

# **HONEYWELL** **RESEARCH** **CHEMICALS**

High-Quality Lab Chemicals From Acetone To Zinc



**Honeywell**

# HIGH-QUALITY REAGENTS, SOLVENTS AND STANDARDS

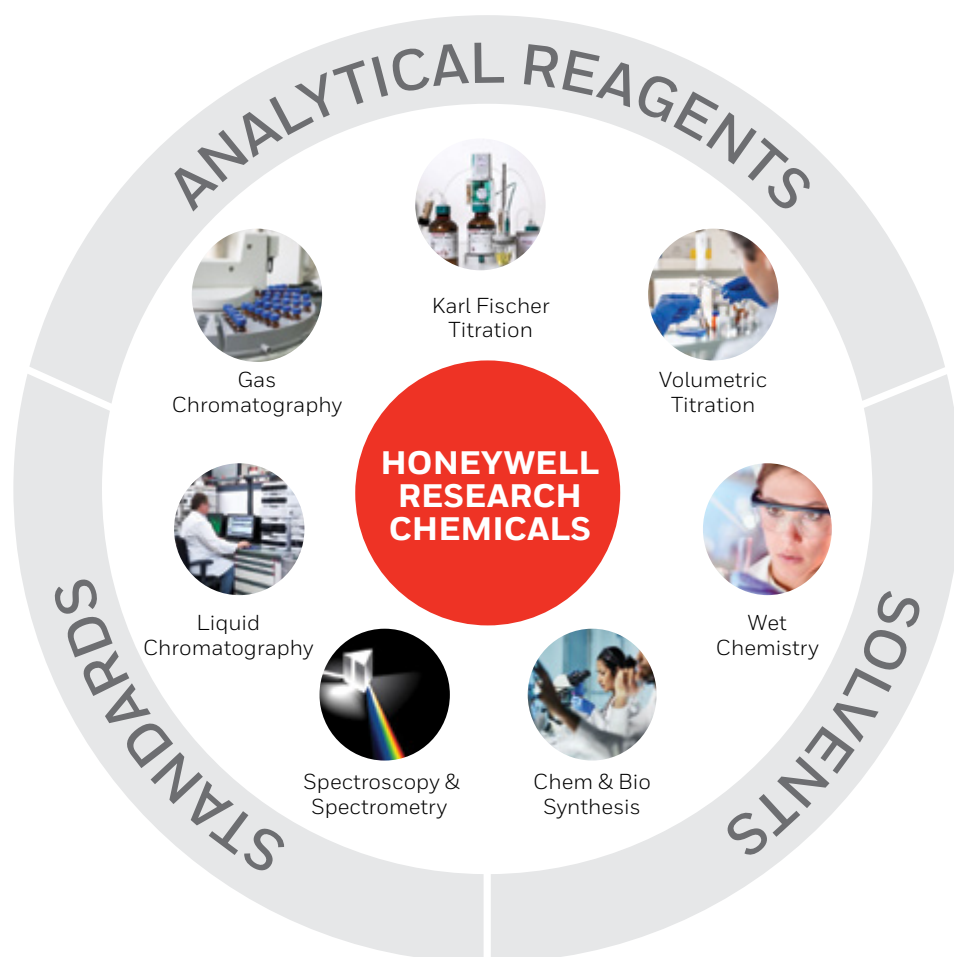
At Honeywell Research Chemicals, we know that working on cutting-edge science is never simple. Quality is crucial at every step of your analytical or synthesis workflows. With technologies and associated costs advancing at a record pace, the need for high-quality chemicals is greater than ever before.

To be successful, you need a wide range of dependable premium products, access to flexible solutions, and expert support. That's why we are committed to advancing our products' performance, custom capabilities, and support to meet your expectations.

Our Honeywell Research Chemicals products provide specifications that are tailored to your needs, supporting applications from highly demanding LC-MS methods for compound identification, GC headspace for residual solvents analysis, Karl Fischer titration (KFT) for water determination, or DNA/RNA synthesis of oligonucleotides drugs.

