PROX-SVERS SUPPORT MEDIA
Since 1952, Christy has produced PROX-SVERS inert ceramic support balls for the global ammonia and methanol industries. Our support balls range in size from 1/16” to 3” and non-standard sizes can be produced when required. Christy offers two product formulations with high alumina content for applications where the possibility of silica leaching is an issue and where higher operating temperatures exist. Our T-99 product has an alumina purity of greater than 99% and has been approved by key catalyst suppliers and technology licensors. Our T-46 high alumina ball has been the industry standard for plants worldwide and it is virtually pressure and thermal shock resistant.

Christy offers two silica-based formulations. The T-38 support ball offers the industry’s best strength and impact resistance. Our T-86 product is economical and can be used in a wide variety of less severe catalytic and adsorbents units.

CASTABLES
Christy sells castable refractory that can be selected to meet your temperature, abrasion, and corrosion needs. Castables provide an inexpensive solution for lining tunnel floors and walls, process vessels, secondary reformers, etc. Selection must be based on the specific needs of the process and the time available to install the product.

CUSTOM-CRAFTED™ HEXAGONAL TARGET TILES
Christy’s erosion resistant hexagonal target tiles are an improvement over using inert support balls to hold down fixed catalyst beds, and are available in three sizes (Standard, Jumbo, and Super Jumbo) and in thicknesses of 2” to 6”. The popular Super Jumbo tile, which minimizes the time and labor of installation, is becoming an industry standard. Their greater size and mass make them virtually immovable in the harsh environment of a secondary reformer, and provide fewer edges for potential erosion. Tiles are available in two ultra-low silica formulations, 95% and 99% alumina.

TOWER PACKING AND INTERNALS
Christy supplies a complete line of random packing in a variety of sizes and configurations. Materials of construction include metals, thermoplastics and ceramics. Some of the available types of random packing offered are cylindrical rings, Pall rings and saddles. Christy also offers a complete range of column internals including bed supports, redistributors, bed limiters, liquid distributors and mist eliminators.

FUSED ALUMINA LUMPS
99.5% fused alumina lumps are available in sizes ranging from 1” to 4”.

BURNER BLOCKS
Christy provides cast burner blocks, plugs, and pogo pins which are heavy duty and more rugged for primary reformers, or vacuum-formed blocks which are lightweight, inexpensive to thermal shock, and easier to install.

AMMONIA DOMES
Christy supplies standard Kellogg/KBR and non-standard ammonia domes, including the wooden forms needed for installation. Each dome includes complete assembly and installation instructions, and each piece is exactly marked to the layout drawing of the dome to assist in installation.

INSULATING-HIGH DENSITY FIREBRICK
Christy can supply IFB in both standard and custom sizes. These refractory bricks and shapes are also available in silica, high alumina, insulating bubble alumina, and traditional fireclay formulations.

TUNNEL TILE
In addition to the typical double tongue and groove unit for tunnel wall construction, Christy also offers a unique extruded tunnel wall block. Its wider design provides a sturdy, more stable wall than that obtained when using traditional shapes. Christy’s ceramic formulation provides improved thermal shock resistance over traditional brick and tile. Larger lightweight blocks also allow faster installation.

AMMONIA AND METHANOL Plant Process and Refractory Solutions
CHRISTY CATALYTICS pioneered spherical PROX-SVERS® inert catalyst support media for use in ammonia, petroleum refining, petrochemical, methanol, and gas processing in 1952. Today, we are one of the largest manufacturers and suppliers of engineered inert catalyst support media in the world.

But We're More Than Just a Source of Bed Support Media

As one of the oldest developers and manufacturers of catalyst support media, Christy also supplies a full range of other refractory, ceramic and insulating products. Additionally, we offer a full range of random packing and associated column internals. These are available in all standard configurations and materials of construction [metal/thermoplastic/ceramic]. Through our network of agents and distributors, we provide many of the essential components for the synthesis gas industries regardless of your location.

Christy Would Like to Be Your Plant Turnaround Partner

One-stop Shopping
Turnarounds are a busy time and we provide a wide variety of product solutions for an array of problems. One phone call can provide multiple solutions, saving you time and worry.

Reliable, High Quality Products
High on-stream time is critical. The Christy name, and the products with our label, have been renowned for their reliability in the chemical processing industries for many years.

On-time Delivery
Timing of deliveries is critical to meet tight turnaround deadlines. With our global logistics capabilities, Christy delivers on time, every time, even for emergency outages. We go the extra step to meet your needs.

