

ROAD-TANK AUTOMATIC LOADING SYSTEM



ROAD-TANK AUTOMATIC LOADING SYSTEM NEW 2015 Version

CO₂ SENSE - IMR-MS

IMR-MS = ION MOLECULE REACTION - MASS SPECTROMETER

The V&F FCA system is a dual mass-spectrometer capable of measuring gas concentrations over a wide range

- Multi component analysis
- Organic compounds
- ppb / ppm Levels of detection
- User friendly easy to use software



Quality control system for tankers for liquid CO₂ / Oxygen / Argon / Nitrogen

Pentatec supplies a fully automatic system to manage the complete process of road-tanker loading under CO₂ quality control which assures:

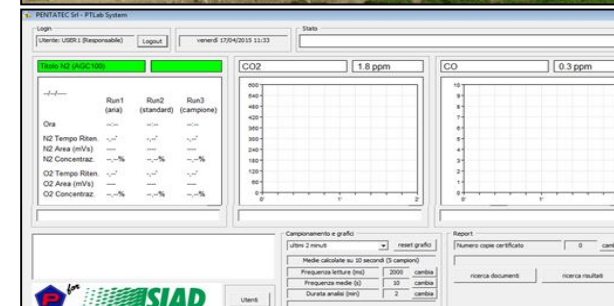
- the control of the automatic filling sequence for liquid CO₂/N₂/Ar/O₂ in transportable tanks;
- the analysis of residual impurities in the road-tank to be filled;
- the analysis of the product loaded (in connection with the CO₂/N₂/Ar/O₂ analysis system);
- The print out of delivery bill and quality certificate.

How the system works

When a road-tank arrives it is recognized by the driver badge. As soon as flexible hoses are connected, the analysis of the road-tank starts to avoid any product contamination. If everything is OK, the system fills the tank truck in a closed loop configuration. If not, the truck is filled in open loop mode. Once completed the filling, the system prints out the Liquid CO₂ certificate of analysis and the Bill of Loading. The system can also be connected to the Factory truck weighing system.

Benefits:

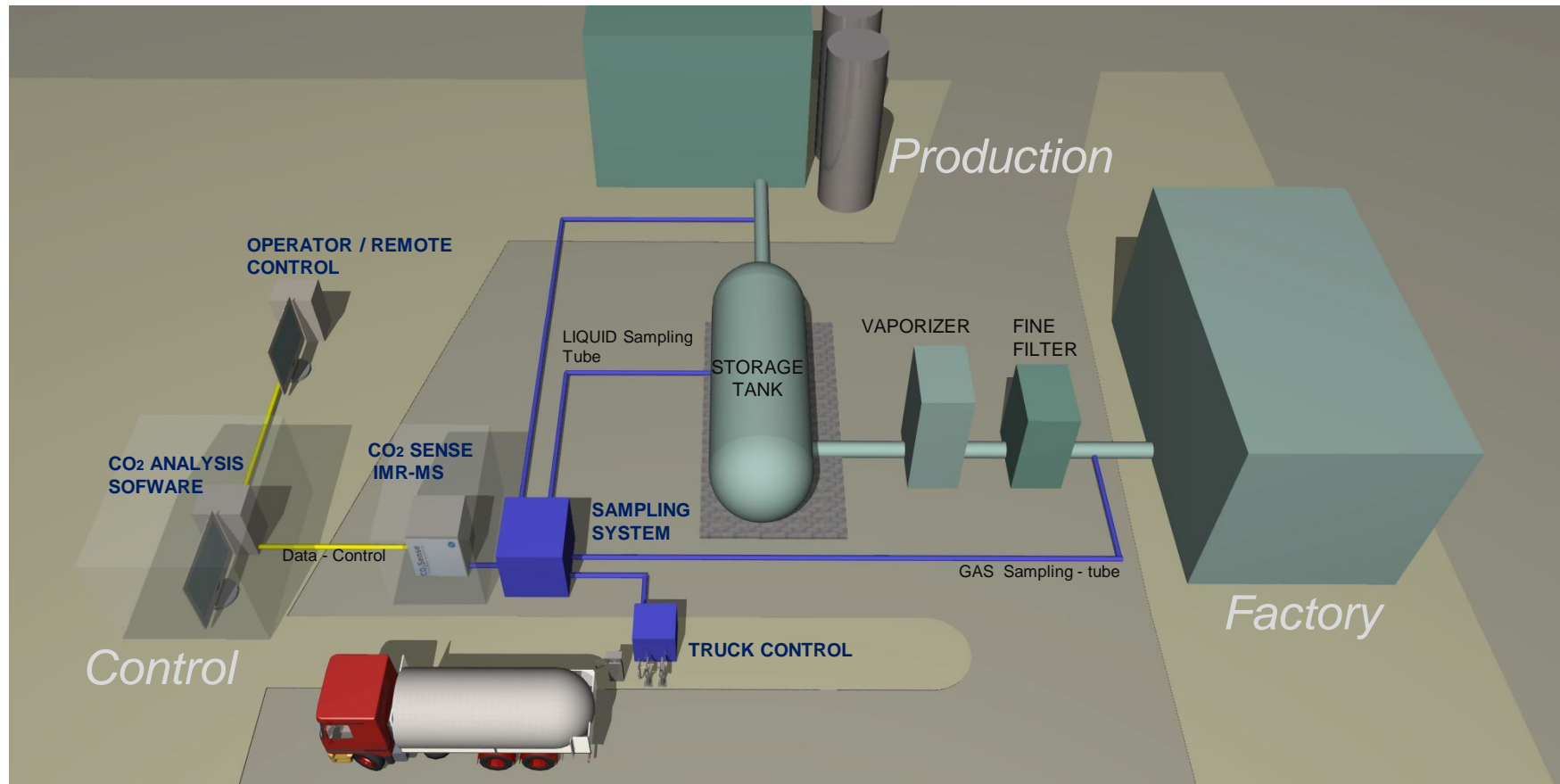
- 24 hours loading
- No personnel required (any manual operation is done by the truck driver)
- Quality certificate
- Automation,
- Product traceability
- CO₂ product batch analysis According to ISBT EIGA criteria
- Versatility