## DISCOVER TYPICAL APPLICATION AREAS FOR OUR PRODUCT PORTFOLIO:

- [Pharmaceutical QA/QC](#)
- [Cannabis Testing](#)
- [Petrochemical Industry](#)
- [Lithium-Ion Batteries](#)
- [Therapeutics and Diagnostics](#)
- [Metal and Mining](#)
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# PHARMACEUTICAL QA/QC APPLICATION HIGHLIGHT

Pharmacopeias are published by the authority of a government or a medical or pharmaceutical society and describe quality standards for pharmaceutical ingredients, end-products, and dosage forms and analytical methods. It is required to follow these quality standards and methods from the early stages in drug development, to the release to market and final pharmaceutical products.

Quality control is not only performed for the final product, but it is also required for raw material testing, APIs, intermediates and excipients, and in-process controls.

Analytical quality control of pharmaceuticals must be rigorous, involving multiple analytical techniques, as impurities can be toxic for patients or affect drug efficacy.

Liquid chromatography is the method of choice for the detection, quantification, and identification of **non-volatile inorganic impurities** and **extractables and leachables** from materials such as plastic packaging. Gas chromatography and GC headspace chromatography are used for the detection of **residual solvents** and other **volatile organic impurities**, including extractables and leachables. Certain pharmaceutical manufacturing processes can result in the production of genotoxic impurities, such as **nitrosamines**, many of which are potentially carcinogenic. Therefore, it is crucial to test for nitrosamine contaminations using LC-MS or GC-MS applications.

Ion chromatography is employed for the detection, quantification, and identification of counterions in drug salts.

In addition, regulators have issued guidelines for monitoring a range of **metal elemental impurities** in pharmaceutical



materials using ICP-OES or ICP-MS in pharmaceutical formulations.

Excessive or deficient **water content** can adversely impact the properties of pharmaceutical product quality, stability, and shelf-life; therefore, determination of the water content by Karl Fischer titration (KFT) is a routine quality check in the pharmaceutical industry.

Honeywell Research Chemicals understands that quality is crucial for your pharmaceutical

and biopharmaceutical quality control. That's why we've developed an analytical chemical portfolio delivering the highest purity reagents and solvents, and reliable analytical standards to save time and reduce costs at every stage of your quality control workflows.

[Explore the Honeywell Research Chemicals Portfolio](#)

	HPLC, LC-MS, UHPLC	IC	GC, GS-MS, GC-FID	GC headspace	ICP-MS, ICP-OES, AAS	KFT
VOCs and Residual Solvents			●	●		
Extractables and Leachables	●		●			
Non-Volatile Organic Impurities	●					
Nitrosamines	●		●			
Counterions	●	●				
Elemental Impurities					●	
Water Content						●



# CANNABIS TESTING APPLICATION HIGHLIGHT

Cannabinoids are a class of psychoactive and non-psychoactive compounds produced in the Cannabis or marijuana plant. In recent years, positive effects have been reported when used in support of sleep and mood disorders, chronic pain, HIV/AIDS, inflammatory diseases and during chemotherapy treatment.

Quality control and testing of Cannabis and Cannabis-based products for human use are mandatory.

Testing for **cannabinoid** identity, consistent purity, and concentration has been completed by TLC for several years. Cannabinoids can also be analyzed using separation by GC, LC, or UHPLC, and identification by MS. Chromatographic methods are also used to analyze **terpenes, pesticides** and detect **mycotoxins**. Terpenes are the primary aromatic constituents of Cannabis resin and essential oils and are analyzed to ensure Cannabis strain identity and medical efficacy. Medical Cannabis plants are susceptible to fungal contamination, which can result in the production of toxic mycotoxins. Even very small amounts can pose a serious health threat and require sensitive and accurate detection. Cannabis concentrates and blends are often extracted using organic solvents. **Residual solvents** can negatively impact product quality, potency, and human health and are detected using GC headspace analysis.

Certain toxic **trace metals** such as arsenic, cadmium, lead, and mercury can accumulate in Cannabis plants. Therefore, Cannabis-based products must be tested by ICP methods for the presence of heavy metals to ensure patient safety and product quality.

To ensure quality and shelf life, and avoid mold and fungal growth,



controlling water content in Cannabis is important. The measurement of water content can be performed by Karl Fischer titration (KFT).

The rapid growth of the Cannabis market has prompted the development of rapid testing methods requiring high-quality reagents and solvents.

For example, according to ICH guidelines for GC headspace analysis, very pure solvents are needed to be produced

with extremely low concentrations of defined residual solvents. Honeywell Research Chemicals offers a wide range of high purity solvents, reagents, and standards for analytical testing.