Rapid Installation
Christy facilitates the installation of our products. PROX-SVERS® inert support balls, support domes, CUSTOM CRAFTED™ hexagonal tiles and tower packing and internals are all packaged and accurately labeled to accelerate installation.

Technical Support
Christy’s engineers and chemists answer all technical questions as needed, at no additional cost to you. We support what we sell!

Call Christy Catalytics at 314.773.7500 or e-mail: CATCO@christyco.com today to discuss your turnaround needs.

---

Simplified Ammonia Process

<table>
<thead>
<tr>
<th>Feed Pretreater</th>
<th>Primary Reformer</th>
<th>Secondary Reformer</th>
<th>Shift Converters</th>
<th>Condensate Stripper</th>
<th>CO. Absorber</th>
<th>CO. Stripper</th>
<th>Methanator</th>
<th>Synthesis and/or Make-Up Gas Driers</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROX-SVERS® inert support balls</td>
<td>PROX-SVERS® inert support balls</td>
<td>PROX-SVERS® inert support balls</td>
<td>Castable refractory</td>
<td>PROX-SVERS® inert support balls</td>
<td>PROX-SVERS® inert support balls</td>
<td>PROX-SVERS® inert support balls</td>
<td>PROX-SVERS® inert support balls</td>
<td>PROX-SVERS® inert support balls</td>
</tr>
<tr>
<td>Burner blocks</td>
<td>Castable refractory</td>
<td>Ceramic ferrules</td>
<td>Castable refractory</td>
<td>High-void fluted cylinders</td>
<td>High-void fluted cylinders</td>
<td>High-void fluted cylinders</td>
<td>High-void fluted cylinders</td>
<td>High-void fluted cylinders</td>
</tr>
<tr>
<td>Tunnel wall brick and block</td>
<td>CUSTOM CRAFTED™ Hexagonal Target Tiles</td>
<td>High-void fluted cylinders</td>
<td>High-void fluted cylinders</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tunnel wall cover tiles</td>
<td>Fused alumina lumps</td>
<td>High-void fluted cylinders</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulating firebrick (IFB)</td>
<td>Support domes</td>
<td>High-void fluted cylinders</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ceramic fiber modules</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Partial Methanol Process

<table>
<thead>
<tr>
<th>Methanol Reformer</th>
<th>cooler</th>
<th>CO₂ Absorber</th>
<th>CO₂ Stripper</th>
<th>Methanator</th>
<th>Synthesis and/or Make-Up Gas Driers</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROX-SVERS® inert support balls</td>
<td>PROX-SVERS® inert support balls</td>
<td>PROX-SVERS® inert support balls</td>
<td>CO₂ Product</td>
<td>PROX-SVERS® inert support balls</td>
<td>PROX-SVERS® inert support balls</td>
</tr>
<tr>
<td>Castable refractory</td>
<td>High-void fluted cylinders</td>
<td>High-void fluted cylinders</td>
<td>High-void fluted cylinders</td>
<td>High-void fluted cylinders</td>
<td>High-void fluted cylinders</td>
</tr>
<tr>
<td>Ceramic ferrules</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Our goal is to continuously improve as your customer-focused designer, producer and supplier of industrial ceramic products.
CHRISTY CATALYTICS pioneered spherical PROX-SVERS® inert catalyst support media for use in ammonia, petroleum refining, petrochemical, methanol, and gas processing in 1952. Today, we are one of the largest manufacturers and suppliers of engineered inert catalyst support media in the world.

But We’re More Than Just a Source of Bed Support Media

As one of the oldest developers and manufacturers of catalyst support media, Christy also supplies a full range of other refractory, ceramic and insulating products. Additionally, we offer a full range of random packing and associated column internals. These are available in all standard configurations and materials of construction [metal/thermoslastic/ceramic]. Through our network of agents and distributors, we provide many of the essential components for the synthesis gas industries regardless of your location.

Christy Would Like to Be Your Plant Turnaround Partner

One-stop Shopping

Turnarounds are a busy time and we provide a wide variety of product solutions for an array of problems. One phone call can provide multiple solutions, saving you time and worry.

Reliable, High Quality Products

High on-stream time is critical. The Christy name, and the products with our label, have been renowned for their reliability in the chemical processing industries for many years.

