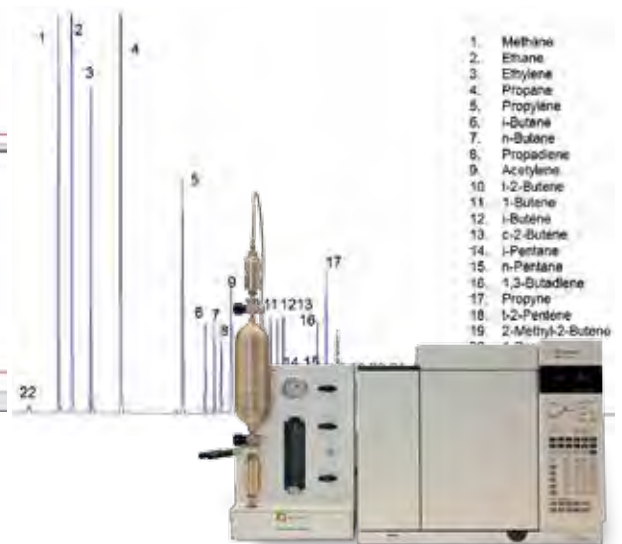
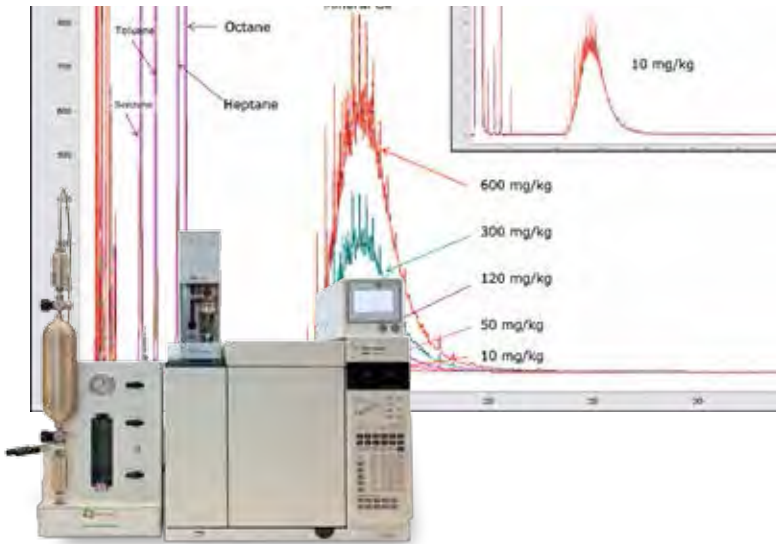




