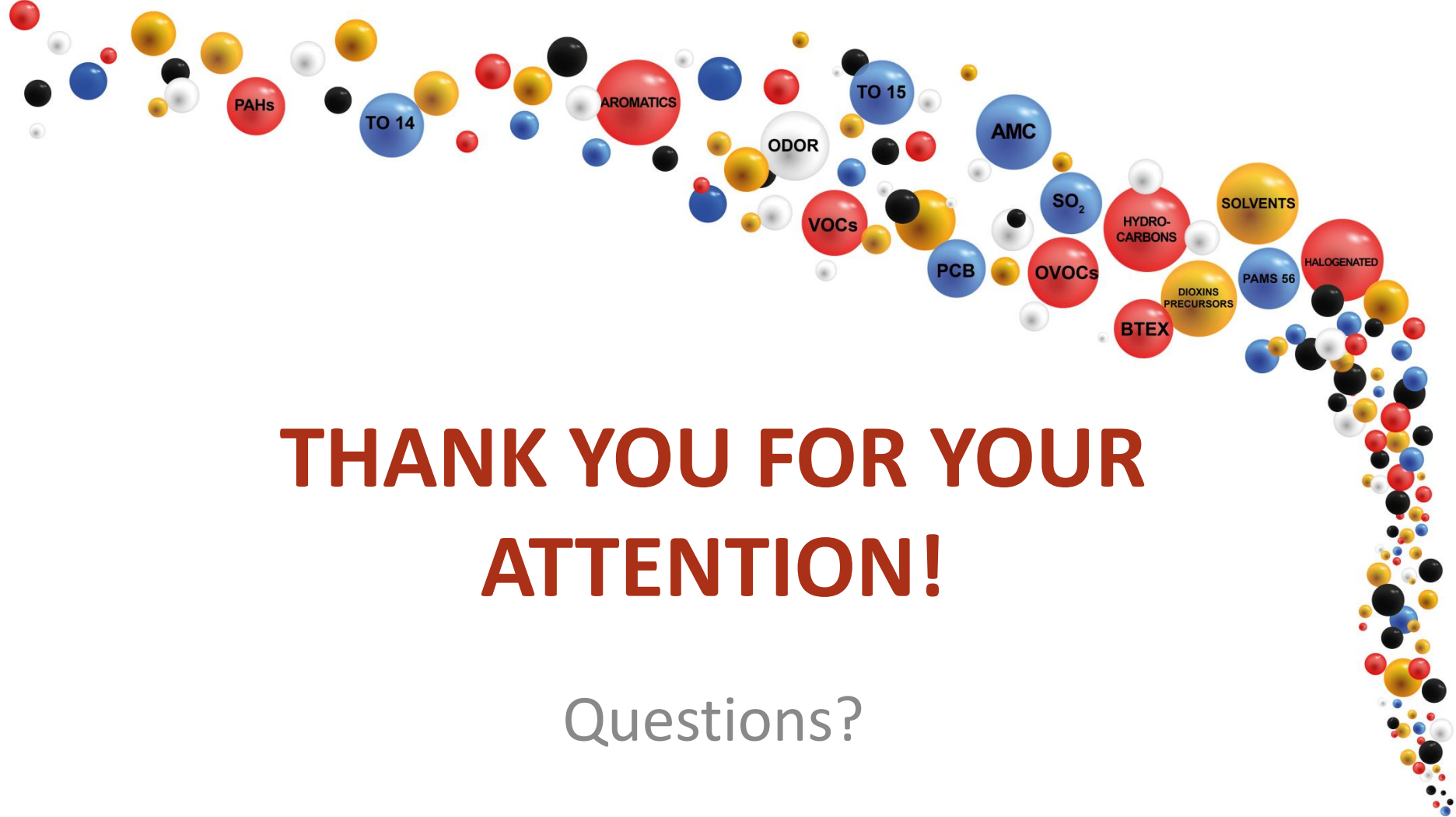
- autoGC in rack, IP54/66 wall mounted cabinet, ATEX, IECEx or CSA certified
- 1 to 32 sample streams
- Alarm on concentration level
- Integrated gas generator (zero air, N2 and H2) controlled by the GC
- Modular and innovative solutions according to your customer's needs
- Equipments 100 % Hand made and control with French Quality

# Conclusions



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- Various application in industry where trace analysis is required in complexe mixture
- Reference analytical method = no risk of interference and wrong measurment
- Cylinder free systems



**THANK YOU FOR YOUR  
ATTENTION!**

Questions?