



V&F
Analyse- und
Messtechnik
GmbH



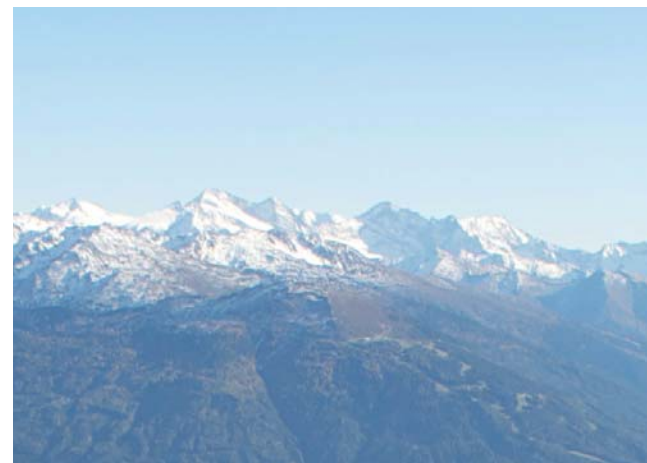
 V&F Analyse- und
Messtechnik GmbH

Company Philosophy

Sensitivity and selectivity are the driving forces behind V&F's technology developments. We produce mass spectrometric equipment of the highest standard. Our philosophy is to understand market needs and listen to our customers, but most importantly, we know how to manufacture cutting-edge analytical instrumentation. Our goal is to provide our customers with optimized solutions for a wide range of applications.

We develop instrumentation for the general market as well as custom-made solutions for specialized industries and niche applications. Our dedicated team of scientists and engineers combines in-depth expertise with specialized skills and experience. We pride ourselves that every mass spectrometer leaving V&F has been hand-made and tested in accordance with customer requirements.

V&F equipment is renowned for its ease of use and for its reliability. New discoveries and developments find their way into V&F's next generation mass spectrometers always with the aim to improve our equipment. Through a combination of in-house research activities and monitoring wider scientific and technological innovations V&F ensure that their systems are continuously evolving and always state-of-the-art.





