Technology Leader Air pollution control

Hot gas Filtration

Catalytic Ceramic Filter Systems

OVERVIEW

Tri-Mer Global Technologies S.r.l.
Via Milano, 14/M
20064 – Gorgonzola (MI) Italy
+39 02 95158575
info@tri-merglobal.com

Tri-Mer Global Technologies (TGT) Introduction

A company created for delivering Air Pollution Control equipment around the world with the competitiveness of an international company and the quality and relationships customers have come to expect from Tri-Mer and Nol-Tec

NOL-TEC EUROPE

- Technology leaders in bulk solids handling
- Expert turnkey project providers in Europe and Latin America
- Opportunity to create and guide the growth of a large customer for their traditional equipment

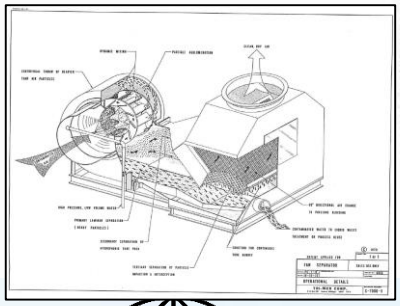
Tri-Mer® CORPORATION

- Technology leaders in pollution control
- Expert turnkey project providers in the US
- Opportunity to partner with company with international project execution experience



Tri-Mer Global Technologies (TGT) Introduction

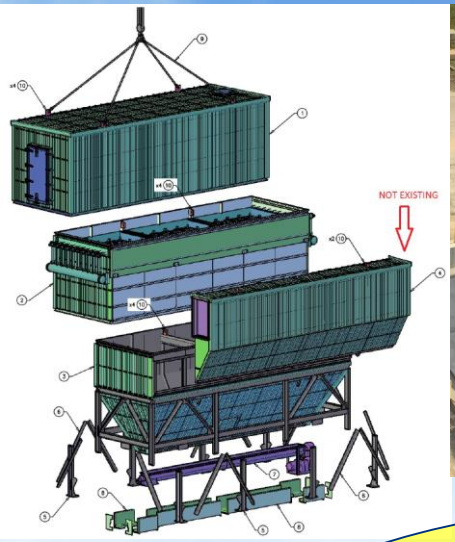
Tri-Mer Corporation
A leader in Air Pollution Control Technologies
since 1960



Tri-Mer Global Technologies provides this wide know-how in the rest of the world.

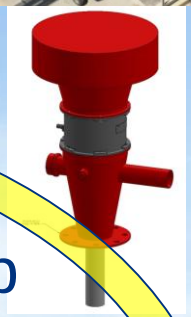
TGT offers turnkey systems and aftermarket services



