Hydrogenators from 50ml to 50,000 litres

Our Product Range
- Lab Autoclaves/Lab Hydrogenators
- Hydrogenators/Pilot Plants
- Agitators
- Non Stirred Pressure Vessels
- Glass - PEEK Autoclaves
- Catalyst Filters
- Mini Magnetic Couplings

Quality | Safety | Performance
About Us

Founded by a group of qualified and experienced personnel to meet the needs of the specialized equipment by fast growing chemical, pharmaceutical, dye chemical, pesticide & perfumery industry.

With a rich experience in the area of Gas-Liquid Reactions, Catalyst Separation and Magnetic Drive arrangement we have perfected the technology to meet stringent process requirements and enhance product economy. We also specialise in fabrication of equipment made of exotic metals such as Zirconium, Monel, Inconel, Hastelloy etc.

With a customer centric approach, innovative technology and an experienced production team backed by a modern production facility, we strive to provide unique solutions at an affordable cost. Our equipment are designed & manufactured to enhance customer’s profitability by achieving high productivity and lowest maintenance cost.

Certifications

- An ISO 9001:2008 certified company
- CE marked Reactors/Hydrogenators/Filter/Magdrives offered as per European Pressure Equipment Directive
- Specialised projects executed with ATEX certification
- All our Autoclaves/Hydrogenators are designed as per ASME section VIII Div 1
- Third party inspection/certification by TUV, Bureau Veritas, Lloyds etc. offered on request
Letters of Appreciation

ACM Incorporated

Date: 20.03.2013

To whom it may concern,

This is to certify that ACM Incorporated is very much pleased with the performance of your Nano-Mag Technologies Ltd. High Pressure Hybridization Reactors, model number 1040001-12A, which were delivered to us on 15th March, 2013.

We are all the more pleased that the quality of your product meets the expectations we had.

We would like to commended your service team for their quick response and support.

Thank you.

Best Regards,

[Signature]

To Whom It May Concern

Date: 19.03.2013

We have received the following orders from you:

- 1040001-12A High Pressure Hybridization Reactor
- 1040002-12A High Pressure Hybridization Reactor
- 1040003-12A High Pressure Hybridization Reactor

These orders were received on 15th March, 2013 and were delivered on time.

We are pleased with the quality of your product and the service provided.

Thank you for your prompt delivery.

Best Regards,

[Signature]
High Mass Transfer Area Lab Autoclaves

Nano-Mag make High Mass Transfer Area Autoclaves are robustly built reaction vessels having magnetically coupled, seal-less agitator. These Autoclaves are provided with PID controlled electrical heating & cooling arrangements. Flameproof or Non-flameproof control panels indicate pressure, temperature, agitator speed etc, with very high degree of accuracy. Also, these panels are fitted with alarms of high pressure & high temperature set points.

Safety accessories such as Rupture Disc & Safety Relief Valves provide safety while operating the equipment at very high pressures. Pressure Gauge, Sampling Valve, Gas Inlet Valve, Vent Valve etc. are provided as standard accessories of the Autoclave.

What is High Mass Transfer Area Autoclave?

Our Autoclaves are fitted with special Agitator which generates very high gas-liquid mass transfer area by recirculation of head space gases.

Nano-Mag make High Mass Transfer Area Lab Autoclaves have following advantages over Conventional Lab Autoclaves presently manufactured in India.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Nano-Mag High Mass Transfer Area Autoclave</th>
<th>Conventional Lab Autoclaves Manufactured In India</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Designed especially for Hydrogenation &amp; other high pressure gas-liquid reactions.</td>
<td>Designed only for stirring liquid mass.</td>
</tr>
<tr>
<td>2</td>
<td>Very high gas-liquid mass transfer area resulting in faster batch time with optimum catalyst usage.</td>
<td>Poor mass transfer area means sluggish rate of reaction despite higher catalyst loading. Longer batch time leads to many unwanted side reactions. Lab results cannot be correlated to plant scale operations.</td>
</tr>
<tr>
<td>3</td>
<td>Various L/D ratios for variety of reactions, applications to match exact customer requirement.</td>
<td>Vessel L/D is standard irrespective of application, reaction requirements.</td>
</tr>
<tr>
<td>4</td>
<td>Very high heat transfer co-efficient. Faster removal of exotherm. Maintaining precise operating temperature is easier despite higher rate of reaction.</td>
<td>Very poor heat transfer.</td>
</tr>
<tr>
<td>5</td>
<td>Improves product profitability by minimizing batch time &amp; catalyst loading.</td>
<td>Longer batch times, higher impurities and high catalyst loading increase the manufacturing/R&amp;D cost.</td>
</tr>
</tbody>
</table>
AUTOCLAVE SALIENT FEATURES