CI-MS 500



AirSense
Ion-Molecule Reaction - Mass Spectrometer

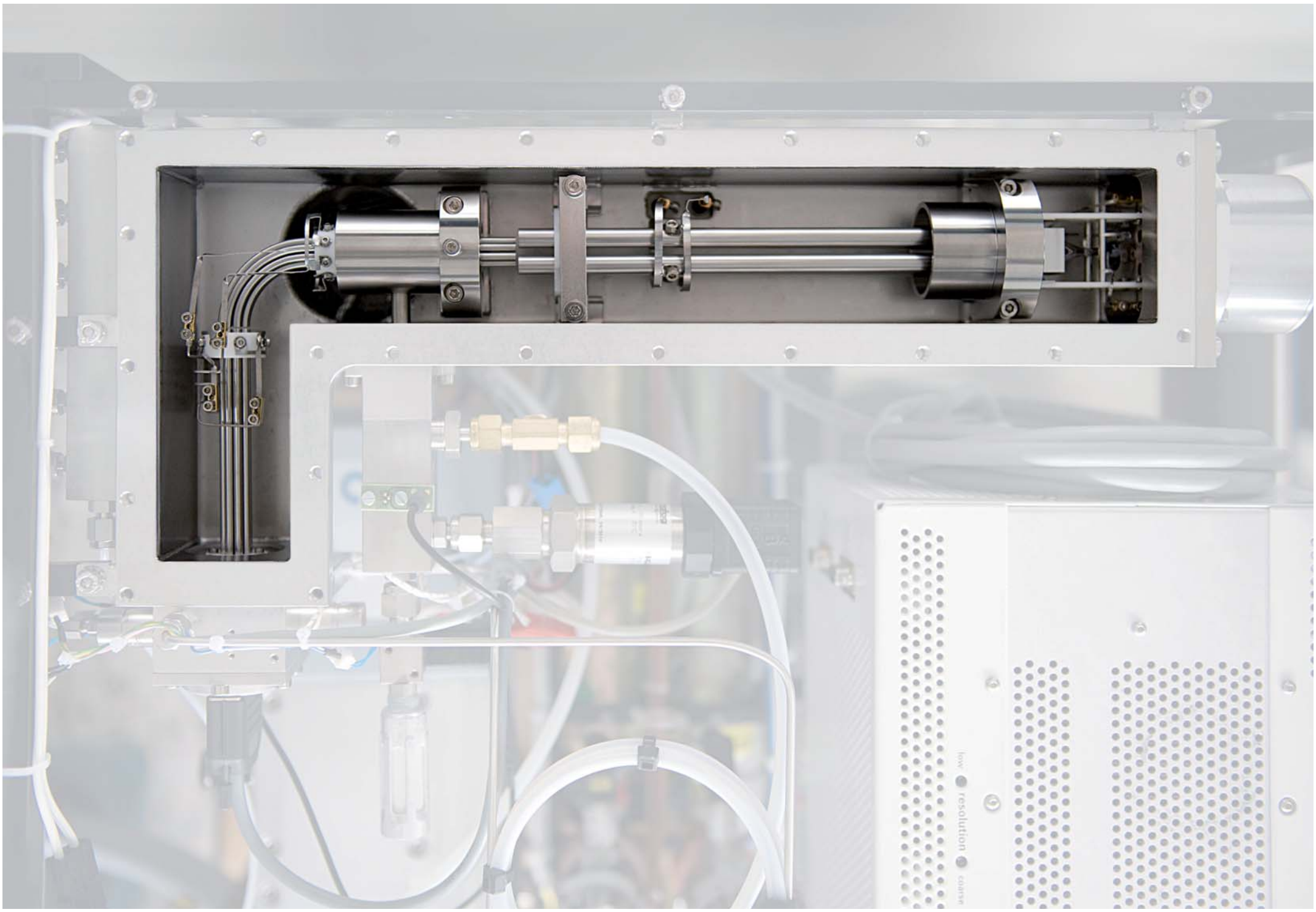
History

Following their doctoral studies two adventurous young Austrian scientists gained further experience in Ion-Molecule Reaction (IMR) mass spectrometry at leading international research institutions. In their spare time they developed a novel octopole system enabling them to build sophisticated equipment that could be used for environmental trace gas analysis. They soon realized that there was a niche market for specially designed mass spectrometers.

Encouraged by the positive uptake of their instrumentation at an analytical trade show Johannes Villinger (the "V") and Werner Federer (the "F") decided to leave academia and to become entrepreneurs instead. In 1985 V&F Analyse & Messtechnik GmbH was born and started its life in Innsbruck. In their early years V&F received prestigious awards and grants for innovation and entrepreneurship.

The first commercially available model was produced in 1986 and was an instant commercial success. V&F soon needed to expand and in 1988 relocated to larger facilities in Absam. Over time, V&F mass spectrometers became a standard measurement technique used in the automotive industries. Nowadays V&F is among the market leaders in high-sensitivity mass spectrometric equipment that is used in various industrial, medical and environmental settings worldwide.