[Explore the Honeywell Research Chemicals Portfolio](#)

	HPLC, LC-MS, UHPLC	TLC	GC, GS-MS, GC-FID	GC headspace	ICP-MS, ICP-OES, AAS	KFT
Cannabinoids	●	●	●			
Terpenes	●		●			
Pesticides	●		●			
Mycotoxins	●		●			
Residual Solvents				●		
Trace Metals					●	
Water Content						●

# PETROCHEMICAL INDUSTRY APPLICATION HIGHLIGHT

The petrochemical industry relies on safe, reliable, and efficient processes to ensure consumers receive consistent, high-quality petroleum products. Petrochemicals tested include the entire complex range of hydrocarbon-based chemicals derived from petroleum, natural gas, coal, and biomass.

The petrochemical analytical testing labs follow ASTM, ISO, IP and other recognized methods and regulatory protocols. Typically measured parameters for petrochemical samples include oil and grease and petroleum composition, hydrocarbon content, trace metal content, water content, and octane value.

Petroleum, natural gas, fuels, LPG, petroleum refined products, petrochemicals, and additional hydrocarbons and chemicals are analyzed for chemical **composition** and **purity** using liquid chromatography and gas chromatography, as well as titration methods. Honeywell Research Chemicals has a comprehensive portfolio of solvents and reagents for chromatography analysis, have low content in other hydrocarbons, and meet the ASTM methods requirements.

When performing **trace analysis** for metal content from materials such as catalysts or wear metal in petrochemical raw materials, intermediates, and finished products, ICP-OES, ICP-MS, AAS procedures are the methods of choice. TraceSelect™ and TraceSelect Ultra™ reagents and solvents for ICP sample preparation and analysis ensure a reliably low metal background and can be used together with the high-quality Fluka™ CRM 's.



**Water content** determination in the petrochemical industry is hampered by sample insolubility in standard Karl Fischer titration (KFT) reagents and side reactions, usually caused by oil additives. To measure total water, the samples need to be fully dissolved or at least well-dispersed in the titration reagent to release the whole water. This can be achieved with special Hydranal™ reagents pre-mixed with co-solvents that act as solubilizers. Many side reactions can be suppressed by using special composition Hydranal™ K-type reagents or by analyzing the sample with Karl Fischer oven. Honeywell 's Hydranal product line

with special reagents and solvents for fats and oils, analytical standards, and CRMs enable accurate and reliable water determination in petrochemical samples.

**The octane number (ON)** is a measure of the resistance of gasoline against compression. It is determined using one or more reference fuel standards and a CFR test engine under controlled conditions. The higher the octane number, the more compression the fuel can withstand before detonating.

[Explore the Honeywell Research Chemicals Portfolio](#)

	HPLC, LC-MS, UHPLC	GC, GS-MS, GC-FID	ICP-MS, ICP-OES, AAS	Titration	KFT	CFR test engine
Composition and Purity	●	●		●		
Trace Metals			●			
Water Content					●	
Octane Number (ON)						●

# LITHIUM-ION BATTERIES APPLICATION HIGHLIGHT

Lithium-ion batteries have several advantages in comparison to traditional batteries. The demand for rechargeable lithium-ion batteries is steadily growing. Manufacturers must meet challenging requirements for faster and safer high-quality production. Stringent analytical testing is required at various steps in the lithium-ion battery value chain, from testing of raw materials and battery components to production and final quality control to ensure strong battery performance.

The electrolyte used in lithium-ion batteries is usually a mixture of organic carbonates and Lithium hexafluorophosphate ( $\text{LiPF}_6$ ), which is not stable against hydrolysis. Traces of water lead to the formation of Hydrofluoric acid, which can destroy electrodes and lower battery capacity. Hence, **water determination** by Karl Fischer titration (KFT) is used to measure the water content in the slurry, anode, cathode, separator, and electrolyte materials. Not only the presence of water, but also the harmful degradation of the product itself, the **Hydrofluoric acid**, can be determined in the electrolyte by acid-base titration. Furthermore, titration can be used to determine the **metal content** of cathode material by complexometric titration and redox titration methods, as well as to test for impurities such as **chlorides, hydroxides, and carbonates**.

**Element analysis** such as Lithium, Cobalt or Manganese in lithium-ion battery materials is critical for raw material control and is an important indicator of lithium battery performance. ICP methods and AAS are used for a variety of element analyses, including main component composition, rations, and impurity analysis.



