Noram Converters

Noram converters are manufactured entirely from stainless steel, eliminating the need for refractory brick lining while meeting both ASME and European design standards. This construction minimizes corrosion, shortens heating and cooling cycles, and improves operating efficiency by preventing gas bypass between catalyst beds.

Elliptical Support Plates
The catalyst beds are supported by welded, elliptical section plates that transfer loads as tensile forces rather than bending stresses. This design eliminates the need for support beams, reduces thermal expansion stresses, and extends the overall service life of the converter. Noram converters are optimized to ensure uniform gas distribution with minimal pressure drop.

Efficient Maintenance and Rapid Installation
Noram's design and manufacturing methods allow converters to be prefabricated in sections for easy shipment and fast field assembly. This reduces on-site labor requirements and ensures consistent quality. The modular design also provides flexibility in catalyst bed and piping arrangements, maximizing conversion efficiency.

The Role of the Converter
In a sulfuric acid plant, the converter plays a critical role in the catalytic conversion of SO_2 to SO_3. Process gas typically flows from top to bottom through a bed of pelletized catalyst and exits via a perforated support plate. Converters contain multiple catalyst beds in series, separated by intermediate plates. For maximum efficiency, the gas must be cooled between beds, usually via external heat exchangers.

Key factors for optimal performance include: Uniform gas distribution across the shallow catalyst beds and low overall system pressure drop.

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Traditional Designs
Historically, converters were built with a carbon steel shell lined with refractory brick around the hot first bed. Cast-iron columns and support grids were used to hold the catalyst. However, this approach often created serious operational challenges, including:

- Gas bypass and uneven distribution between catalyst beds
- Unreliable bed supports and mechanical deformation
- Corrosion, high-temperature oxidation, and catalyst contamination

Extended downtime during maintenance due to thermal inertia

Development and Innovation
Beginning in the 1980s, fully welded stainless steel converters were introduced and quickly became the industry standard. Noram has advanced this technology and patented several key innovations, including the use of elliptical support plates to separate catalyst beds. These flexible, membrane-like plates minimize mechanical stress on the converter shell and are superior to conventional flat bed supports. In contrast, flat-plate stainless steel designs have proven vulnerable to thermal expansion stresses during operation.

Summary of Benefits:
- No refractory lining required
- Faster startup and shutdown cycles
- Low corrosion
- Extended service life
- Minimal mechanical stress on catalyst supports
- Uniform gas distribution for optimal SO_2 conversion
- Approximately 25% lower overall weight

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