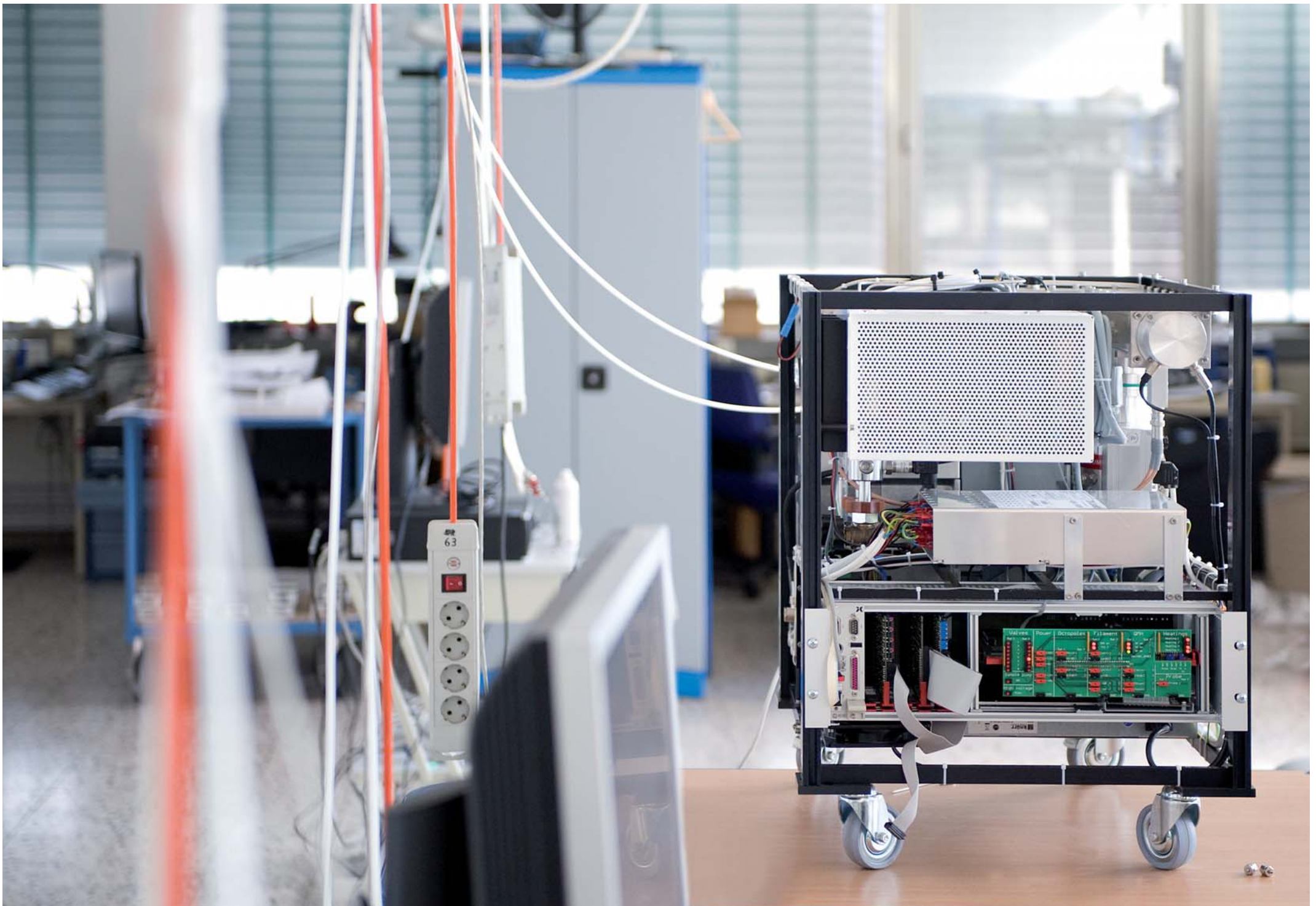
Technology

V&F employ a variety of mass spectrometric techniques, each of which can be tailored to the task at hand. Magnetic sector field (SF) analyzers are used to detect hydrogen or helium, and electron impact mass spectrometry (EIMS) in combination with a quadrupole mass filter is used in classical multicomponent analysis.

Our flagship patented technology is Ion-Molecule Reaction Mass Spectrometry - IMR-MS. This is a soft ionization method where fragmentation of the analyte is greatly reduced or eliminated. Positively charged atomic ions undergo low energy collisions with a neutral gas stream containing the molecules for analysis. The resulting product molecular ions are subsequently separated by a quadrupole mass filter, which typically has a mass range from 7-519 amu. For some applications, V&F equipment combines IMR-MS with EIMS. These instruments are particularly well suited if inorganic molecules with comparatively high ionization energies are to be measured alongside a suite of volatile organic compounds.

