



SYNTHESIS GAS Plant Process and Refractory Solutions



ST. LOUIS • HOUSTON • CROOKSVILLE • EDMONTON • SHANGHAI • ROTTERDAM • DAMMAM

From Christy...A World Leader in Catalyst Support Media





CHRISTY CATALYTICS pioneered spherical PROX-SVERS® inert catalyst support media in 1952 for ammonia, methanol, and hydrogen processing. 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 global 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

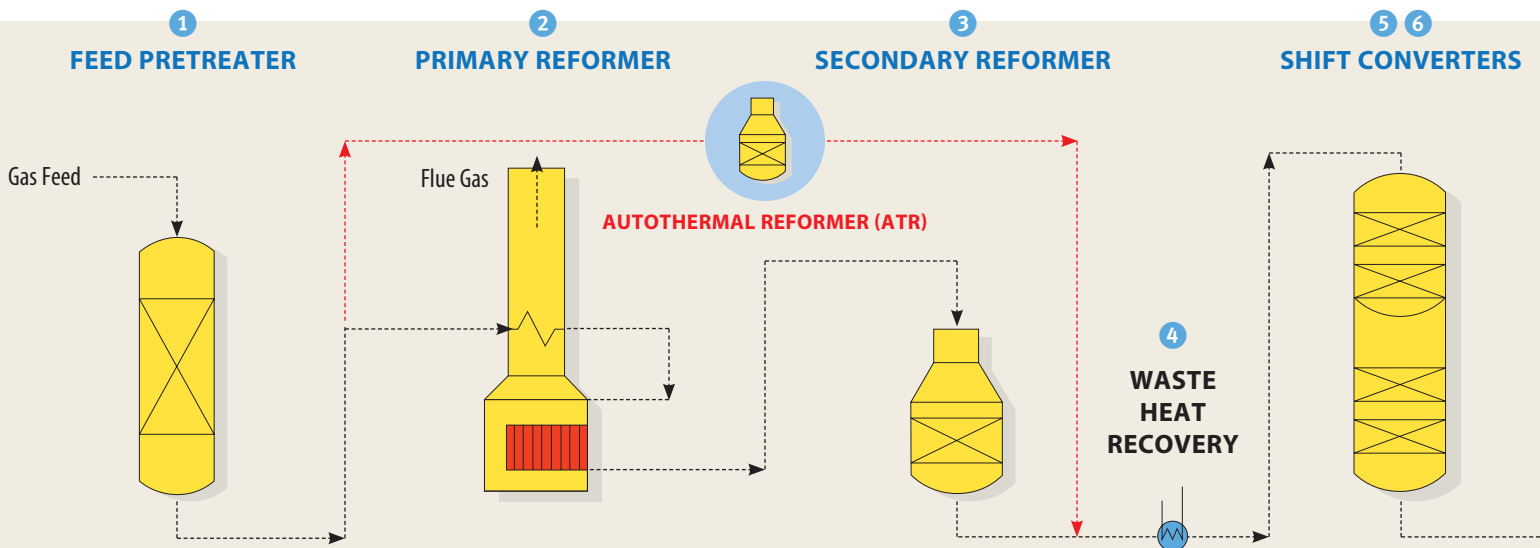
One-Stop Shopping

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.

SIMPLIFIED AMMONIA PROCESS



1 Feed Pretreater

- PROX-SVERS® inert catalyst support balls

2 Primary Reformer

- StaBlox™ flue gas tunnel system
- Burner blocks
- Flooring castable and brick
- Peep sites and frames
- Insulating firebrick (IFB)
- Ceramic fiber modules

3 Secondary Reformer

or Autothermal Reformer (ATR)

- PROX-SVERS® inert catalyst support balls
- Castable refractory
- CUSTOM-CRAFTED™ Hexagonal Target Tiles
- Fused alumina lumps
- KBR support domes