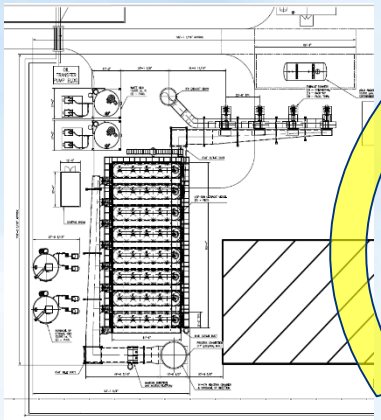












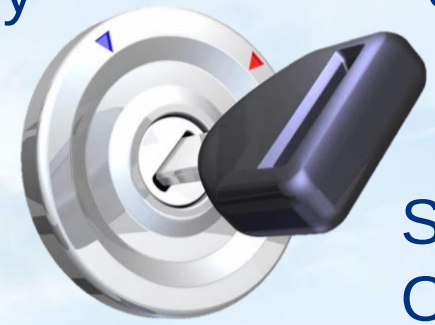
Supply

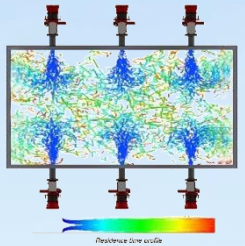
Installation

Start-up

Design

Service and Optimization





Technology Leader *air pollution control*

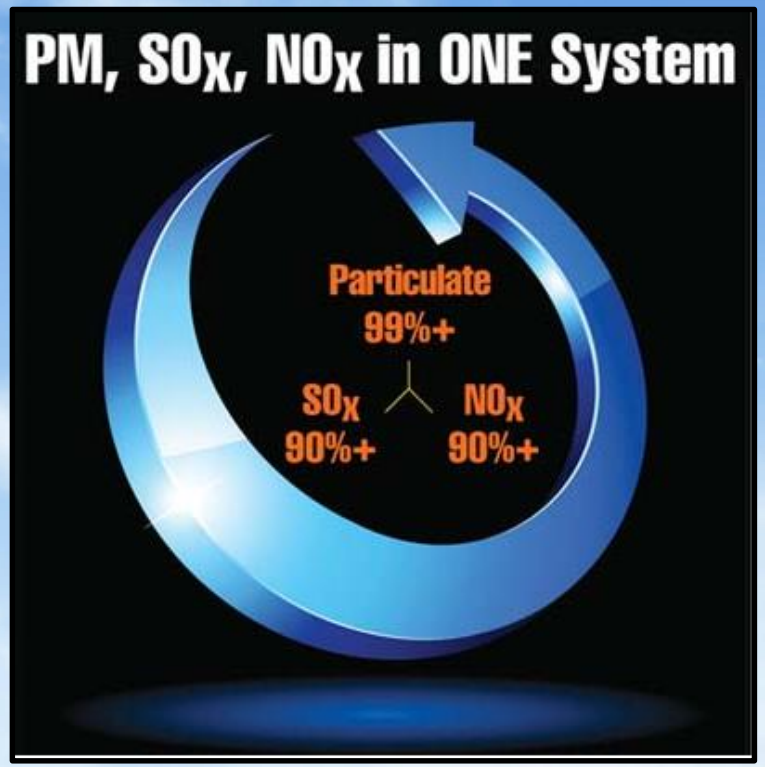
Project Delivery

Tri-Mer Systems for International Companies

POROCEL — AR	PLASMA POWER — FL	The University of Iowa — IA	illumina — CA	ArdaghGroup — IL, WA	GRAYMONT — Portable Pilot Unit	CAF — CA	3M — MN
intel — NM	arc — NJ	ONEIDA / ANCHOR HOCKING — PA	IMERYS — GA	SIEMENS — CA	PPT Powder Processing & Technology, LLC — IN	GUARDIAN INDUSTRIES — MI	PQ Corporation — CA
AGC — TN, KS	CalgonCarbon — AZ	GALLO GLASS CALIFORNIA PURE — CA	KOHLER — WI	Cardinal Glass Industries Inc.	OI	FUYAO GLASS AMERICA	Proprietary Installations