Our versatile gas inlet system allows for sample pressures ranging from several millibars to above atmospheric pressure at constant flow rates. V&F instruments are calibrated against certified gas mixtures and work over a wide range of sensitivities from sub parts per billion to percentage levels.



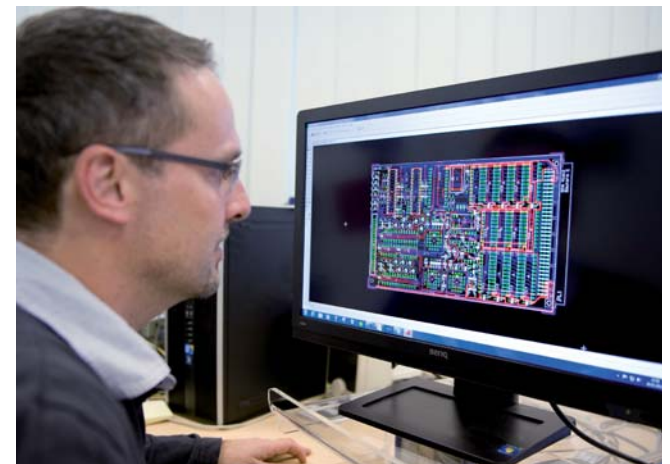


Research & Development

Since the development of V&F's first octopole unit by the company's founders there hasn't been any standstill with respect to the evolution of our mass spectrometers. The R&D department is constantly working to devise and implement further improvements into our instrumentation.

These days the company has dedicated mechanical engineering, electronics and software design units in order to optimize performance in each of these areas. Continuous technology advances in the industrial and medical sectors drive the demand for equally sophisticated analytical equipment. V&F engineers have the expertise and experience to design solutions that bridge customer requirements, practical necessities and technological innovations.

Over the years the company has built up a patent portfolio that comprises technology improvements and application oriented intellectual property. The V&F scientific team is research driven and staff members are involved in a range of development and application projects through industry collaborations and participation in clinical trials. V&F actively support initiatives that further the knowledge for the good of the customers.