4 Waste Heat Boiler

- ProLok™ 99.7% alumina ferrules
- Castable refractory

5 High Temperature Shift

- PROX-SVERS® inert catalyst support balls
- 99% alumina low ΔP fluted cylinders

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

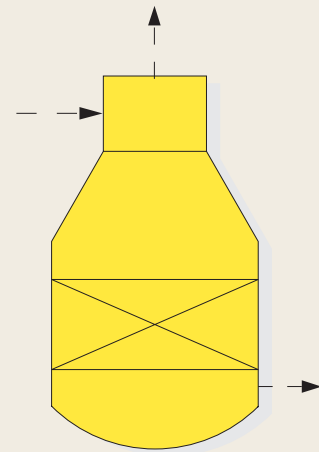
Christy facilitates the installation of our products. PROX-SVERS® inert support balls, support domes, CUSTOM CRAFTED™ hexagonal tiles and tower packing and internals are all packaged and accurately labeled to accelerate installation.

Technical Support

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

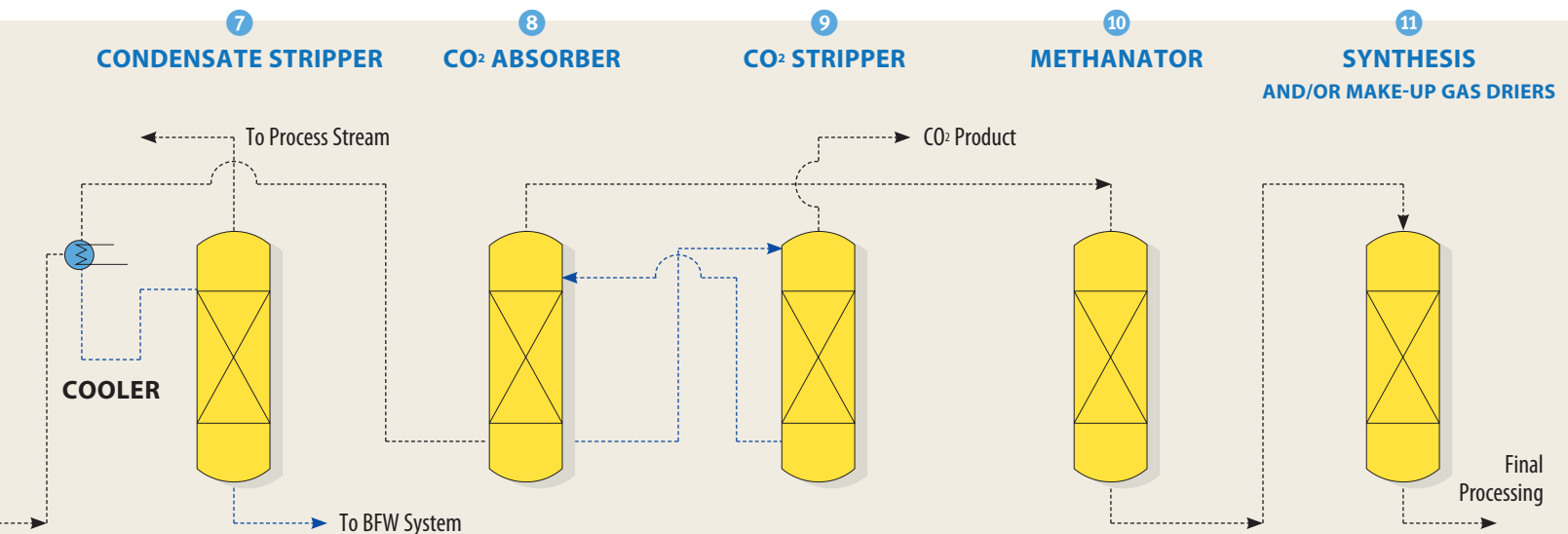
Call Christy Catalytics at 314.773.7500 or e-mail: CATCO@christyco.com today to discuss your turnaround needs.

