

ENTRAINMENT MITIGATION DEVICE (EMD)



NORAM introduces the patented **Acid Entrainment Mitigation Device (EMD)** to deal with acid mist carryover from sulfuric acid towers.

Causes of Acid Mist Carryover

Possible causes of the acid carryover are:

- Fine mist carryover from the gas cleaning section into the dry tower
- Excessive acid entrainment from acid tower distributors and/or packing
- Failure of demisters in the dry, interpass and final towers
- Excessive cooling of the gas downstream of acid towers causing increased condensation

Effects of Acid Mist Carryover

Acid mist carryover can cause the following issues:

- Corrosion and damage of equipment such as blowers, gas-to-gas heat exchangers, converters and ducting
- Fouling and increased pressure drop in gas-to-gas heat exchangers
- Catalyst fouling, increased pressure drop and unwanted plant shut-downs to perform catalyst screening (lost production)
- Reduced equipment life

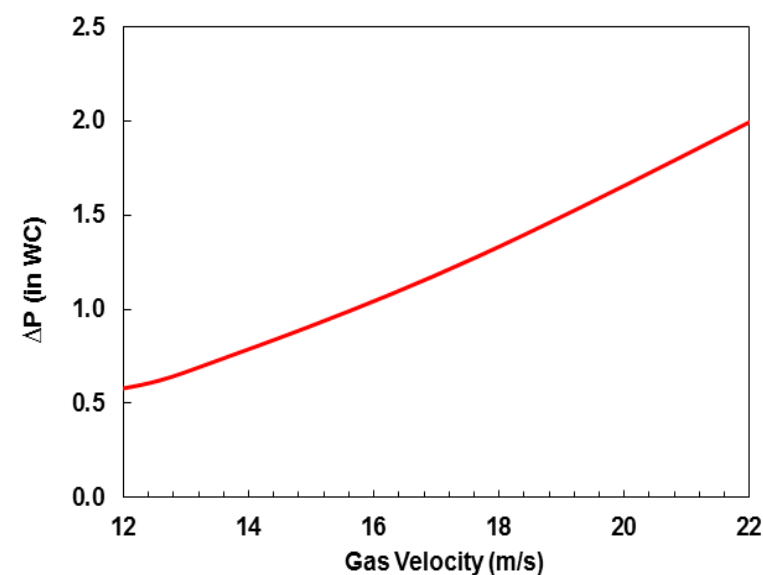


Tube Bundle

EMD Features

NORAM's EMD has the following features:

- Removes acid droplets from process gas
- Drains to capture any sulfuric acid that flows along the ducting internal walls
- Bundle of swirl tubes that are designed to separate acid from the gas. It uses a cyclonic principle to remove acid droplets from the gas system
- Made of acid resistant alloys and does not require replacement of internals (equipment only to be inspected at plant turnarounds)
- Can be installed in-line and inside of a process gas duct
- Will not require a new civil foundation and will fit in the available space
- Requires low pressure drop to operate and does not create an obstruction for process gas