- Sizes from – 50 ml to 100 litre
- Material of construction – SS316, SS316L, Hastelloy C, Zirconium, Inconel, Monel etc.
- Standard design pressure upto 100 bar & design temperature upto 250°C
- Maximum design pressure upto 350 bar & temperature upto 600°C
- Accessories – Flameproof Control Panel, Auto cooling system, Digital Pressure Indicator, Safety Relief Valve, Flameproof IIC Motor, SS Ball Valve with funnel for solid/liquid inlet, Reflux condenser, Chain pulley arrangement, SCADA software with data logging facility etc.
- Skid mounted Hydrogenation pilot plant.

NANO-MAG AUTOCLAVE ADVANTAGES

- High mass transfer area
- Faster reaction
- Shorter batch time
- Lesser catalyst loading
- Minimum impurities
- High yields
- Better product economy

AUTOCLAVE APPLICATIONS

For various high pressure reactions and gas-liquid reactions with

- Hydrogen
- Ethylene Oxide
- Ammonia
- Oxygen
- HCL
- Phosgene
- Co2
- CO

- In R&D labs of fine & speciality chemicals, bulk drug manufacturers, agrochemicals, petrochemicals companies and chemical/chemistry departments of educational institutes/universities etc.
# Design Data

## STANDARD AUTOCLAVE MODELS

<table>
<thead>
<tr>
<th>Autoclave Model</th>
<th>Maximum Operating Capacity</th>
<th>Minimum Operating Capacity</th>
<th>L/D Ratio</th>
<th>Motor Rating</th>
<th>Standard Design Pressure</th>
<th>Standard Design Temperature</th>
<th>Optional Design Pressure</th>
<th>Optional Design Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 ml</td>
<td>50 ml</td>
<td>25 ml</td>
<td>1.4</td>
<td>0.25 HP</td>
<td>100 kg/cm²g</td>
<td>250°C</td>
<td>Available up to 350 kg/cm²g</td>
<td>Available up to 600 deg C</td>
</tr>
<tr>
<td>400 ml</td>
<td>200 ml</td>
<td>80 ml</td>
<td>1</td>
<td>0.25 HP</td>
<td>100 kg/cm²g</td>
<td>250°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>750 ml</td>
<td>400 ml</td>
<td>80 ml</td>
<td>1.39</td>
<td>0.25 HP</td>
<td>100 kg/cm²g</td>
<td>250°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Litre</td>
<td>600 ml</td>
<td>80 ml</td>
<td>1.94</td>
<td>0.25 HP</td>
<td>100 kg/cm²g</td>
<td>250°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Litre</td>
<td>1200 ml</td>
<td>150 ml</td>
<td>1.96</td>
<td>0.25 HP</td>
<td>100 kg/cm²g</td>
<td>250°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Litre</td>
<td>3.5 Litre</td>
<td>500 ml</td>
<td>1.54</td>
<td>0.25 HP</td>
<td>100 kg/cm²g</td>
<td>250°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Litre</td>
<td>7 Litre</td>
<td>1 Litre</td>
<td>1.3</td>
<td>0.50 HP</td>
<td>100 kg/cm²g</td>
<td>250°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 Litre</td>
<td>15 Litre</td>
<td>2 Litre</td>
<td>1.36</td>
<td>0.50 HP</td>
<td>100 kg/cm²g</td>
<td>250°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 Litre</td>
<td>18 Litre</td>
<td>2 Litre</td>
<td>1.59</td>
<td>0.50 HP</td>
<td>100 kg/cm²g</td>
<td>250°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 Litre</td>
<td>36 Litre</td>
<td>4.5 Litre</td>
<td>1.78</td>
<td>1.00 HP</td>
<td>50 kg/cm²g</td>
<td>250°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 Litre</td>
<td>70 Litre</td>
<td>8.5 Litre</td>
<td>1.63</td>
<td>1.50 HP</td>
<td>50 kg/cm²g</td>
<td>250°C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Typical 2 Litre High Pressure Lab Autoclave