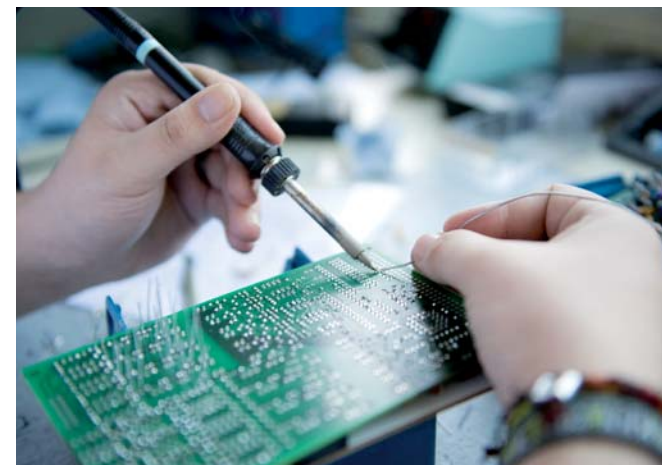


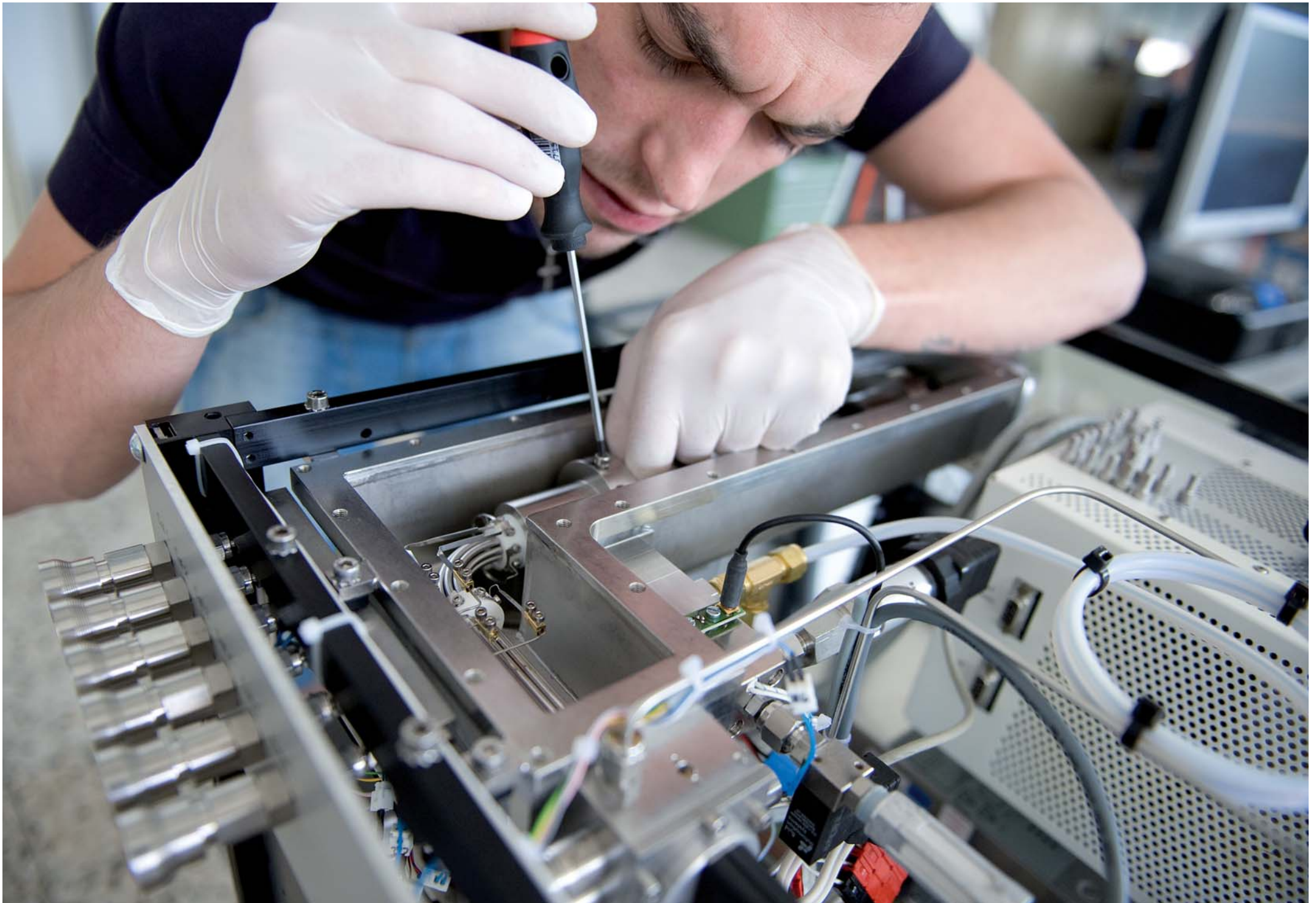
Production

V&F products comply with worldwide standards for analytical and electronic equipment. The highly qualified personnel are dedicated to delivering high-quality solutions. We pride ourselves on our attention to detail and ensuring each part of the instrument works perfectly.

At the heart of V&F's manufacturing process is the production line. The word "manufacture" is taken literally at V&F as each instrument is handmade. The main system components are a mass spectrometry unit, a gas inlet and a vacuum system as well as control electronics with integrated software. Each unit is assembled following a stringent manufacturing protocol and tested individually to ensure it is running according to specification. Quality control is an essential part of our process and we demand the same high standards from third party components as we do from our in-house made products.

At the end of the production process stands rigorous testing of each finished instrument against customer requirements. We perform a range of short-term tests to check equipment running procedures as well as long term reliability tests. Every instrument leaves the production line ready to meet individual customer needs. Everything is done to ensure that the instrument will run perfectly at the customer's facility.