EMD Gas Pressure Drop

Performance

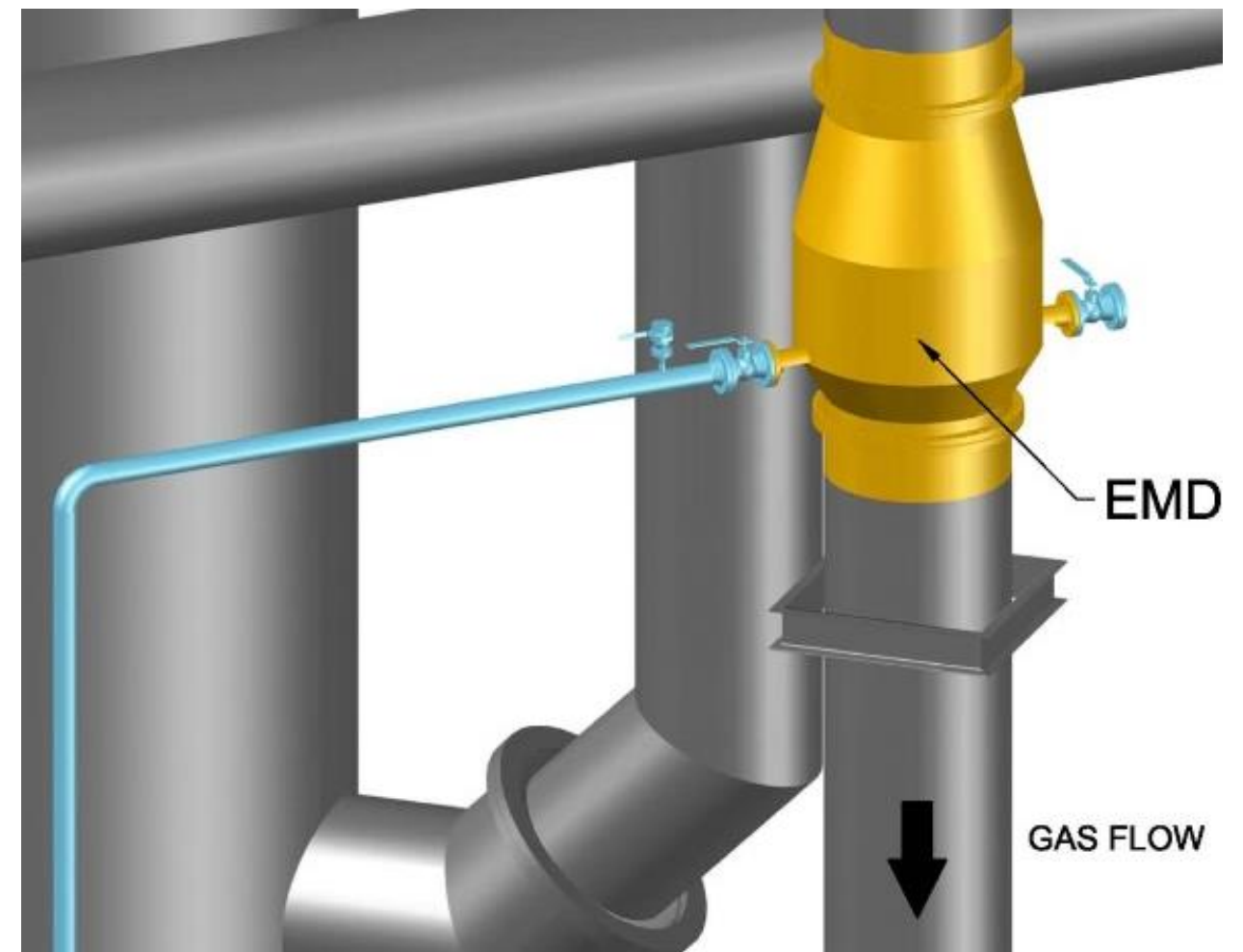
EMD is designed to achieve significant acid entrainment removal while maintaining low gas pressure drop.

The equipment pressure drop is between 1 and 2"WC. The droplet capture efficiency increases for larger particles. The best performance is found for particles above 10 microns in diameter.

Acid collected is drained to an existing tank or a drainpot with level indication to act as an early-warning system to alert operators if acid entrainment collection has increased, and therefore identify issues of upstream towers.



EMD Inspection at Fabrication Shop



EMD In-line Installation

NORAM ENGINEERING AND CONSTRUCTORS LTD.

Suite #1800 – 200 Granville Street
Vancouver, British Columbia, Canada, V6C1S4
Tel: 604-681-2030 Fax: 604-683-9164

E-mail: acid@noram-eng.com Website: www.noram-eng.com

SERVICE TO THE SULFURIC ACID INDUSTRY

Ask about the products and services
NORAM supplies to the sulfuric acid industry:

NORAM PLANTS, PROCESSES, SYSTEMS, AND PROCESS EQUIPMENT

NORAM PLANT UPGRADE AND DEBOTTLENECKING ENGINEERING STUDIES
NORAM/CPPE HYBRID SULFURIC ACID PROCESS (HSAP)
NORAM CLEAN START™ PROCESS
NORAM PLANT PREHEATING SYSTEMS
NORAM'S TURBOSCRUBBER FOR GAS SCRUBBING
NORAM STAINLESS STEEL CATALYTIC CONVERTERS
NORAM RF™ RADIAL FLOW GAS-TO-GAS HEAT EXCHANGERS
NORAM SF™ SPLIT FLOW GAS-TO-GAS HEAT EXCHANGERS
NORAM BRICK-LINED ACID TOWERS
NORAM SULFUR & SPENT ACID BURNERS
NORAM CELLCHEM SULFUR BURNERS
NORAM ANODICALLY PROTECTED ACID COOLERS
NORAM SX® ACID COOLERS
NORAM SX® TOWERS AND NORAM SX® PUMP TANKS

NORAM EQUIPMENT INTERNALS, PERIPHERALS AND ANCILLARY EQUIPMENT

NORAM HP™ SADDLE PACKING FOR ACID TOWERS
NORAM SMART™ ACID DISTRIBUTORS FOR ACID TOWERS
NORAM TROUGH ACID DISTRIBUTORS FOR ACID TOWERS
NORAM SX® CHIPGUARD CG™ ACID STRAINER
NORAM ENTRAINMENT MITIGATION DEVICE (EMD)
NORAM ACID DILUTION SYSTEMS
NORAM SX® MATERIAL
NORAM SX® ACID DISTRIBUTORS
NORAM SX® PIPING
NORAM SX® VALVES
NORAM GAS DUCTING
NORAM DAMPER
NORAM SULFUR GUNS

NORAM ENGINEERING AND CONSTRUCTORS LTD.

Suite #1800 – 200 Granville Street
Vancouver, British Columbia, Canada, V6C1S4
Tel: 604-681-2030 Fax: 604-683-9164
E-mail: acid@noram-eng.com Website: www.noram-eng.com