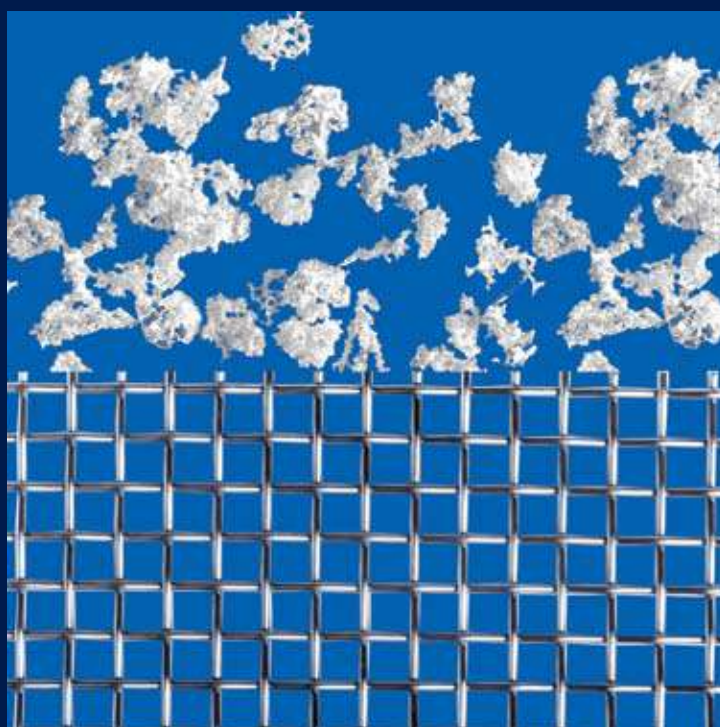




HAYER STANDARD

INDIA PRIVATE LIMITED

(In joint venture with Haver & Boecker, Germany)



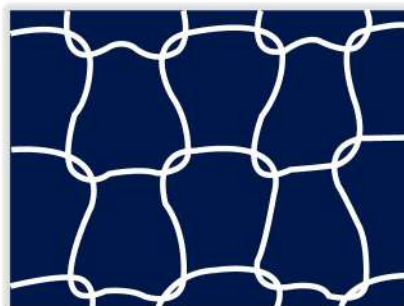
Silver Catalyst

Catalyst

One of the great discoveries of chemistry was that the efficiency of chemical reactions can be significantly increased in the presence of other elements or compounds that do not enter into the reaction, which was later termed as a **catalyst**.

A hundred years ago, it was discovered that silver was one of those elements and ever since, silver has been essential to the production of chemicals.

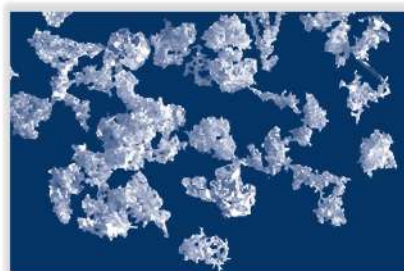
Catalyst: A chemical substance that increases the rate of a reaction without being consumed; after the reaction it can potentially be recovered from the reaction mixture chemically unchanged. The catalyst lowers the activation energy required, allowing the reaction to proceed more quickly or at a lower temperature. In the case of Formaldehyde, the Silver Catalyst facilitates the oxidation reaction.



Silver Knitted Mesh

HAST Expertise

Haver Standard India Pvt. Ltd. (also known as HAST) has been a well-renowned producer of silver granular catalysts for more than 20 years. These catalysts are commonly used to produce Formaldehyde (CH_2O), a chemical compound used for glue, varnish, plastic, preservative, and as a disinfectant. Orders are carried out safely and quickly. Our silver products are being exported throughout the world for a number of applications. We have a number of clients in India, who have observed our dealings through the years, which has resulted in them becoming our very faithful customers. HAST has a long experience of refining silver and this knowledge provides us with silver, to a purity of an outstanding 99.95%+. This purity assures that our catalyst is of highest conceivable quality and thus presents a unique opportunity for your business. After the refining and granules production, the catalyst is sieved into a wide spectrum of fractions and delivered to our customers. We also provide woven and knitted silver gauzes, specifically suited to meet your demands and needs.



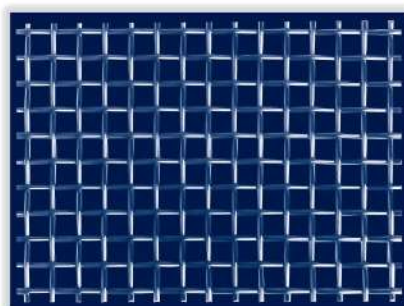
Granules

As a service, we give you the opportunity to sell back your used catalyst at advantageous prices. We also offer full chemical analyses on your used and new catalyst so that you can evaluate your production accordingly.

Properties of Silver

Silver (Ag) is a precious metal which has always been much sought after due to its special chemical properties.