JUSHI — SC	ROCKY MOUNTAIN BOTTLE COMPANY — CO	RMC REPUBLIC METALS CORPORATION — FL

UltraCat Ceramic Filter systems

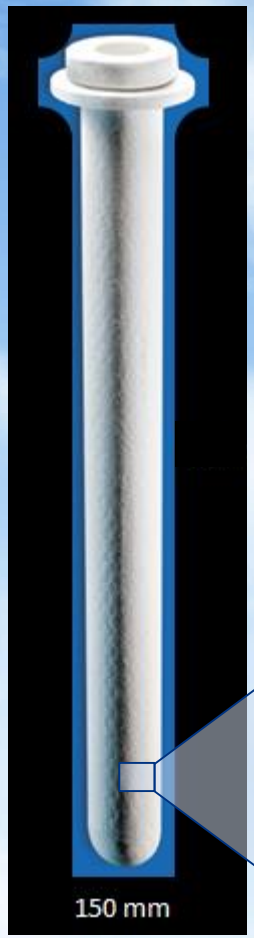




Also Treats CO, VOC, Hg, Pb, Se, Dioxin

Tri-Mer is the Largest Supplier of Ceramic Filter Systems in the World

Filter Elements – Operating Temperatures



NO_x: 240 → 400 °C

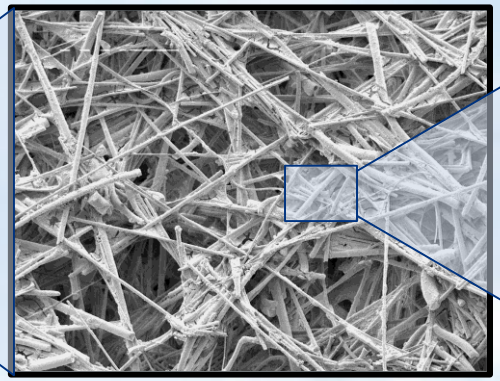
Acids (*): 140 → 650 °C

PM: 240 → 900 °C

Higher Temperature
- *Higher removal efficiency*

140 °C — Temperature Scale — 900 °C

(*) *Acids Include: SO_2 - HCl - HF - SO_3*



Ceramic Filter Element
Outer Surface

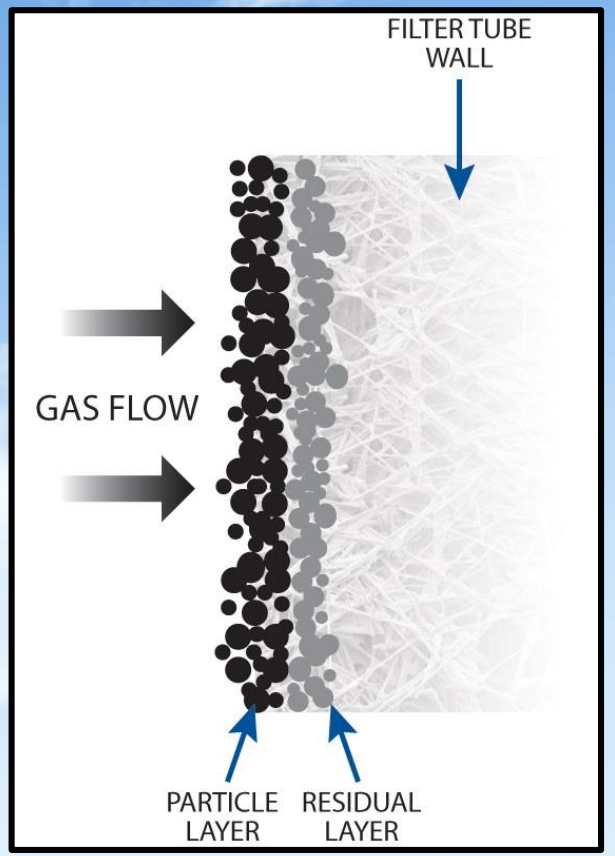


Inner Fibers with Imbedded
Catalyst for DeNOx

Barrier Filter Effective on All Particle Sizes

- Dust cake builds upon the residual layer, does not penetrate into filter body
- Cake is periodically removed with a reverse pulse of air, a brief low volume shockwave
- Can handle variable loading conditions
- Tube does not flex like a Fabric Filter bag,

  No mechanical wear = long filter life



This is a classic example of a “barrier filter.”

There is no “mesh size” or “average pore size.”

UltraCat filters are effective on all particle sizes, including PM2.5 and Submicron.

5 – 10 years filter life

Summary Performance

- PM — Filterable Submicron PM, PM2.5, PM10
  Outlet less than 2 mg/Nm3
- SOx — Over 90% removal with dry sorbent injection (DSI)
  95+% in certain applications
- NOx* — Over 90% removal at 350º C
  95+% in certain applications