Instruments

The V&F product line covers a wide range of applications with dedicated instruments for individual industries.

Product	Technology	Applications
AirSense	IMR-MS	Patented flagship technology for a wide range of applications
CO2Sense	IMR-MS	AirSense type equipment especially developed for measurements of impurities in carbon dioxide
PETSense	IMR-MS	AirSense type equipment developed for the PET bottle refilling industry
CombiSense	IMR-MS plus EIMS	AirSense type equipment with the additional capability to measure Vol% concentrations; equipped with a single gas inlet system
TobaccoSense	IMR-MS plus EIMS	CombiSense type technology dedicated to applications in the tobacco industry
TwinSense	Double IMR-MS	Double AirSense equipment offering flexibility and very fast high precision measurements
EISense	EIMS	A traditional mass spectrometer for measurements in the Vol% concentration range
HSense	SF-EIMS	High precision measurements of hydrogen and helium

IMR-MS
EIMS
SF-EIMS

Ion-Molecule Reaction Mass Spectrometry
Electron Impact Mass Spectrometry
Sector Field Electron Impact Mass Spectrometry



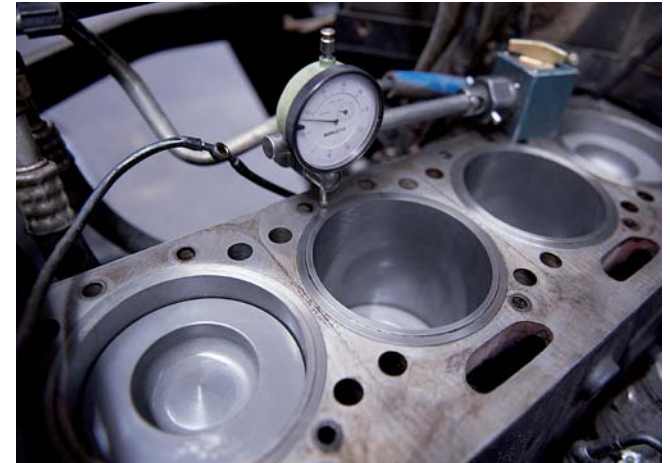


Automotive Applications

Measurements of raw and diluted exhaust gases from combustion engines are vital steps in the development and monitoring of catalysts, oil consumption, low emission and emission free vehicles. Minimization of regulated emissions (hydrocarbons, carbon monoxide and nitrogen oxides) as well as unregulated emissions of molecules such as formaldehyde, benzene, or toluene constitutes a major goal in the automotive industry.

Multicomponent measurements in exhaust gases and internal combustion can be accomplished with an AirSense instrument. Additionally, V&F offer the Gas-Oxidizer, a tube furnace that converts sulphur components into sulphur dioxide, which can then be measured to reflect the amount of oil consumption.

Limited availability of fossil fuels resulted in research into alternative energy sources such as hydrogen or electricity powered vehicles. Fuel cells have the potential to facilitate the transition from internal combustion to emission free electric engines. V&F HSense is an electron impact mass spectrometer dedicated to hydrogen measurements in catalyst, combustion and fuel cell research. The V&F CombiSense offers flexibility in the analysis of highly variable gas compositions within the entire process flow from development to product testing and quality control.





Applications in Food, Beverages and Tobacco Industries

The growing demands of food safety and consistent brand experience can only be satisfied by the highest standards of quality control. Consumer satisfaction and consumer protection require immediate identification and quantification of contaminants in the food, beverage and tobacco industries.

Contaminants need to be detected at very early stages of the production process. In the dairy industry even small impurities in raw milk or the subsequent fermentation process may render a whole production batch unusable. Leaks during food packaging may lead to produce unfit for consumption. Several V&F systems have been tailored towards industry specific applications. PETSense presents a highly sensitive and fast solution to identify contaminated refillable PET-bottles in the beverage industry. With individual bottles tested on a 100 millisecond time scale, a PETSense system is capable of measuring batches of up to 36.000 bottles per hour.