GC-FID, GC-MS or GC headspace technology is used for the separation, identification, and quantification of **organic carbonates**. GC-MS is well-suited to determine the composition and ratio of cyclic carbonates, and to analyze the gasses generated by lithium-ion batteries.

HPLC and LC-MS are powerful tools for the separation and quantification of lithium-ion battery main components and aging products, including organic carbonates and phosphates, as well as different low-concentrated additives and impurities.

Additional testing parameters for lithium-ion batteries include pH measurement and the determination of **chloride** content via pH or UV/Vis spectrometry.

Honeywell Research Chemicals has accumulated robust experience and data collection in the field of lithium-ion battery material testing. Whether for raw material testing or scientific research, we can provide high-quality products and services to support the lithium battery industry.

[Explore the Honeywell Research Chemicals Portfolio](#)

	HPLC, LC-MS, UHPLC	GC, GS-MS, GC-FID	GC headspace	ICP-MS, ICP-OES, AAS	KFT	Titration	pH Measurement
Water Content					●		
Hydrofluoric Acid						●	●
Metal and Elements				●		●	
Organics	●	●	●				
pH							●
Chloride, Hydroxides, Carbonates						●	

# THERAPEUTICS AND DIAGNOSTICS APPLICATION HIGHLIGHT

Oligonucleotides are short, single-stranded DNA and RNA nucleotides that are synthesized from lab to production scale. They are useful as therapeutics or for diagnostic purposes.

Oligonucleotides therapeutics are attracting recent attention because they have high specificity to the molecular target. Several therapeutic treatments based on oligonucleotides have already been approved. Many more are currently being evaluated for the treatment of cancer, infectious diseases, metabolic disorders, genetic disorders, and other diseases.

The molecular diagnostics market grows steadily and increases the need for oligonucleotides. Mostly, oligonucleotides are used as primers and probes for PCR, but they can also be used in other applications, such as microarrays, in-situ hybridizations, and antisense analysis. RT-PCR is used to detect the presence of a specific virus, such as the Coronavirus, by detecting the presence of viral RNA in a patient sample.

Purity and yield are always crucial for oligo manufacturers. Scientists and manufacturers create an oligonucleotide by sequentially coupling the building blocks of DNA or RNA. This synthesis cycle, including **activation, deblocking, capping and oxidation**, has been fully automated since the late 1970s. Once completed, the final product is released from a solid support and collected in solution.

The quality of reagents and solvents can impact the number of side reactions in the synthesis cycle. Excellent reagents and solvents reduce these side reactions and increase the yield of the finished oligonucleotide.



To ensure high purity oligonucleotide production, it is important to start with high-quality reagents and solvents. Especially when health and lives are at stake, the use of high-quality chemicals from a proven manufacturer is important.

Honeywell's Burdick & Jackson™ BioSyn™ products are specifically processed and purified to exacting specifications, ensuring outstanding oligo synthesis efficiency. They include ready-to-use reagents for each step of the oligonucleotide synthesis cycle in various formulations, as well as acetonitrile with extremely low water content for the **washing** steps in-between. All chemicals are produced using consistent quality manufacturing standards, including

submicron filtration, to ensure improved overall purity and yield of the final product. They address the needs of oligo manufacturers with a wide range of pack sizes from 1L glass bottles to 1,250L returnable containers that can be connected directly to popular synthesizers. The final oligo product is then **purified** using preparative HPLC and the **identity** is frequently confirmed using LC-MS analysis.

[Explore the Honeywell Research Chemicals Portfolio](#)

	Activation	Deblocking	Capping	Oxidation	Washing	HPLC	LC-MS
Synthesis	●	●	●	●	●		
Purification						●	
Identification							●



# METAL AND MINING INDUSTRY APPLICATION HIGHLIGHT

The mining industry faces operational and environmental challenges. Analytical testing in the metals and mining industry optimize exploration programs and production procedures and drive regulatory compliance. Testing can determine major or trace analytes in steel or alloy samples, gold, silver, and platinum group elements in ore grade material, and analyze plating solutions or perform geochemical mapping, mine gas for safety, and wastewater to protect the environment.