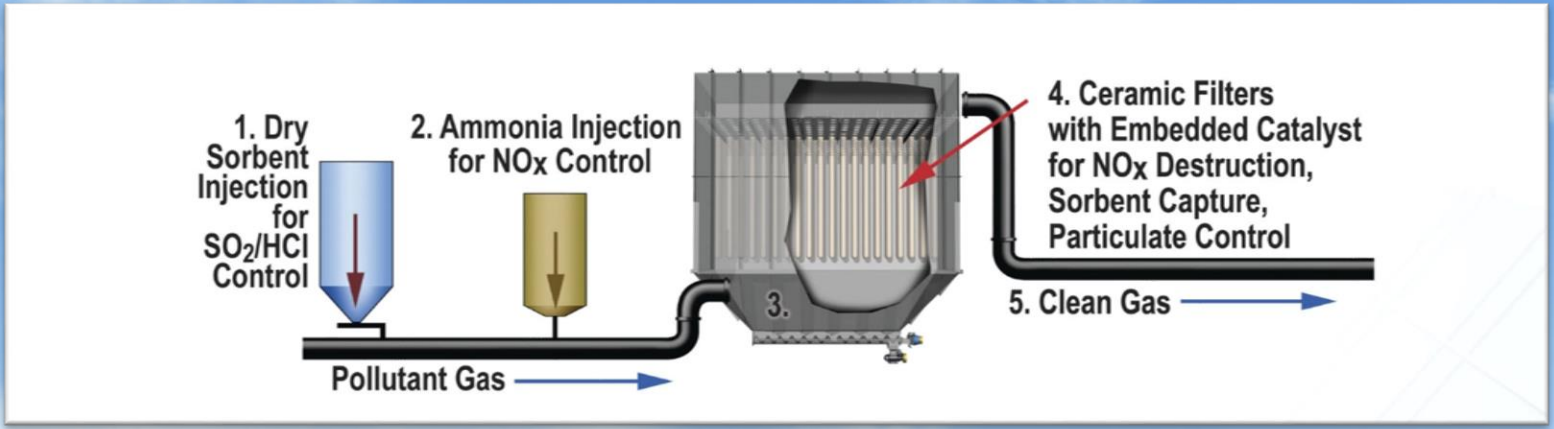
Also removes

- HCl, HF (Many regulations) to 95 – 99 %

**catalytic filters only*



Typical Installation – Catalyst candles



- Catalyst Filters preceded by upstream ammonia/urea injection
  - Selective Catalytic Reduction (SCR) with proprietary catalyst
  - Catalyst formulation much less sensitive to SO2→SO3, HCl
- Catalyst Filter performance meets USA EPA NESHAP, EU BAT, PRC MEP standards for NOx
- DeNOx Operating temperature range 175 C to 480 C.
  - Much higher (up to 900C) operating temperatures available if DeNOx not required