Analytical Solutions

- **An Overview of GC Solutions for the Gas and Petrochemical Industry**

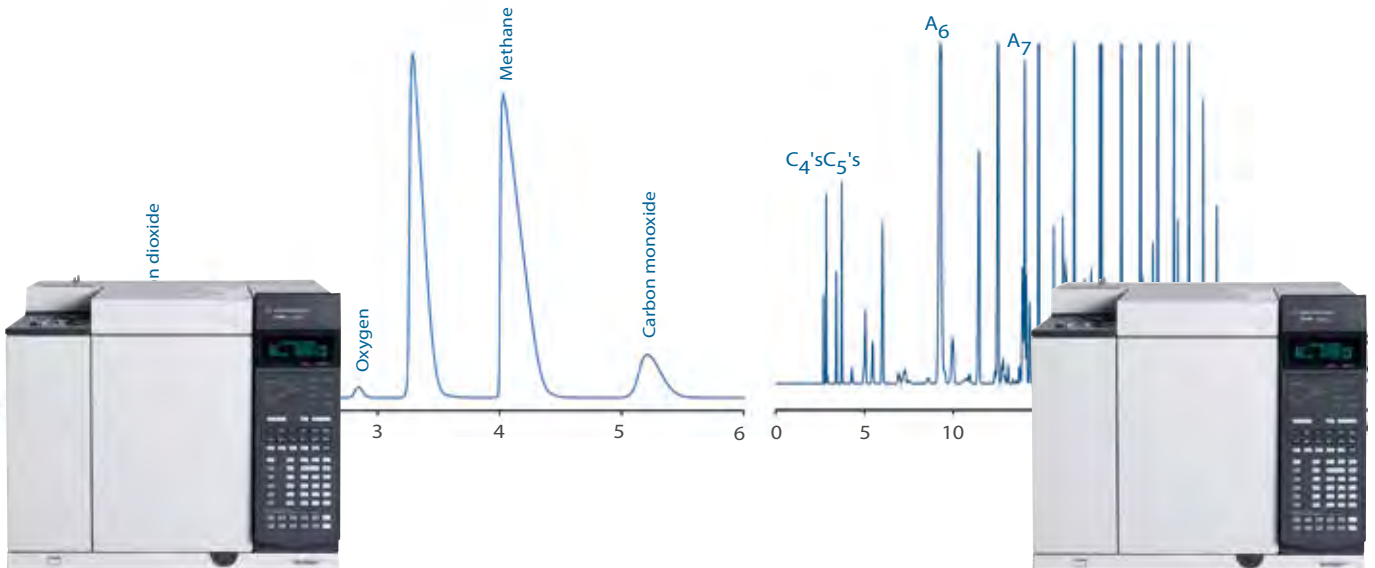
Analysis of Gas & LPG



Solution	DVLS Liquefied Gas Injector	DVLS LPG Analyzers
Method	<ul style="list-style-type: none"> ASTM D7756-13 EN 16423 Alternative to: <ul style="list-style-type: none"> ASTM D2163, DIN 51666, EN 27941, ISO 7941 ASTM D1159 ASTM D2426 	<ul style="list-style-type: none"> ASTM D2163, DIN 51666, EN 27941, ISO 7941 ASTM D2593 ASTM D2712 ASTM D4424 ASTM D6159 DIN 51619 UOP 983, UOP 1014
Analysis of	<ul style="list-style-type: none"> Desulfurization additives in LPG: DIPA, MEA & DEA Hydrocarbon Composition of Liquefied Gases Inhibitors, additives and dimer in 1,3-Butadiene: ACN, TBC, VCH, NMP, DEHA, BHT, DMF and residue Oxygenates in liquefied gases Residue in DME Residue and heavier contaminants in LPG Sulfur compounds in light hydrocarbons N₂, CO₂, H₂S and HC in unstabilized gas condensate 	<ul style="list-style-type: none"> Hydrocarbon composition Traces of hydrocarbon impurities Traces of sulfur compounds and oxygenates
Application Range	<ul style="list-style-type: none"> 1,3-Butadiene Butylenes Crude C4 streams Dimethyl ether (DME) Ethylene LPG Propylene Raffinate Unstabilized gas condensate 	<ul style="list-style-type: none"> 1,3-Butadiene Butylenes Crude C4 streams Dimethyl ether (DME) Ethylene LPG Propylene Raffinate Vinyl chloride monomer (VCM)