**Metals and elements** including base metals, ferrous metals, precious metals, radioactive metals, and hydride elements are analyzed in soil, drill core, rocks, ores, or wastewater using ICP or AAS technology. In addition, they can be quantified using titration methods. Base metals (Cu, Zn, Ni, Pb) are assayed to provide accurate determinations for high-value materials. Hydride elements (As, Bi, Se, Sb, Te, Hg) are considered pathfinder elements, and they are often closely associated with metals of interest, such as gold. For example, PFAS are widely used in everyday products such as coatings for cookware, clothes and carpets, and in detergents, cleaning and firefighting products. Many organic contaminations are persistent organic pollutants (POPs) that bioaccumulate and find their way into the food chain.

Gold and silver typically occur at very low concentrations in ores. For the extraction, an aqueous chemical extraction process is used, involving a leaching step during which the metal is dissolved in an aqueous medium, followed by the separation and further concentration. Gold and silver are not soluble in water, therefore a complexant, such as **cyanide**, must be used. Chemical analysis is commonly



performed to determine the exact chemical form of the cyanide, and reduce costs and waste, assess risk, and optimize technical processes. The preferred method for analytical determination of free cyanide is, for example, silver nitrate titration. Titration is not only used for cyanide speciation, but as a quantitative analytical method for metal analysis.

During sample preparation for ICP, AAS, or titration analysis and leaching processes, pH measurements are frequently performed, requiring standards for pH meter calibration and acids and bases for pH adjustments.

Routine air quality in underground mines is monitored to ensure the safety of miners and equipment operators. Multiple **mine gases**, including helium, hydrogen, oxygen, nitrogen, methane, carbon monoxide, ethane, and ethylene can be monitored using GC.

Honeywell Research Chemicals offers the special chemicals and purity grades needed by the mining industry to fulfill quality requirements under the ISO 17025 certification.

[Explore the Honeywell Research Chemicals Portfolio](#)

	ICP-MS, ICP-OES, AAS	Titration	pH Measurement	GC
Metals and Elements	●	●	●	
Cyanide		●	●	
Mine Gas				●



# ENVIRONMENTAL TESTING APPLICATION HIGHLIGHT

A wide variety of contaminants with the potential to cause harm to humans and wildlife can make their way into the environment and are regulated. Environmental testing of air, drinking water, wastewater, and soil is required according to legal and regulatory requirements and industry standards.

Potentially, the harmful organic contamination of soils can occur through chemical spills, leakage, agricultural processes, natural disasters, and other sources. Contaminations can include polycyclic aromatic hydrocarbons (**PAHs**), polychlorinated biphenyls (**PCBs**), and per- and polyfluoroalkyl substances (**PFAS**), among many other organic chemicals. For example, PFAS are widely used in everyday products such as coatings for cookware, clothes, carpets, and in detergents, cleaning, and firefighting products. Many organic contaminations are persistent organic pollutants (POPs) that bioaccumulate and find their way into the food chain.

Gas chromatography techniques, including GC-MS or GC headspace, are powerful tools for identifying, verifying, and quantifying the presence of **volatile organic chemicals (VOCs)** in environmental samples. VOCs are released from a variety of products from paints and hydraulic fluids to dry-cleaning products and refrigerants, as well as petroleum-based products and gasoline. A typical GC application is the analysis of hydrocarbons in water or soil samples contaminated by gasoline, diesel, or fuel oil.

While GC is common in environmental analysis for volatile and non-polar compounds, liquid chromatography is better suited for compounds which are polar, **non-volatile**, thermolabile, or



have a high molecular weight. LC-MS is a technique for identifying, verifying, and quantifying diverse organic pollutants in the environment and their degradation products, including antibiotics, pesticides, steroid oestrogens, nitrosamines, or certain hydrocarbons.

In addition to organic pollutants, trace amounts of nearly all **metals, elements** and elemental compositions within environmental samples are commonly analyzed by ICP or AAS at ppm ppt levels.

**Inorganic anions** such as  $F^-$ ,  $Cl^-$ ,  $NO_2^-$ ,  $Br^-$ ,  $NO_3^-$ ,  $PO_4^{2-}$ ,  $SO_4^{2-}$ , and  $C_2O_4^{2-}$  in environmental samples can be analyzed by ion chromatography (IC).

Honeywell Research Chemicals provides high purity solvents and reagents with excellent lot-to-lot consistency and certified standards for calibration to support you in obtaining reliable results, keeping up with advances in environmental testing techniques, and optimizing laboratory productivity.