TobaccoSense is a one-stop solution that serves the needs for gas analysis in the tobacco industry. From quality control of the main components tobacco, filter, packaging and paper to puff-by-puff online analysis of the final product TobaccoSense meets the industry's requirements for every process step.





Environmental Applications

The growth in the world's population along with concurrent increase in industrial production processes is placing growing stress on the environment. Governments worldwide are regulating emissions of pollutants to protect the natural environment and the safety of individuals. Polluted, contaminated or hazardous areas often demand real-time monitoring to facilitate immediate and appropriate action. Parameters such as air pollutant concentrations need to be established to inform decision making regarding environmental impact assessment exercises. Governmental institutions and independent laboratories in several countries employ V&F equipment to evaluate ambient air quality. Applications range from pollutant detection in industrial estates, roadside traffic and aircraft emission monitoring to soil gas measurements and work place surveys. Across the industries V&F equipment is used for online-monitoring of emissions resulting from industrial processes where stack gases and combustion products need to be controlled. During waste incineration V&F mass spectrometers are utilized to detect dioxine precursors and sulphur emissions. If your company is legally obliged to control air pollution our experts are at hand to discuss your requirements.





Medical Applications

Non-invasive diagnosis of infectious diseases and subsequent monitoring of therapeutic effects are rapidly developing fields in medical sciences. V&F is collaborating internationally with medical equipment manufacturers and clinical staff to investigate new routes to achieve non-invasive diagnosis. The detection of mixtures of gaseous compounds in breath or above bacterial cultures during growth produces mass spectrometric profiles.

Human breath contains several hundred volatile compounds some of which are biomarkers for disease while others mirror physiological changes. Mass spectrometry can measure minute quantities (parts per billion) of these volatile biomarkers. V&F equipment has found use in numerous trials such as monitoring anaesthetics in real-time, measuring volatiles during exercise or distinguishing between certain liver diseases by breath profiling. In microbiology rapid identification of infectious agents is vital and bacterial headspace profiling can facilitate fast species determination of bacteria.

V&F mass spectrometers have a specially designed gas inlet system that can be used in conjunction with surgical masks to allow measurements on a breath-by-breath basis. Alternatively, for headspace analysis the inlet can be easily coupled to commercially available autosampling systems.





