

# HYDRAZINE AND DERIVATIVES

ENHANCE YOUR ACTIVITY WITH HYDRAZINE & DERIVATIVES CHEMISTRY



# Hydrazine chemistry

**Make the difference, choose a leader**

**Number 1 in Europe**

Hydrazine hydrate:  
**leader on the free market**

**A worldwide presence**

Derivatives:  
**Competitive position**

**Clean processes**  
**know-how in process technology**

Upstream integration  
ISO 9001 and 14001

**Innovation**

Arkema is manufacturing hydrazine hydrate at the Lannemezan plant (France) and plays a significant role on the worldwide market. Today, we are leader on the free market for hydrazine hydrate and we own a worldwide competitive position for derivatives. Always focused on mastering risk, protecting the environment and providing our customers requirements, we have developed exclusive clean processes that enable us to match these targets. We also benefit from our upstream integration, giving our customers guaranty on their product availability.

Our research centres, taking advantage of a dedicated process and pilot team, enables us to focus on new products for future challenges and accompany our customers developments.

## From industrial to **everyday life products**

Hydrazine hydrate and its derivatives play a significant role in various applications contributing to ensure comfort, safety and healthcare in our everyday life:

- water treatment: oxygen scavenger, protection of boiler circuits, synthesis of flocculants and coagulants;
- agrochemicals: phytosanitary synthesis intermediates;
- pharmaceuticals: bioactive synthesis intermediates;
- polymerisation and blowing agents: acrylics, PE, PVC, EVA, rubber, etc.;
- processes and chemical applications: synthesis intermediates, treatment processes, precious metal purification.



## At the cutting edge of **safety and technology**

We commit to provide the highest quality products and services to our customers and have developed consequently powerful and proven tools for the responsible management of hydrazine hydrate and its derivatives.

A full range of dedicated packaging (rail, truck, Iso tanks, IBCs, big bags, drums) has been especially designed to ensure safe handling, product integrity.

We also provide our customers all the necessary support through specific technical brochures, Cd-rom or direct contact whenever storage, packaging, transport and products answers are needed.

**High purity** products

Full **packaging** range

Total life cycle control

**Technical support**

**Product stewardship**



## A complete and dedicated range of products

### Hydrazine hydrate N<sub>2</sub>H<sub>4</sub>, H<sub>2</sub>O

	CAS	Application
Hydrazine hydrate 24-35-55%	302-01-2	Mainly for water and effluent treatments
Hydrazine hydrate 60-80-85-100%	302-01-2	Mainly for synthesis and derivatives manufacturing
Liozan®	302-01-2	Activated hydrazine hydrate for boiler water treatment

### Hydrazine derivatives

#### ■ Hydrazine salts

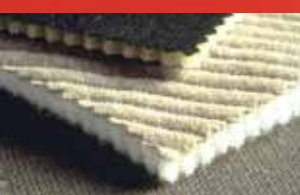
Dihydrazine sulphate 55%	13464-80-7	Synthesis intermediate, de-NO <sub>x</sub>
Hydrazine hydrochloride 35%	2644-70-4	Synthesis intermediate, Oil-well treatment
Acetylhydrazide	1068-57-1	Synthesis intermediate

#### ■ Triazoles

1,2,4-Triazole	288-88-0	Synthesis intermediate for phytosanitary and pharmaceutical products
Sodium salt of 1,2,4-triazole	41253-21-8	Synthesis intermediate for phytosanitary and pharmaceutical products
3-Amino-1,2,4-triazole	61-82-5	Defoliation herbicide for vineyards and orchards
4-Amino-1,2,4-triazole	584-13-4	Synthesis intermediate for pharmaceutical products
Aminoguanidine bicarbonate (AGBC)	2582-30-1	Synthesis intermediate

#### ■ Azoics

Azobis isobutyronitrile (AZDN)	78-67-1	Acrylic and vinyl polymerisation initiator, halogenations, low temperature blowing agent
Azobis isovaleronitrile (AIVN)	13472-08-7	Acrylic and vinyl polymerisation initiator, halogenations
Azodicarbonamide (Azobul®)	123-77-3	Blowing agent



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Clean process

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# Enhance your polymers / resins

## Give the best to your processes

Through its 3 business segments and access to wide field experience, Arkema has strong positions in the polymer industry (Acrylics, PVC, technical polymers, additives, organic peroxides, etc.). Consequently a strong expertise of what is needed to get optimal performance in the polymers / resins applications has been developed.

Our internal applicative synergies have enabled us to design a comprehensive and tailor-made product range from hydrazine hydrate and derivatives adapted to the requirements in this field:

- azoics initiators (AZDN, AIVN);
- chain extension and cross-linking (Hydrazine hydrate, hydrazides, etc.);
- blowing agents (AZDN, Azobul®).

## Key success factors

Product	Some Benefits	Area of performance
<b>Azoic initiators</b>	Low energy radicals, increased polymerisation control (linear polymers, narrow distribution, high molecular weight, no cross-linking, less branching)	Flocculants, acrylic fibres, PMMA
	Less sensitivity to contaminant, non oxidative by-products, (less ageing of polymers, stability of pigmented or dyed polymer systems, no eye-fishing guarantying transparency)	Coatings, acrylic fibres PMMA, ASA
	Rapid and adequate grafting, no poisoning by-product for polycondensation	Grafting of SAN on PU or acrylic rubber
	Low temperature blowing agent Homogeneity of foam	Pressure blown PVC and silicone rubber
<b>Hydrazine Hydrazides</b>	Effective reactivity for chain extension or cross-linking	Urethane, rubber
<b>Azobul®</b>	Rapid decomposition in process temperature range Homogeneity of foam	PE, PVC, EVA, SBR, NBR

## Our added value

We have developed products with tailor-made specifications according to customers' requirements:

- low metal and chloride content hydrazine and azoics for applications demanding high levels of purity or transparency;
- free-flowing and/or dust free azoics for improved processibility and safer handling;
- azoic adapted granulometry for PVC foam homogeneity;
- a special new azoic free from TMSN decomposition;
- safe packaging for Hydrazine hydrate (IBCs, Safety Transfer System, dry linked systems);
- Azobul® granulometry and specific surface adapted to end application, etc.