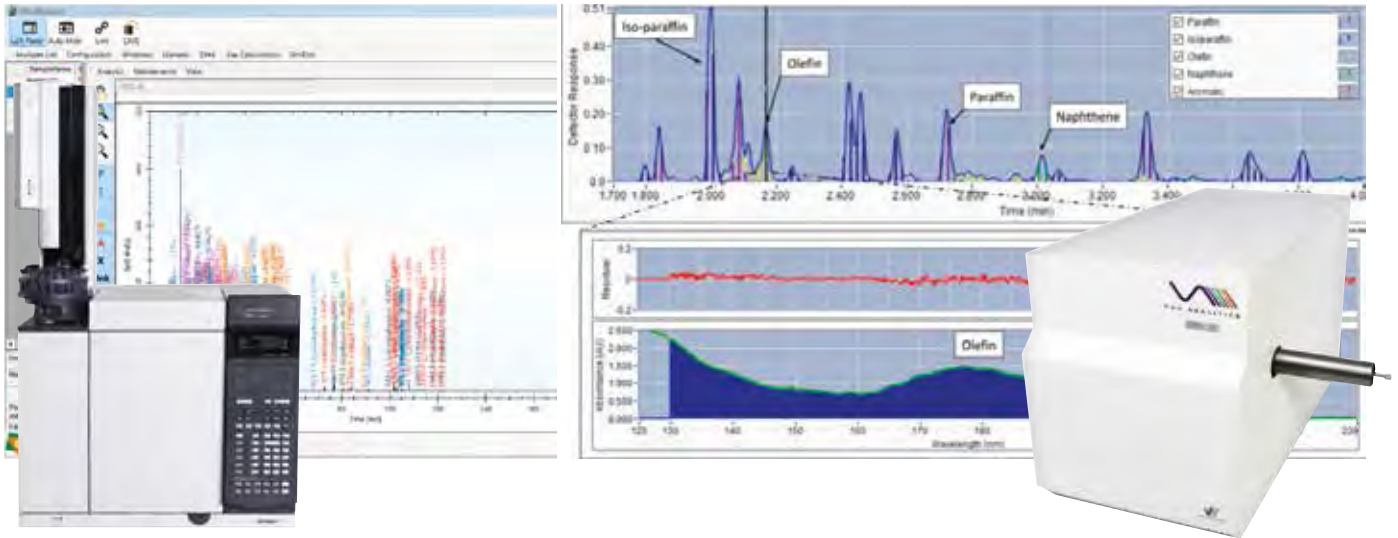
Analysis of Gas & LPG



Solution	DVLS Refinery Gas Analyzer	DVLS Natural Gas Analyzer
Method	<ul style="list-style-type: none"> ASTM D1946, D2163, D2504, D2593, D4424 ISO 7941 UOP 539, UOP 603 EN 15984, EN 27941 IP 405 DIN 51666 	<ul style="list-style-type: none"> ASTM D1945, D3588 GOST 22667 GPA 2172, GPA 2177, GPA 2186, GPA 2261, GPA 2286 IP 345 ISO 6974, ISO 6975, ISO 6976
Analysis of	<ul style="list-style-type: none"> Hydrocarbon composition Individual volatile sulphur-containing compounds Non-condensable gases: hydrogen, nitrogen, carbon monoxide, carbon dioxide, oxygen, hydrogen sulphide 	<ul style="list-style-type: none"> Hydrocarbons Non-condensable gases: hydrogen, nitrogen, carbon monoxide, carbon dioxide, oxygen, hydrogen sulphide BTEX
Application range	<ul style="list-style-type: none"> Biogas Butane Flue gas Gaseous fuels LPG Refinery gas Propane Syngas 	<ul style="list-style-type: none"> Liquefied natural gas Natural gas Natural gas condensate