Applications in Other Industries

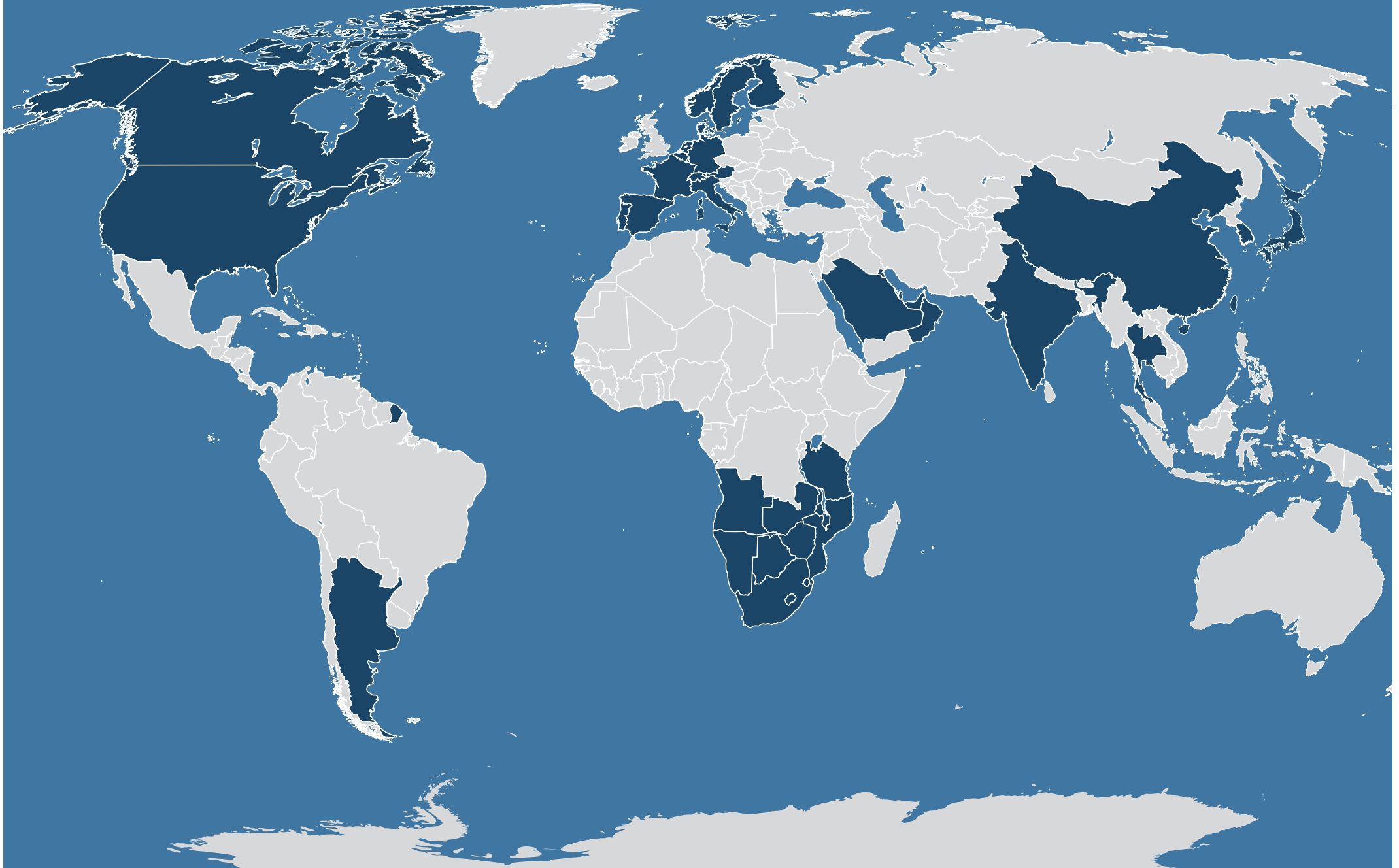
V&F instruments have found their way into a wide range of industries. V&F mass spectrometers are employed to monitor the quality of raw materials and to evaluate efficiency, continuity and consistency of industrial processes as well as end product quality.

Typical applications include process biotechnology where production progress and quality are monitored in order to deliver products of the highest standards. The elastomer industry uses V&F instruments to determine the amounts of ingredients in blends and to monitor the subsequent production. The cement industry employs V&F equipment to assess raw material, for process control and emission measurements. Further applications include determination of flavorings, fragrances and active ingredients in cosmetics production, clean room monitoring and a variety of measurements in the oil and gas industry.

A questionnaire is provided on our website where you can submit details of your requirements. V&F application specialists will review your enquiry and reply to you with a recommended solution. V&F offer a range of instruments wherever the highest levels of analytical capability are required.



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We won't let you down

Customer satisfaction is V&F's number one priority. From the moment you contact one of our representatives to express interest in purchasing a V&F instrument every step will be taken to meet your needs. Our approach is individual and we will discuss options as well as alternatives with you to help you decide which instrument is best suited for your intended application. Once a V&F mass spectrometer has been purchased our dedicated team of engineers and scientists is available to set up the instrument and to train staff. Training sessions can last from one day up to a week depending on your requirements and will take place either at the customer's facilities or alternatively in-house at V&F.

We offer continuous after-sales support and endeavour to solve any problem that may arise as quickly as possible. All V&F instruments are web enabled and equipped with the necessary software for remote diagnosis of your mass spectrometer. In most cases problems can be resolved this way. Consumables can easily be replaced by the customer. However, should it be necessary our experienced engineers are available to deal with any potential problem. For your convenience a variety of service contracts is available. Enjoy the V&F experience!

Because we have a different idea of what reliability and service mean.