## Our fingerprint on the market

Key players in the following businesses are confiding in Arkema's Hydrazine and derivatives: Wall-papers, gaskets, cables, sport footwear, tubing, wind turbine blades, isolation panels, flotation devices, seats foams, varnishes, paints, coatings, water treatment, synthetic glass, textile fabrics, etc.

High purity  
Efficiency  
Workability  
Safety

Enhance your polymers / resins





# Enhance your active ingredients synthesis

## Give the best to your processes

Arkema manufactures and markets synthesis intermediates with world-renowned purity and quality. Essential for the production of thousands of medicines and agrochemicals, these products act as building blocks (hydrazine hydrate and triazoles), reducing agents (hydrazine hydrate) and catalysts (azoics). At the cutting edge of safety and technology, these products offer optimum performance:

- top purity;
- top selectivity;
- top productivity.

Our ambition: to combine the quality of medicines / phytosanitary products with economic development, in full safety and in accordance with environmental protection.

## Key success factors

Area	Key Properties	Benefits
Agrochemicals	Building blocks for active ingredient (triazoles, hydrazine) Halogenations (azoics)	Purity, selectivity, productivity
Pharmaceuticals	Building blocks for API	Purity, selectivity, productivity
Synthesis	Building blocks Reducing agent Radical generation	Purity, selectivity, productivity

## Our added value

We have developed products with tailor-made specifications according to customers' requirements:

- ultra-pure hydrazine hydrate and top derivatives quality;
- safe packaging for hydrazine hydrate (IBCs, Safety Transfer System, dry linked systems) and triazoles (antistatic big bags, etc.);
- ISO certifications: quality management at every level;
- quality, control;
- integrity of the product.

## Our fingerprint on the market

Arkema is the partner of the worldwide leaders in the agrochemicals and pharmaceutical businesses.

**Agrochemicals:** Herbicides, fungicides, insecticides, growth regulators, systemic products.

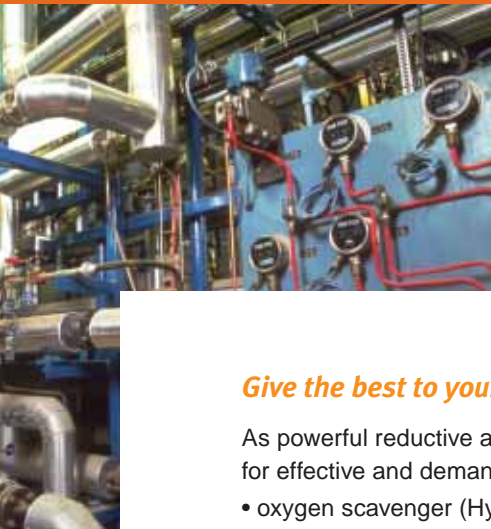
**Pharmaceuticals:** Anti-cancer, antidepressants, anti-fungus, diuretics, anxiolytic, anti-arrhythmic, anti-allergic, anti-Parkinson, anti-hemorrhagic, anti-tuberculosis, antiviral, anti-migraine.

High purity  
Efficiency  
Control  
Workability  
Safety

Enhance your active ingredients synthesis







## Enhance your treatment processes

### Give the best to your processes

As powerful reductive agents, hydrazine hydrate and its salts are designed for effective and demanding processes in the following areas:

- oxygen scavenger (Hydrazine hydrate, Liozan®) for boiler water treatment;
- reductive agent (Hydrazine hydrate and salts) for effluent treatment and purification processes.

### Key success factors

Area	Key Properties	Benefits
<b>Boiler water treatment</b>	Removal of water dissolved oxygen Passivation of inner boiler system Very low impurity levels	Less corrosion Longer equipment life cycle Operating reliability Maintenance cost reduction Energy savings
<b>Refining / purification</b>	Precious ores recovery, purification of noble metals (gold, silver, platinum, nickel)	Quicker recovery Higher purity of metals High degree of reactivity
<b>Waste water and Effluent treatment</b>	Removal of contaminants (Cl <sub>2</sub> , Br <sub>2</sub> , NO <sub>x</sub> , heavy metals) from gaseous and aqueous streams	Operating reliability High degree of reactivity Selectivity Productivity

### Our added value

We have developed products with tailor-made specifications according to customers' requirements:

- ultra-pure hydrazine hydrate as a guarantee for the lowest water conductivity ever;
- ultra-pure hydrazine hydrate as a guarantee for higher precious metal quality;
- safe packaging for hydrazine hydrate (IBCs, Safety Transfer System, dry linked systems);
- support in product stewardship.

### Our fingerprint on the market

Arkema is the preferred supplier of hydrazine hydrate for:

- the leading European energy companies (nuclear and thermal power plants);
- key water treatment companies;
- key industrial customers (chemistry, paper-mills, etc.).

## Contacts

Arkema offers its customers all the necessary support:

A worldwide sales network and a central department  
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A global chemical player, Arkema consists of 3 coherent and balanced business segments: Vinyl Products, Industrial Chemicals and Performance Products. Present in over 40 countries with 18,600 employees, Arkema achieves sales of 5.2 billion euros. With its 6 research centres in France, the United States and Japan, and internationally recognized brands, Arkema holds leadership positions in its principal markets.

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