## [Explore the Honeywell Research Chemicals Portfolio](#)

	HPLC, LC-MS, UHPLC	GC, GS-MS, GC-FID, GC-ECD	GC headspace	Ion Chromatography (IC)	ICP-MS, ICP-OES, AAS
VOCs		●	●		
Non-volatile Organics	●	●			
PAHs, PCBs, PFAS	●	●	●		
Antibiotics, Pesticides, Herbicides	●	●	●		
Metals and Elements					●
Inorganic Anions				●	

# FOOD QUALITY AND SAFETY APPLICATION HIGHLIGHT

The food and beverage industry is subject to stringent regulations. Contaminations through environment, production, packaging, and adulteration is a major concern and require rigorous quality control. Analytical testing is performed from product development to production, ensuring consumer safety, regulatory compliance, and brand reputation.

Processing and packaging are common contamination sources. The determination of **residual solvents** and **volatile organic compounds (VOCs)** by GC headspace is key to mitigating potential health risks, meeting industry regulatory standards, and ensuring product quality.

Another contamination source is **persistent organic pollutants (POPs)** from pesticides, solvents, pharmaceuticals, or industrial chemicals. Due to their persistent nature, these compounds migrate naturally from the environment into the food chain where they bioaccumulate in milk, eggs, fish, or meat. POPs, including pesticide residues, are strictly regulated in food and require strict control by LC and GC.

Food **adulteration** has become an increasing issue. To prevent fraud and ensure consumer health, it is important to determine if a product has been contaminated using LC, GC, and IC methods, depending on the analyte type. LC or GC methods are also used to analyze edible **fats and oils** for nutrition, contamination, and composition, as well as authenticity.

**Mycotoxins** and toxic metabolites in food are an ever-present danger that could result in serious poisoning or death to humans and animals. Therefore, many countries require regular and reliable analytical testing with HPLC



or LC-MS. The ICP and AAS analysis for inorganic contaminants and **trace elements** is necessary because toxic elements like heavy metals from soil, water, and air can be transferred to living organisms via the food chain.

Titration is another analytical method that is widely used in the food industry.

**Water content** or moisture is one of the most frequently tested parameters using Karl Fischer titration (KFT). The Kjeldahl titration is used to determine the **protein content** of products, such as milk, by measuring the nitrogen content. Titration

can also be used to determine **chloride, vitamins, acid** amount or **peroxide** values to ensure quality, shelf life, taste, and batch-to-batch consistency.

Honeywell Research Chemicals offers high purity and reliable solvents, reagents, and standards that can help protect health and lives. They provide the needed specifications for analytical testing in the food and beverage industry and fulfill quality and regulatory requirements.

[Explore the Honeywell Research Chemicals Portfolio](#)

	HPLC, LC-MS, UHPLC	GC, GS-MS	GC headspace	IC	ICP-MS, ICP-OES, AAS	KFT	Titration
Non-volatile Organics and POPs	●	●					
Food Adulteration	●	●		●			
Fats and Oils	●	●					
Mycotoxins	●						
VOCs and Residual Solvents		●	●				
Inorganics and Trace Elements				●	●		
Water Content						●	
Nitrogen, Vitamin, Peroxide, Acid, Chloride							●

# HONEYWELL RESEARCH CHEMICALS PORTFOLIO OVERVIEW TABLE

		HPLC	LC-MS	UHPLC	TLC	CE/HPCE	IC	GC	GC HEADSPACE	KFT	TITRATION	OLIGO SYNTHESIS	CHEMICAL SYNTHESIS	SEMICONDUCTOR	ICP	AAS	PH	SPECTROSCOPY	WET CHEMISTRY	SAMPLE PREPARATION	CFR TEST ENGINE	
Acids and Bases	Acids and Bases																					
Biosynthesis	Activator Reagents																					
	Capping Reagents																					
	Deblock Reagents																					
	Oxidation Reagents																					
	Low Water Solvents																					
Buffers	Buffer Salts																					
	pH Buffer Solutions																					
Certified Reference Materials*	CRM 's																					
Eluents and Additives	Eluents and Additives																					
Products for Karl Fischer Titration (KFT)	Volumetry Reagents																					
	Coulometry Reagents																					
	NextGen Reagents																					
	Water Standards																					
	Auxiliaries																					
	Labware																					
Metals and Elements	Metals and Elements																					
Prepared Solutions	Prepared Solutions																					
Primary Reference Fuels **	Primary Reference Fuels																					
Reagents	Reagents																					
Reference materials	Environmental																					
	Food and Cosmetics																					
	Pesticide and Metabolite																					
	Petrochemical																					
	Pharmaceutical and Veterinary																					
	Water Standard																					
Salts	Salts																					
Solvents	Solvents																					
	Solvent Labware																					
Titration	Complexometric Titration																					
	Indicators																					
	Volumetric Solutions																					

Product availability may vary from country to country. Please go to [lab.honeywell.com](http://lab.honeywell.com) for an overview of the products available in your country or check with your local distributor.