**NOZZLE SCHEDULE**

<table>
<thead>
<tr>
<th>NOZZLE NO.</th>
<th>SIZE</th>
<th>SERVICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>1/4&quot; BSP</td>
<td>H2 INLET/SAMPLING</td>
</tr>
<tr>
<td>N2</td>
<td>1/4&quot; BSP</td>
<td>PRESSURE GAUGE</td>
</tr>
<tr>
<td>N3</td>
<td>1/4&quot; BSP</td>
<td>VENT/REPTURE DISC</td>
</tr>
<tr>
<td>N4</td>
<td>1/4&quot; BSP</td>
<td>SPARE</td>
</tr>
<tr>
<td>N5</td>
<td>1/4&quot; QC</td>
<td>COOLING WATER SUPPLY</td>
</tr>
<tr>
<td>N6</td>
<td>1/4&quot; QC</td>
<td>COOLING WATER RETURN</td>
</tr>
<tr>
<td>N7</td>
<td>5 ID</td>
<td>THERMORELL</td>
</tr>
</tbody>
</table>

**SS NON FLAMEPROOF PANEL**

SINGLE PHASE, 220 VAC, 50 Hz
INPUT POWER SUPPLY

**INSTALLED FEATURES**

- **1/4 HP, FLAMEPROOF GROUP II A/III, 1440 RPM, SINGLE PHASE MOTOR**
- **ZERO LEAKAGE, CONTACTLESS MAGNETIC DRIVE COUPLING**
- **NOZZLES AS PER NOZZLE SCHEDULE**
- **QUICK OPENING TYPE SPLIT CLAMP**
- **HEAD**
- **VEssel**
- **EXTERNAL CERAMIC BAND HEATER**
- **COOLING COIL**
- **MOVABLE SS TROLLEY**
- **INSULATION**
- **HOLLOW SHAFT WITH HIGH MASS TRANSFER AREA IMPELLER SUITABLE FOR HYDROGENATION & OTHER GAS-LIQUID REACTIONS AS WELL AS LIQUID-LIQUID-SLURRY REACTIONS**

**DIMENSIONS**

- **VEssel Height: 276 mm**
- **VEssel ID: 114 mm**
- **J/D = 1.97**

**COOLING WATER TANK (OPTIONAL)**

**AUTO COOLING PUMP (FITTED ON TROLLEY)**
Photo Gallery - High Pressure Lab Autoclaves

25 Litre Autoclave with Flameproof IIC Panel, Flameproof IIC Motor, Flameproof IIC Autocooling System, Chain Pulley Arrangement

1 Litre & 5 Litre Interchangeable Metal Autoclave

Multiple Autoclave System

Skid mounted Alkoxylation Pilot Plant
Photo Gallery - High Pressure Lab/Pilot Autoclaves

250 ml Table Top Autoclave

100 ml Interchangeable Glass - Metal Autoclave

5 Litre Autoclave with Hydraulic Raising/Lowering/Tilting Arrangement of Vessel

100 Litre Pilot Plant Hydrogenator
High Mass Transfer Area Reactors

Nano-Mag make High Mass Transfer Area Reactors are specially designed for various Gas-Liquid reactions. These reaction vessels are robustly built for longer life and to withstand constantly varying temperatures and pressures due to internal reaction conditions. These reactors are fitted with specially designed Agitator which creates very high gas-liquid contact area by recirculation of headspace gases, leading to superior mass transfer rates. Agitator is available with two sealing options such as Mechanical Seal & Magnetic Coupling.