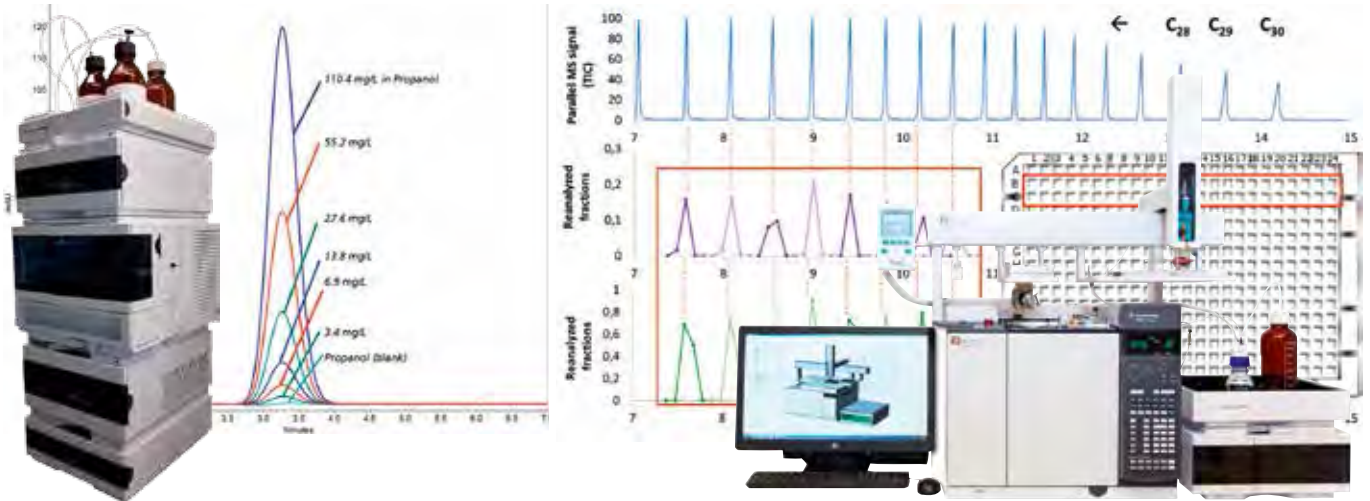
Analysis of Petrochemicals



Solution	DVLS Simulated Distillation Solutions	DVLS Detailed Hydrocarbon Analysis & GC-VUV Solutions	DVLS Oxygenates Solution
Method	<ul style="list-style-type: none"> ASTM D2887, D3710, D5442, D6352, D7096, D7169, D7213, D7398, D7500 DIN 51435, DIN 51581 EN 15199 IP 406, IP 480, IP 507, IP 545 ISO 3924 	DHA: <ul style="list-style-type: none"> ASTM D5134, D6729, D6730, D6733, D7900 PIONA+: <ul style="list-style-type: none"> ASTM D8071 	<ul style="list-style-type: none"> ASTM D4815, D5501, D7059, D7423, D7754, EN 13132 UOP 960, UOP 1015
Analysis of	<ul style="list-style-type: none"> Alkane profile (Wax) Distillation residue Initial boiling point (IBP) Final boiling point (FBP) True boiling point (TBP) distribution 	<ul style="list-style-type: none"> Individual hydrocarbons & Group types PIONA analysis of gasoline & blending components Oxygenates Light ends in crude oil 	<ul style="list-style-type: none"> Carbonyls content Ethanol and methanol content Ether content Oxygenate content Traces of oxygenates
Application Range	<ul style="list-style-type: none"> Crude oil Diesel fuel Distillates Fuel oil Gasoline Lube oils Jet fuel Naphthas Reformate/platformate Thermal cracker feed Vacuum gas oil Wax 	<ul style="list-style-type: none"> Alkylate Crude oils Gasoline Isomerate Naphthas Reformate/platformate Pygas 	<ul style="list-style-type: none"> Alkylate Aromatics Crude oil Ethanol Gasoline Isomerate Liquefied gases Naphthas Reformate/platformate



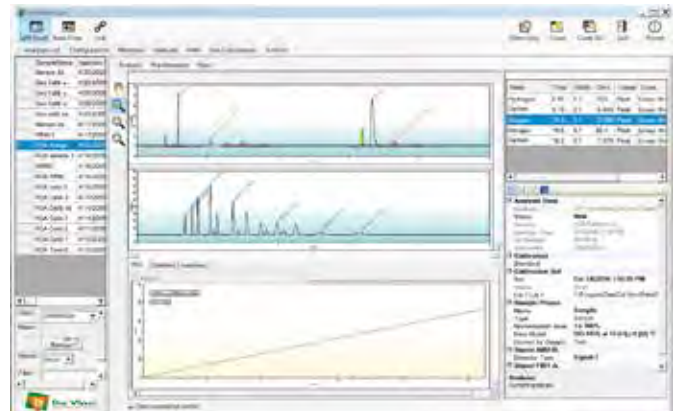
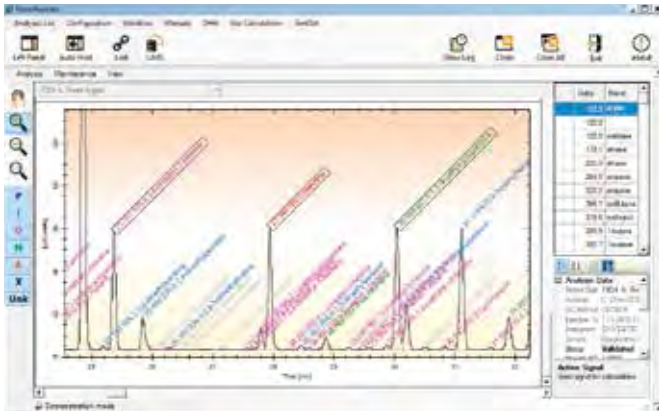
Analysis of Petrochemicals