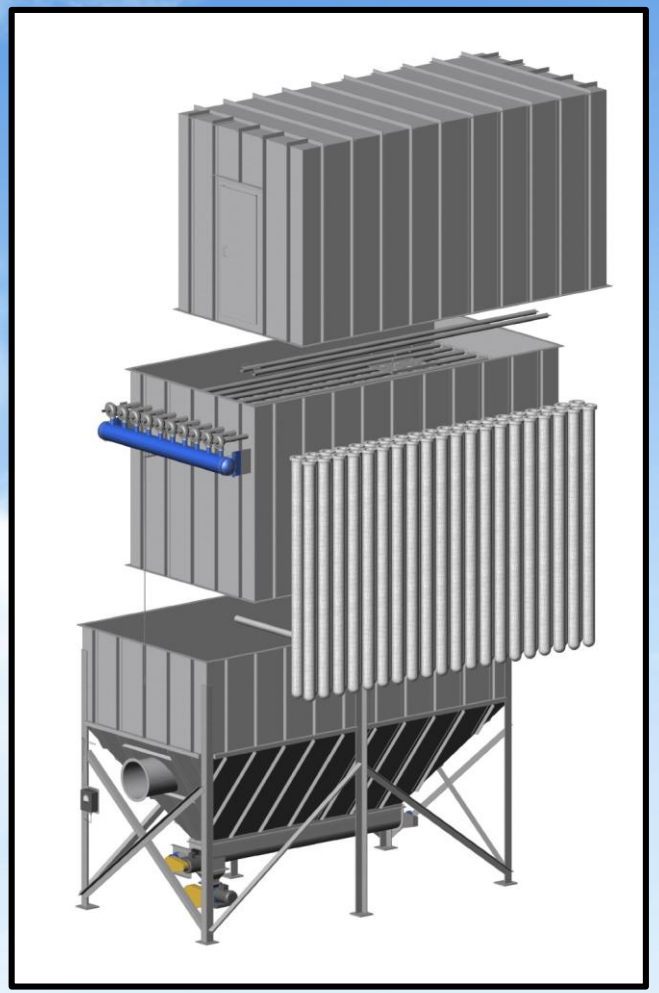
Constructed in Four Sections

1. Walk-in plenum
2. Tube Sheet
3. Hopper
4. Support Frame

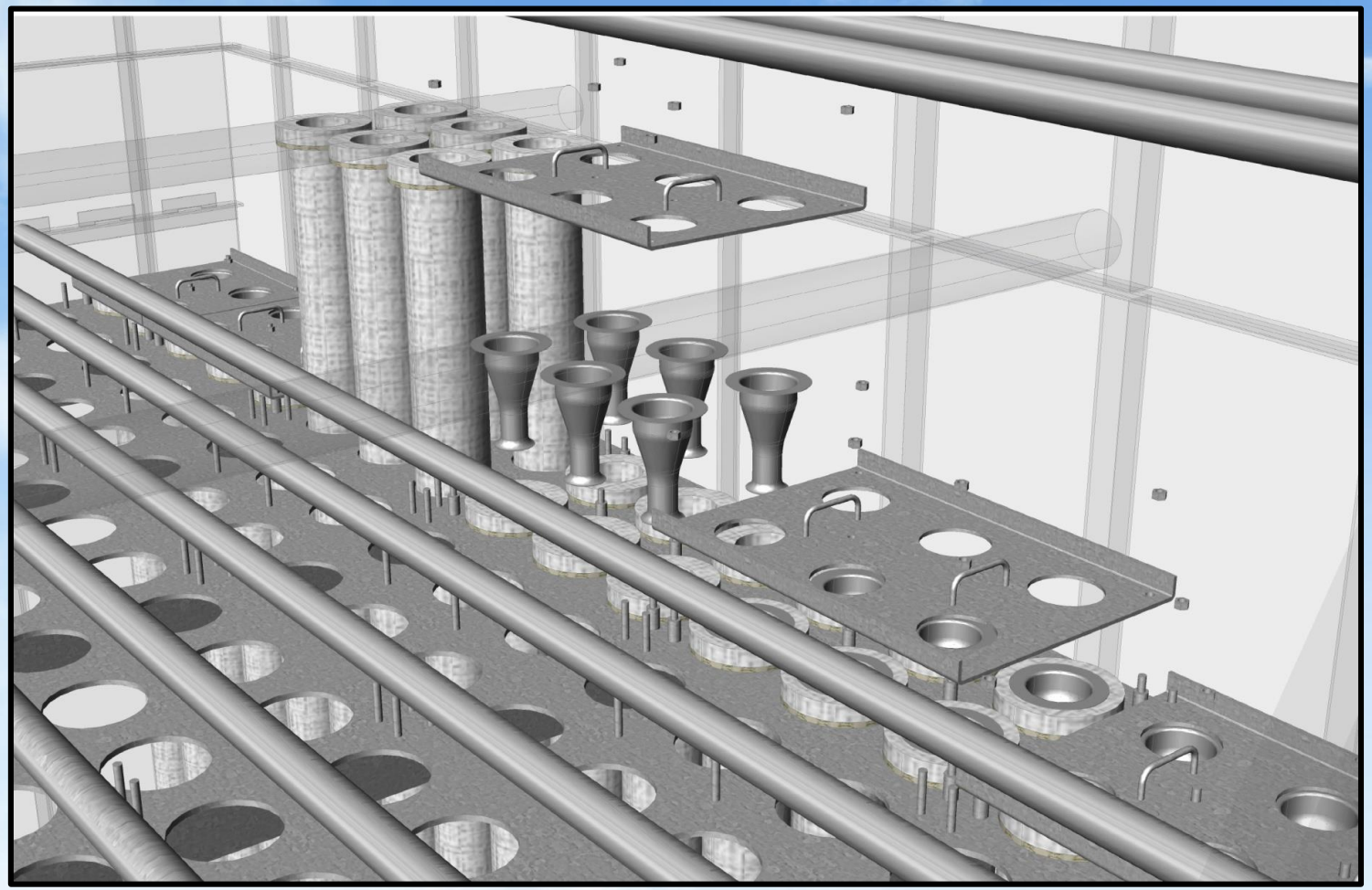
Shipped in four pieces

Simple installation with a crane

Filter elements installed in the field by Tri-Mer Global Personnel



Tube Sheet and Filter Element Hold Down Detail



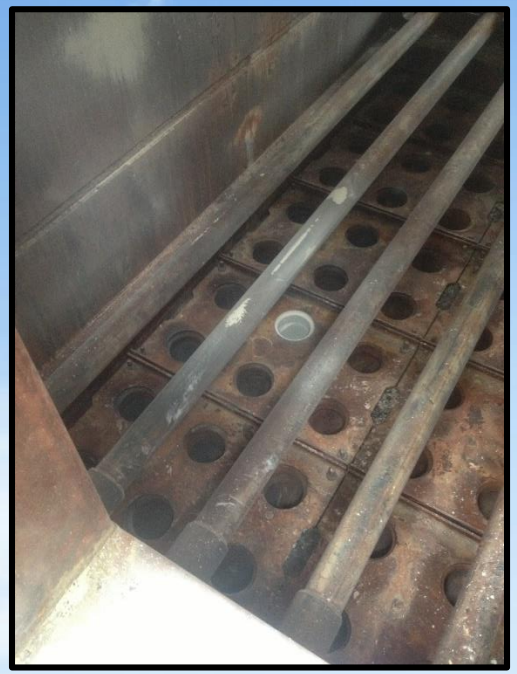
Filter Element Installation



Filter Gasket, Stud, Spacer, and Hold Down Plate



Completed Assembly with Blow Tubes in Place



Broken Filter Element

Multiple Filter Housings option

With More Housings…

- Modules can be isolated
- Modules can be maintained individually
- Remaining modules can treat 100% of the gas flow
- No loss of performance while servicing
- Minimal pressure drop increase while servicing
- Availability up to 100%