SALIENT FEATURES

- Capacities from 50 ml to 50 KL
- Pressure from full vacuum to 150 bar.
- Temperature from Cryogenic to 400°C
- Material of construction – SS 316, SS 316L, Hastelloy, Inconel, Monel, Zirconium etc.
- Accessories – Flameproof control panel, Safety accessories such as Rupture Disc, Safety Relief Valve etc.
- Automatic pressure & temperature controllers, PID controlled DM water cooling systems for exotherm removal etc.
- Fully automated skid mounted Hydrogenation pilot plants up to 150 litre capacity with Group II-C electrical fittings, Auto heating/cooling system, Catch pot, Nitrogen blanketing system, Remote sampling and venting arrangement etc.
ADVANTAGES OF NANO-MAG HIGH MASS TRANSFER AREA REACTORS

- High Mass Transfer Area
- Faster reaction
- Shorter batch time
- Lesser catalyst loading
- Minimum impurities
- Higher yields
- Better product economy

APPLICATIONS

For various Gas-Liquid Reactions with following gases

- Hydrogen
- Ethylene Oxide
- Ammonia
- Oxygen
- Air
- HCl
- Phosgene
- CO2
- CO

Jacketed Reactor with Magdrive

Limpeted Reactor with Mechanical Seal
Noble Metal Catalyst Filters

Nano-Mag make Noble Metal Catalyst Filters are specially designed for filtration of various catalysts such as Palladium, Platinum, Rhodium, Ruthenium etc. These filters are fitted with state of the art Sintered metallic cartridges which are coated with metallic membrane. This membrane prevents the catalyst particles from getting penetrated in the sintered wall of the filter candle and enhances its life. These filters are fitted with a heel filter to ensure that entire liquid volume is filtered. Hence, these filters improve the production capacity by preventing product recycling.

SALIENT FEATURES

- Sintered SS 316L or other Sintered High Nickel Alloys
- Metallic Membrane coating
- Surface filtration, hence no depth filtration and choking problems
- Porosity up to absolute 0.5 microns
- Liquid recirculation not required
- No need of polishing filter.
- No atmospheric exposure
- No spillage losses
- 100% recovery of catalyst

APPLICATIONS

Filtration of following Noble Metal Catalysts

- Palladium
- Platinum
- Rhodium
- Ruthenium
Noble Metal Catalyst Filters
DO YOU HAVE DIFFICULTY IN VACUUM DISTILLATION?

DO YOU HAVE LEAKAGE PROBLEMS OF TOXIC, CORROSIVE GASES FROM YOUR FLASK?

DOES YOUR DISTILLATION PROCESS TAKE TOO LONG A TIME?

DOES YOUR MATERIAL GET CHARRED/POLYMERISED VERY OFTEN?

Mini Magnetic Coupling Will Solve All Your Above Difficulties
Mini Magnetic Couplings for Laboratory Stirrers

Nano-Mag make Mini Magnetic Couplings are designed to suit all kinds of laboratory stirring applications where maintaining full vacuum or inside pressure in the glass flask is absolutely necessary. Presently R&D professionals use a gland packed glass shaft which cannot maintain desired positive or negative pressure in the glass flask. This results in very long distillation times, charring and polymerisation of material, longer reaction times etc. Due to these limitations of the current equipment, R&D professionals always have difficulty in generating accurate data with respect to various chemical processes.

Nano-Mag make MINI MAGNETIC COUPLINGs are specially designed for laboratory glass flasks. One end of the coupling snuggly fits on the nozzle of a glass flask while the other end can be coupled to stirrer motor. A glass shaft with PTFE impeller can be fitted on the bottom side. These magnetic couplings can fit various glass nozzle types such as B-34, B-29, B-24 etc. These couplings can easily handle torques of various DC Motors to stir the mass up to 200 Litre capacity.
Some of our Esteemed Customers

[Logos of various companies]

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