PARTIAL METHANOL PROCESS



METHANOL REFORMER

- PROX-SVERS® inert catalyst support balls
- Castable refractory
- CUSTOM-CRAFTED™ Hexagonal Target Tiles
- Fused alumina lumps



6 Low Temperature Shift

- PROX-SVERS® inert catalyst support balls
- 99% alumina low ΔP fluted cylinders
- Christy® Pak Raschig Rings

7 Condensate Stripper

- Christy® Pak Metal Packing
- Metal column internals

8 CO₂ Absorber

- Christy® Pak Metal Packing
- Metal column internals

9 CO₂ Stripper

- Christy® Pak Metal Packing
- Metal column internals

10 Methanator

- PROX-SVERS® inert catalyst support balls

11 Synthesis and/or Make-Up Gas Driers

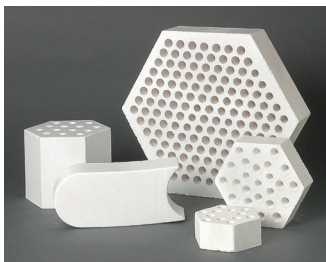
- PROX-SVERS® inert catalyst support balls



PROX-SVERS® SUPPORT MEDIA

Since 1952, Christy has produced PROX-SVERS® inert ceramic support balls for the global synthesis gas industry. Our support balls range in size from 1.6 mm to 100 mm 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.



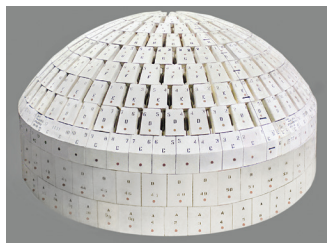
CUSTOM-CRAFTED™ HEXAGONAL TARGET TILES

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 from 50 mm to 150 mm. The popular Super Jumbo size, which minimizes the time and labor of installation, is now 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.



FUSED ALUMINA LUMPS

99% fused alumina lumps are available in sizes ranging from 25 mm to 100 mm.



AMMONIA DOMES

Christy supplies standard Kellogg/KBR 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.



TOWER PACKING & 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.



99% LOW ΔP FLUTED CYLINDERS

99% alumina, low ΔP media's high void fraction can dramatically decrease pressure drop for water shift converters when compared to balls and are available in three sizes from 16 mm to 80 mm.



BURNER BLOCKS

Christy provides cast burner blocks, plugs, and peep sites which are heavy duty and more rugged for primary reformers, or vacuum-formed blocks which are lightweight, impervious to thermal shock, and easier to install.



CASTABLES

Christy manufactures 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. Specific products for synthesis gas are Christy Cast 95, Christy Cast 97, Christy Cast 99 and its flag ship lightweight castable, Christy Lite 95.



INSULATING/HIGH DENSITY FIREBRICK

Christy can supply IFB in both standard and custom sizes. Dense refractory brick and shapes are also available in silica, high alumina, insulating bubble alumina, and traditional fireclay formulations.



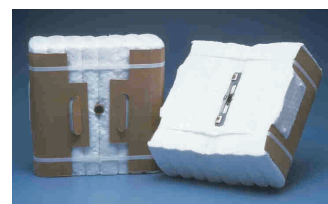
ProLok™ FERRULES

Patented 99.7% alumina twist and lock two piece ferrules are superior to traditional ferrules due to their faster installation, elimination of castable refractory, built in expansion joints, and their ability to accommodate warped tube sheets. Standard ferrules are also available.



StaBlox™ FLUE GAS TUNNEL SYSTEM

Patent pending, the StaBlox tunnel system are stackable, interlocking blocks which reduce installation time by 50% and reduce weight by over 30% all while offering a much higher level of reliability with highly engineered, mortar free expansion joints. For replacement in kind of existing tunnel cover tiles, standard extruded fireclay and 60% alumina castable tiles are available.



CERAMIC FIBER INSULATION

Ceramic fiber insulation is available in fiber module, board, blanket, and textile formats for uses such as interior wall insulation, pigtailed, and gaskets in primary reformers.

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