Solution	DVLS Fast Peroxide Analyzer	DVLS GC Fractionator	GC Custom Solutions
Method	DVLS method Alternative to: <ul style="list-style-type: none"> • ASTM D2340, E299 • ASTM D3703, D6447 • ASTM D5799 	DVLS method for high resolution GC fractionation	User specified configuration according to e.g.: <ul style="list-style-type: none"> • ASTM D3606, D5504, D5507, D5580, D5623, D6584 • EN 12177, EN 14103, EN 14106, EN 14110 • EN 14105, EN 15721, EN 15779 • IP 585
Analysis of	<ul style="list-style-type: none"> • Hydrogen peroxides • Organic peroxides 	<ul style="list-style-type: none"> • Biomarkers in petroleum exploration • Oil spills 	<ul style="list-style-type: none"> • Aromatic content • FAMES • Fuel speciation • Sulfur compounds
Application Range	<ul style="list-style-type: none"> • 1,3-Butadiene • Aqueous matrices in process streams • Aviation turbine fuels • Glycols • Isoprene • Olefinic hydrocarbon streams • Styrene monomer 	<ul style="list-style-type: none"> • Crude oil • Sediment extracts • Fuels 	<ul style="list-style-type: none"> • Alkylate • Aromatics • Biodiesel • Crude Oils • Diesel fuel • Ethanol • Gasoline • Isomerate • Liquefied gases • Naphthas • Reformate/platformate



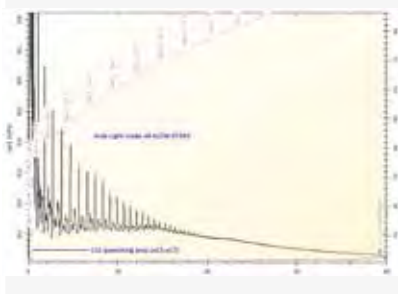
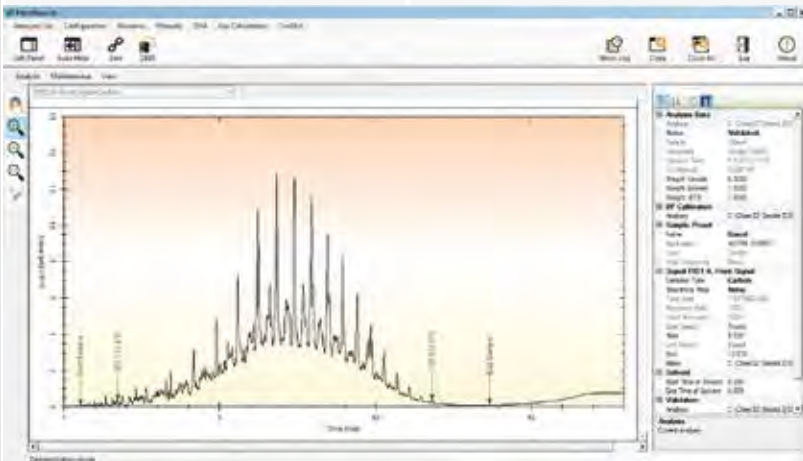
Data Processing & Reporting



The DVLS PetroReporter is an universal software tool that automates data processing and reporting of petroleum samples ranging from gases up to and including crude oil for DHA, FAME, Simdist and Gas Calculation applications.