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ROAD-TANK AUTOMATIC LOADING SYSTEM SCHEMATIC

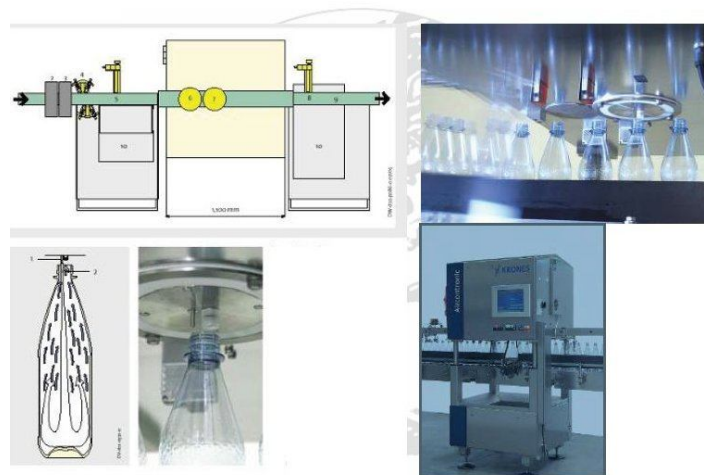


New list compounds impurities in CO₂ - IMR-MS - 2015



Compound	FORMULA	Unit	MDL
Methane	CH ₄	ppm v/v	0,1
Ethane	C ₂ H ₆	ppm v/v	0,1
Ethylene	C ₂ H ₄	ppm v/v	0,1
Acetylene	C ₂ H ₂	ppm v/v	0,1
Propane	C ₃ H ₈	ppm v/v	0,1
Isobutane	C ₄ H ₁₀	ppm v/v	0,1
N-Butane	C ₄ H ₁₀	ppm v/v	0,1
Total volatile hydrocarbons as Metane	-	ppm v/v	
Benzene	C₆H₆	ppb v/v	1
Toluen	C₇H₈	ppb v/v	1
M-Xylene	C₈H₁₀	ppb v/v	2
Total Aromatic hydrocarbons	BTX	ppb v/v	
Chloroform	CHCl₃	ppb v/v	2
1-2 Dichloroethane	C₂H₄Cl₂	ppb v/v	2
Trichloroethylen	C₂HCl₃	ppb v/v	2
Tetrachloroethylen	C₂Cl₄	ppb v/v	2
BromodiChloromethane	CHCl₂Br	ppb v/v	2
Chlorodibromomthane	CHClBr₂	ppb v/v	2
Tribromomethane	CHBr₃	ppb v/v	2
Methanol	CH ₃ OH	ppm v/v	0,1
Acetaldehyde	C ₂ H ₄ O	ppm v/v	0,02
Ethanol	C ₂ H ₆ O	ppm v/v	0,1
Hydrogen	H ₂	ppm v/v	1
Oxygen	O ₂	ppm v/v	1
Nitrogen	N ₂	ppm v/v	1
Carbon monoxide	CO	ppm v/v	0,5
Carbonyl sulfide	COS	ppb v/v	5
Hydrogen sulfide	H₂S	ppb v/v	5
Methylmercaptane	CH₃SH	ppb v/v	5
Carbon sulphyde	CS₂	ppb v/v	5
Dimethyl Sulfide	(CH₃)₂S	ppb v/v	5
Sulfur dioxide	SO₂	ppb v/v	10
Total sulfur (expressed as S, SO₂ Excluded)		ppb v/v	
Ammonia	NH ₃	ppm v/v	0,1
Nitrogen monoxide	NO	ppm v/v	0,1
Nitrogen dioxide	NO ₂	ppm v/v	0,1
Dimethyl Ether	C ₂ H ₆ O	ppm v/v	0,1
Ethyl acetate	C ₄ H ₈ O ₂	ppm v/v	0,1
Ethyl formate	C ₃ H ₆ O ₂	ppm v/v	0,1
Diethanolamine	C ₄ H ₁₁ NO ₂	ppm v/v	0,1
Umidity	H ₂ O	ppm v/v	1

CO₂ SENSE - IMR-MS - Ion molecule reaction - mass spectrometer



Major Market / Industry Fields

Automotive Industry
 Specialty gases Industry
 Environmental Industry
 Tobacco Industry
 Health Care Industry