\* Only available in Europe, \*\* Only available in North and Latin America



# ABOUT US

The history of Honeywell Research Chemicals dates back more than 200 years to when Chemist Johann Daniel Riedel started production of pharmaceuticals in Berlin, and to when high-purity solvent manufacturing began in Muskegon, Michigan, more than 50 years ago.

Today, Riedel-de Haën™, Fluka™, Hydranal™, Chromasolv™, TraceSELECT™, Burdick & Jackson™ and many other world-leading brands are part of the Honeywell Research Chemicals portfolio, providing researchers with a choice of consistent, high-quality chemical and analytical reagents designed to improve productivity.

The Research Chemicals business is headquartered in Morris Plains, New Jersey, with world-class manufacturing locations in Seelze, Germany, and Muskegon, Michigan. It manufactures high-purity solvents and reagents for laboratory research and testing applications.



# OUR BRANDS

As part of our efforts to provide an ever-growing and innovative portfolio, we are pleased to introduce a broad offering of premium solvents and analytical reagents commonly used in chemistry and analytical workflows.

## Honeywell Riedel-de Haën™

### SOLVENTS

High-purity solvents for dedicated applications

## Honeywell Burdick & Jackson™

### SOLVENTS

High-purity solvents for multi-purpose and dedicated applications

## Honeywell Fluka™

### ANALYTICAL REAGENTS

Karl Fischer titration (KFT), standards, acids, bases, salts, and pH buffers

## Honeywell

### PERFORMANCE GRADE

Solvents and inorganics for general laboratory use

### Product lines

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**Chromasolv™** – Chromatography techniques including LC-MS, UHPLC, Headspace, and GC

**Spectroscopy Solvents** – IR and UV-Vis applications

**ACS and Pharmacopoeia Grade** – Industrial and pharmaceutical analytical applications

**TraceSELECT™ Solvents** – Trace and low-metal content analysis

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**B&J Brand™** – Multi-purpose solvents for demanding analytical applications

**B&J GC<sup>2</sup>™** – Capillary gas chromatography applications requiring trace analysis at or below the part-per-billion level

**B&J BioSyn™** – DNA, RNA and peptide synthesis

**Anhydrous** – Moisture-sensitive organic synthesis, organometallic, combinatorial chemistry, and related applications

**B&J Purified Plus™** – Specialty organic synthesis, prep-LC, and other industrial and pharmaceutical applications requiring higher levels of lot-to-lot consistency

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### Analytical Inorganics

**Standard Solutions** – Buffers and concentrated solutions

**Hydranal™** – Karl Fischer titration (KFT) for measuring water content

**TraceSELECT™ Inorganics** – Trace and low-metal content analysis

**Standards and Certified Reference Materials** – Chromatography and spectroscopy

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**Solvents** – ACS- specific use (HPLC), ACS general use, solvents for histology, and reagent- grade solvents for chemical synthesis and other industrial applications

**Inorganics** – Chemical synthesis and inorganic chemistry, including essential acids and bases, salts, metals and elements, and reagents for chemical reactions

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Product lines may vary by country.

# OUR SERVICES

The growth of Honeywell's brands and recognized product portfolio is matched by significant expansion of our manufacturing sites, technical services, customer support, global distribution centers, and authorized distributor partners.

These new facilities, services, and partnerships enable us to support customers in more ways than ever, offering a host of custom solutions, expert customer assistance, worldwide centers of excellence, advanced manufacturing capabilities, and a global supply chain and distribution partnership.

## CUSTOM SOLUTIONS

### Special Packaging and Returnable Containers

Honeywell Research Chemicals solvents and inorganics are available in traditional packaging as well as a variety of specialized or custom packs, suitable for lab scale through to production applications. Our returnable container program helps improve lab safety and increase storage space. The program can also be tailored to your current laboratory processes.