Application range of Petroreporter





- ASTM, DIN, EN, IP, ISO applications for Simulated Distillation (SimDist)
- ASTM D5134, D6729, D6730, D6733, D7900 applications for Detailed Hydrocarbon Analysis (DHA)
- ASTM, DIN, EN, GPA and ISO gas calculation modules
- EN14103 application for ester content of FAME

Solution	PetroReporter for DHA	PetroReporter for SimDist	PetroReporter for Gas Calculation
Report of	<ul style="list-style-type: none"> • Bromine number • DHA/SimDist merge data • Gross and nett heat of combustion of liquid • Individual hydrocarbons & group types • Oxygenates • PIONA • Reid vapor pressure • RON and MON values • Specific gravity • True boiling point (TBP) distribution 	<ul style="list-style-type: none"> • Alkanes (Wax) • Cut point distribution • Flash point correlation • Motor oil volatility (MOV) • Noack evaporation loss • True boiling point (TBP) distribution • Volume correlation 	<p>Examples of calculation of gas values:</p> <ul style="list-style-type: none"> • ASTM, DIN, EN, GPA, ISO and UOP standard method calculations • Compressibility • Carbon content • Carbon emission factor • Density • Heating value, calorific value and BTU • Liquid gallons per cubic feet of gas (GPM) • Liquid volume (LPG) • Molecular weight • Motor octane number • Oxygen correction • Relative density • Real specific gravity • Vapour pressure (LPG) • Wobbe index • Custom calculations
		<h3>PetroReporter for FAME Calculation</h3> <ul style="list-style-type: none"> • Ester content of FAME • Linolenic acid content of ester samples 	

General laboratory equipment



Solution	DVLS GasMix	DVLS GasMix for Liquids	DVLS Pressure Station for Gas & Liquid Injection
			
Application range	<p>On-site customized gas standard preparation for single and multi-point calibration standards for:</p> <ul style="list-style-type: none"> • Air pollution analysis, e.g. NOx • Environmental gas analysis • Flavour, fragrance & odour analysis • Impurities in gas analysis • Refinery gas analysis & LPG • Natural gas analysis 	<p>Gas standard generation of liquids for example VOC's for:</p> <ul style="list-style-type: none"> • Air pollution analysis • BTEX analysis • Fragrance & odour analysis 	<p>Representative sample injection of a liquid or gaseous hydrocarbon stream into a GC system while keeping the pressure at a constant level:</p> <ul style="list-style-type: none"> • LPG • Butadiene • Propane • Pentane

Solution	DVLS Standards	DVLS Gas Generator	DVLS ³ Simply Smart Sensor	DVLS UltraSilc
				
Application range	<ul style="list-style-type: none"> • Benzene/aromatic and biodiesel standards • Nitrogen and sulfur standards • Oxygenate standards for GC • Physical properties standards • PONA & PIANO Standards • SimDist standards • Custom standards 	<p>Zero air for GC/LC</p> <ul style="list-style-type: none"> • N₂ for LC-MS • H₂ for FID • H₂ for GC • N₂ for GC carrier gas • H₂/Air combined 	<p>Sensor for detecting hydrogen leaks in GC systems.</p> <p>Next to the hydrogen leak detection Da Vinci Laboratory Solutions offers multiple sensors dedicated to the detection of:</p> <ul style="list-style-type: none"> • Hydrogen (H₂) • Temperature • Barometric pressure • Level (liquid) weight 	<p>Inert coating of stainless steel, borosilicate glass or quartz parts such as:</p> <ul style="list-style-type: none"> • Detector parts • Flow controllers • Inlets • Liners • Regulators • Unions • Vials • Tubing

About us

Da Vinci Laboratory Solutions (DVLS) was established as a laboratory support provider in 2000.

Today Da Vinci has become the versatile partner to laboratories by offering chromatographic solutions that address all analytical challenges starting from sample preparation, analysis, reporting, data management up to providing technical support and supplies.

Our mission is to boost laboratory efficiency through:

- Expertise in GC, LC, MS, TOC, VUV, XRF and software development
- Knowledge of laboratory processes
- Distributorship of leading suppliers in the Benelux such as Agilent, GERSTEL, LECO, VUV Analytics and XOS
- Development and manufacturing of innovative solutions

As a result of our wide range of solutions and high level of expertise Da Vinci is able to meet your analytical needs.



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