On-time Delivery

Timing of deliveries is critical to meet tight turnaround deadlines. With our global logistics capabilities, Christy delivers on time, every time, even for emergency outages. We go the extra step to meet your needs.

Rapid Installation

Christy facilitates the installation of our products. PROX-SVERS® inert support balls, support domes, CUSTOM CRAFTED™ hexagonal tiles and tower packing and internals are all packaged and accurately labeled to accelerate installation.

Technical Support

Christy’s engineers and chemists answer all technical questions as needed, at no additional cost to you. We support what we sell!

Call Christy Catalytics at 314.773.7500 or e-mail CATCO@christyco.com today to discuss your turnaround needs.

OUR GOAL IS TO CONTINUOUSLY IMPROVE AS YOUR CUSTOMER-FOCUSED DESIGNER, PRODUCER AND SUPPLIER OF INDUSTRIAL CERAMIC PRODUCTS.
PROX-SVERS SUPPORT MEDIA
Since 1952, Christy has produced PROX-SVERS inert ceramic support balls for the global ammonia and methanol industries. Our support balls range in size from 1/16” to 3” and non-standard sizes can be produced when required. Christy offers two product formulations with high alumina content for applications where the possibility of silica leaching is an issue and where higher operating temperatures exist. Our T-99 product has an alumina purity of greater than 99% and has been approved by key catalyst suppliers and technology licensors. Our T-46 high alumina ball has been the industry standard for plants worldwide and it is virtually pressure and thermal shock resistant. Christy offers two silica-based formulations. The T-38 support ball offers the industry’s best strength and impact resistance. Our T-86 product is economical and can be used in a wide variety of less severe catalytic and adsorbents units.

CASTABLES
Christy sells castable refractory that can be selected to meet your temperature, abrasion, and corrosion needs. Castables provide an inexpensive solution for lining tunnel floors and walls, process vessels, secondary reformers, etc. Selection must be based on the specific needs of the process and the time available to install the product.

CUSTOM-CRAFTED™ HEXAGONAL TARGET TILES
Christy’s erosion resistant hexagonal target tiles are an improvement over using inert support balls to hold down fixed catalyst beds, and are available in three sizes (Standard, Jumbo, and Super Jumbo) and in thicknesses of 2” to 6” The popular Super Jumbo Jumbo size, which minimizes the time and labor of installation, is becoming an industry standard. Their greater size and mass make them virtually impervious to the harsh environment of a secondary reformer, and provide fewer edges for potential erosion. Tiles are available in two ultra-low silica formulations, 95% and 99% alumina.

TOWER PACKING AND INTERNALS
Christy supplies a complete range of random packing in a variety of sizes and configurations. Materials of construction include metals, thermoplastics and ceramics. Some of the available types of random packing offered are cylindrical rings, Pall rings and saddles. Christy also offers a complete range of column internals including bed supports, redistributors, bed limiters, liquid distributors and mist eliminators.

FUSED ALUMINA LUMPS
99.5% fused alumina lumps are available in sizes ranging from 1” to 4”.

TUNNEL TILE
In addition to the typical double tongue and groove used for tunnel wall construction, Christy also offers a unique extruded tunnel wall block. Its wider design provides a sturdy, more stable wall than that obtained when using traditional shapes. Christy’s ceramic formulation provides improved thermal shock resistance over traditional brick and tile. Larger lightweight blocks also allow faster installation.

AMMONIA DOMES
Christy supplies standard Kellogg/KBR and non-standard ammonia domes, including the wooden forms needed for installation. Each dome includes complete assembly and installation instructions, and each piece is match-marked to the layout drawing of the dome to assist in installation.

INSULATING-HIGH DENSITY FIREBRICK
Christy can supply high density firebrick in both standard and custom sizes. These refractory bricks and shapes are available in silica, high alumina, insulating/insulation, and traditional fireclay formulations.

CERAMIC FIBER INSULATION
Ceramic fiber insulation is available in board, blanket, and textile formats for uses such as pigtails on primary reformers or gasket applications.

AMMONIA AND METHANOL Plant Process and Refractory Solutions

---

Christy Catalytics, LLC
From Christy…A World Leader in Catalyst Support Media

4641 McRee Avenue
St. Louis, Missouri USA 63110
314.773.7500 • telephone
314.773.8371 • fax
CATCO@christycatalytics.com • email
www.christycatalytics.com • Web

An ISO 9001:2008 Certified Company
©2011 Christy Catalytics, LLC