- Melting Point : 962°C
- Chemical Symbol : Ag
- Electronic Structure : Kr 4d10 5s1
- Atomic Number : 47
- Specific Electrical Resistivity : 1.60 $\mu\Omega$.cm
- Atomic Weight : 108
- Thermal Conductivity : 429 m-1 K-1
- Density : 10.5g/cm³
- Specific Heat at 25°C : 237 J K-1 Kg-1
- Linear Expansion Coefficient : 19.1x10⁻⁶ K-1
- Boiling Point : 2212°C
- Crystal Structure : FCC



Silver Wire Mesh

Procedure for Recovery and Refining of Silver Granules

The procedures followed at our operations for silver granules are:

- Melting of used catalyst
- Refining of used catalyst
- Production of new catalyst
- Sieving into fractions
- Chemical analysis with certificate of new and used catalyst
- Research and Development on how to alter critical parameters pertaining to greater fields for our customers. Continuous development is the principle.

Our manufacturing scope:

Silver Wire Mesh

Wire Dia. (mm)	Mesh
0.23	20, 30, 40, 50
0.35	18, 20
0.45	16, 18, 20

Silver Granules

Size		Bulk Density
mm	Mesh	(gm/sq.mm)
2 - 1.4	8 - 12	1.5 - 1.7
1.4 - 1	12 - 16	1.7 - 1.9
1 - 0.5	16 - 24	1.9 - 2.3
0.5 - 0.312	24 - 30	2.3 - 2.4
0.312 - 0.125	30 - 40	2.4 - 2.8
0.125 - 0.0234	40 - 60	2.8 - 3.2

At the forefront of all our activities is refining. At Haver Standard India Pvt. Ltd., we have state-of-the-art and sophisticated precious metal refining facilities. We handle silver scrap and spent catalysts, to provide pure silver at the end of our process. Each consignment received goes through an extensive process of batching, melting, sampling, and assaying.

We constantly strive to maximize recovery of precious metal from the scrap received. We can physically return the recovered metal in any form to suit an individual's requirement. In keeping with international standards, we refine and return the metal with a minimum guarantee of 99.95% and can also refine upto 99.99% purity based on the customers' necessities.

It is our constant endeavour to provide need-based solutions, which go beyond the use of standard silver catalysts, which are essential in optimizing individual catalytic reactions.

Applications of Silver Catalysts

• Manufacture of Acetaldehyde from Ethyl Alcohol

Acetaldehyde (ethanol, $\text{CH}_3\text{CH}=\text{o}$, Melting point: 123.5°C , Boiling point: 20.1°C , Flash point: -38°C , Ignition temperature: 165°C) is a colourless, odourous liquid.

Acetaldehyde has a pungent, suffocating odour which is somewhat fruity and quite pleasant in dilute concentration.

Acetaldehyde is miscible in all proportions with water and most common organic solvents, e.g., acetone, benzene, ethyl alcohol, ether, gasoline, toluene, xylenes, turpentine, and acetic acid.

Commercially, passing alcohol vapours and preheated air over a silver catalyst at 480°C carries out the oxidation. With a multitubular reactor, conversions of 74 to 82 percent per pass can be obtained while generating steam to be used elsewhere in the process.

• Manufacture of Formaldehyde from Methyl Alcohol

Since 1908, it has been known that silver greatly increases the efficiency of production of formaldehyde from methyl (wood) alcohol. Here silver catalyses the oxidation of an alcohol into an aldehyde called formaldehyde, which is one of the most important industrial and research chemicals. It is an essential block for a class of plastics with an estimated world production exceeding 15 million tonnes per year, which includes adhesives, laminating resins for construction, plywood and particle boards, finishes for paper and electronic equipment, surface coatings that resist heat and scratches, casings for appliances, packaging materials, automotive parts, thermal and electrical insulating materials, toys, and the list goes on.

Catalyst Characteristics

To sum up the course of events, our catalysts are characterized by:

- High chemical purity
- High specific surface area
- Low bulk density, which would reduce consumption of catalyst
- Wide spectra of fractions providing the customer with an optimal catalyst bed

The afore mentioned would be very helpful in providing:

- Optimal pressure drop
- High yield
- Long-lasting catalyst bed
- Simple and safe handling

Management of Precious Metals

Due to certain losses during the process, make-up metals are required to be added to manufacture the product. These metals can either be provided physically or can be added to the customers' metal pool. Haver Standard India Pvt. Ltd. maintains metal pools for customers with open orders, with metal account statements being forwarded monthly.

In addition to supplying such make-up metals, HAST also provides the customer the options to buy and sell precious metals that are traded in the international markets on a daily basis.



HAYER STANDARD

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HAYER STANDARD INDIA PVT. LTD., called "HAST", is one of the leading manufacturers of Woven Wire Cloth and Wire Products in India.

HAST was established in 1988 as a joint venture between two companies, one being HAYER & BOECKER, Germany and the other being Standard Wire Group (Wire Weaving and Engineering Works), Mumbai, India. The former has been in the wire weaving business since 1887 and the latter a group of Standard Wire Products since 1958.

With decades of experience and the right weaving loom for each specification, HAYER & BOECKER and Standard Wire guarantee the most suitable Woven Wire Cloth for every demand. Meticulous handling of production processes, with special attention to quality control measures, makes our products popular. This is indeed a vital factor in our creditable performance.

Regd. Off.: Standard House, 83, Maharshi Karve Marg, P. O. Box 2082, Mumbai 400 002.

T: +91 22 2206 0031 / 16 F: + 91 22 2208 6915 E: wiremesh@haverstandard.com W: www.haverstandard.com