### Custom Blends

Need a bespoke solvent blend? We produce customized blends using our own proprietary, closed loop blending technology. These pre-prepared blends help you to:

- Save time
- Reduce waste
- Improve consistency
- Enhance safety

### Bulk Orders

We have the technology, capacity, and processes to scale up and meet your needs for larger quantities of a specific product. We can help reduce your costs and waste, and improve your production processes, by supplying specific or high-volume quantities as required.

## CUSTOMER SERVICE

### Responsive and Helpful Support

Honeywell Research Chemicals takes great pride in its customer and product support. Our Global Customer Care teams are trained to be responsive and helpful. Multilingual advisors can help you place an order online, track the status of a delivery, or provide a quick and courteous response to your questions.

## GLOBAL FOOTPRINT

In addition to an extensive distribution network, we have invested in seven warehousing and fulfillment centers across Europe, the Americas, and Asia to enable uninterrupted access to our products and services worldwide. We provide unparalleled global support on Karl Fischer titration (KFT) through the Hydranal Center of Excellence and Application Labs in Germany and China. Our team of experts conducts regular seminars, webinars and workshops in partnership with leading equipment manufacturers and distributors across the globe.





## MANUFACTURING SITES

### Consistent Quality Production

Honeywell Research Chemicals produces the vast majority of its own products in advanced manufacturing facilities in Seelze, Germany, and Muskegon, Michigan, USA. Both sites are specially equipped to produce consistent, high-purity products that meet the standards you demand.



### SEELZE, GERMANY

#### Overview:

- Site covers more than 485,000 m<sup>2</sup>
- Operates according to the highest standards (TS 16949, ISO 9001, ISO 14001)
- OSHA 18001 and ISO 50001 accredited

#### Capabilities and Personnel:

- Fully equipped R&D and analytical QC departments
- High-purity hydrogen fluoride production
- Organic and inorganic bulk production of fine chemicals for the pharmaceutical and agricultural industries
- Wastewater treatment

#### Strengths:

- Distillation units from lab scale (2 L) up to 6000 L
- Fully automatic filling line under laminar flow box to ensure quality
- All high-purity grades filtered at the point of filling
- High-quality packaging technology
- Exceptional lot-to-lot consistency

### MUSKEGON, MICHIGAN, USA

#### Overview:

- Site covers more than 34,000 m<sup>2</sup>
- ISO 9001 certified

#### Capabilities and Personnel:

- Fully equipped, in-house analytical department
- On-site chemists for R&D and technical support

#### Strengths:

- Fast-cycle custom products
- Fleet assembly methodology
- Six Sigma and lean manufacturing
- Integrated operations, HSE, supply chain, technology, procurement, and commercial teams
- Excellent safety and environmental record
- Excellent lot-to-lot consistency

## GLOSSARY

ACS	American Chemical Society	IP	Institute of Petroleum
AIDS	Acquired immunodeficiency syndrome	IR	Infrared
API 's	Active pharmaceutical ingredients	ISO	International Organization for Standardization
ASTM	American Society for Testing and Materials	KFT	Karl Fischer titration
CFR engine	Cooperative fuel research engine	LC	Liquid chromatography
CRM 's	Certified reference materials	LPG	Liquefied petroleum gas
DNA	Deoxyribonucleic acid	ON	Octane number
GC	Gas chromatography	PAHs	Polycyclic aromatic hydrocarbons
GC-FID	Gas chromatography with flame ionization detection	PCBs	Polychlorinated biphenyls
HIV	Human immunodeficiency virus	PCR	Polymerase chain reaction
HPLC	High-performance liquid chromatography	PFAS	Per- and polyfluoroalkyl substances
HPLC	High-pressure liquid chromatography	POP	Persistent organic pollutants
IC	Ion chromatography	ppb	Parts per billion
ICH	International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use	ppm	Parts per million
ICP-AES	Inductively coupled plasma with atomic emission spectroscopy	ppt	Parts per trillion
ICP-MS	Inductively coupled plasma with mass spectrometry detection	QA	Quality assurance
ICP-OES	Inductively coupled plasma with optical emission spectroscopy detection	QC	Quality control
		RNA	Ribonucleic acid
		RT-PCR	Reverse transcription PCR
		TLC	Thin layer chromatography
		UHPLC	Ultra high performance liquid chromatography
		UV Vis	Ultraviolet-visible
		VOC	Volatile organic compounds

## **AMERICAS**

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