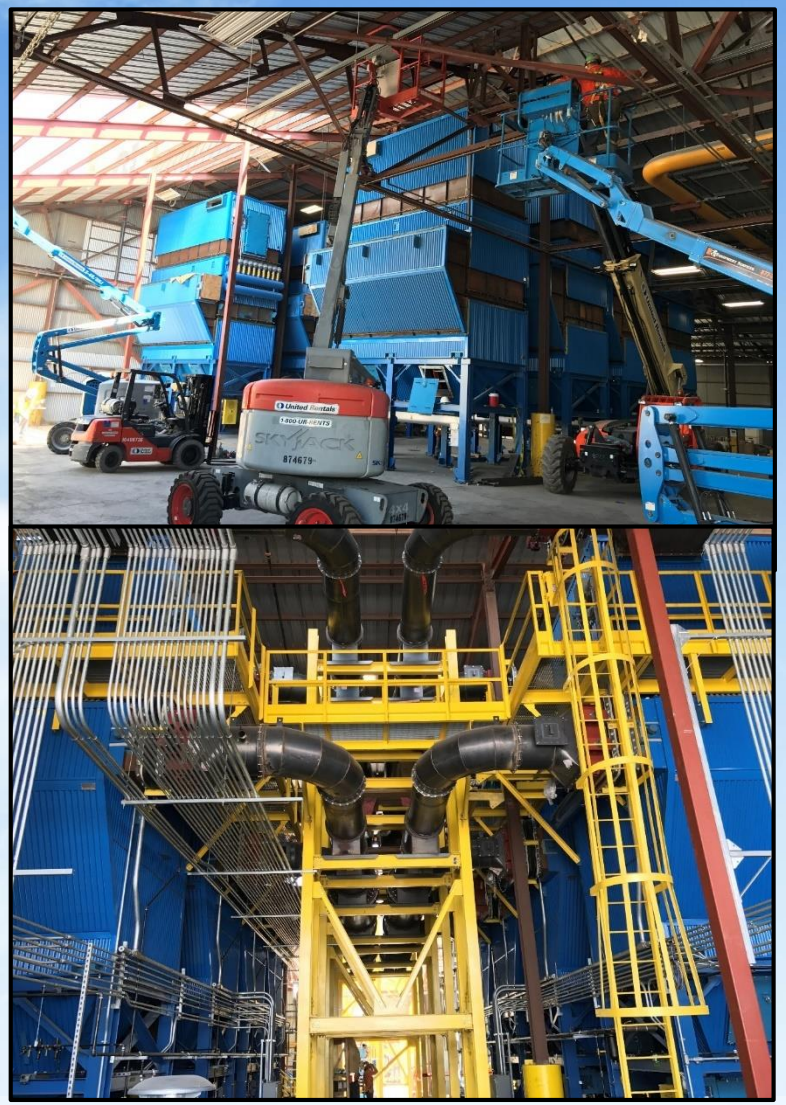
Five Housings – Float Glass Production

- 700 tpd (clear)
- Single Furnace
- Air/Fuel
- PM, NOx, & SO2
- Full Turnkey w/ civil & CEMS
- Start-up April 2017
- Compliance Verified



Eight Housings, 2 Container Glass Furnaces

- 780 tpd (clear)
- Two Furnaces
- Oxy/Fuel
- PM, NOx, & SO2
- Full Turnkey w/ civil
- Start-up Oct 2017



9 Housings – Tableware Glass Production

- UltraCat Ceramic Filter Systems
- 3 Housings per Furnace, 3 Furnaces
- 315 ^{o}C
- PM, NO_x, SO_x, HCl, and Metals
- Operational Since Jan 2011
- Compliance Verified





1 Housing – Sodium Silicate Production

- UltraCat Ceramic Filter Systems
- Single furnace, air/fuel, 220 tpd
- PM, NOx, SO2, Metals
- Operational March 2017
- Compliance Verified



Solution Provider Company - Overview

Other technologies delivered:

- Conventional SCR DeNOx Systems
- Enhanced Dry Acid Gas Treatment Systems
- Whirl/Wet Dust Collector
- Vertical & Cross/Flow Scrubbers
- Corrosion Resistant Specialty Design and Fabrication
- Technical and maintenance Services

Tri-Mer® Global Technologies

Solution Provider Company

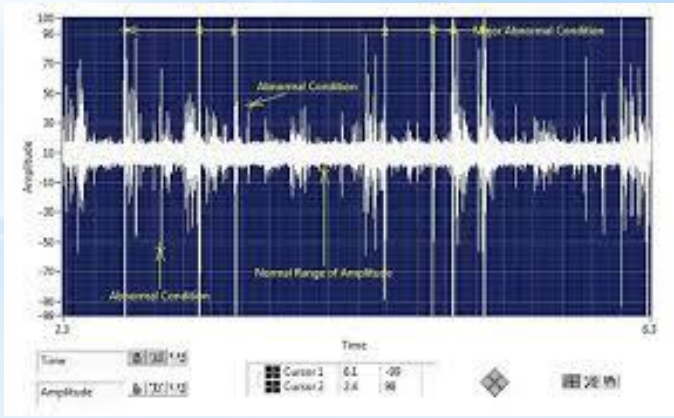
+

EXPERIENCES ⇨ **SOLUTION**

Advantages of a maintenance contract

- **Continuous Training**
  Every visit from Tri-Mer presents opportunities for onsite training.
- **Constant Review**
  Engineering review from Tri-Mer Process Group is an effective tool
- **Consistent Operation**
  Not a vague goal…a Reality to be achieved with the right plan, based on multiple glass installs.
- **Continuous Improvement**
  Engineering and optimization to remain on the leading edge can be reflected to existing systems.
- **Spare Parts**
  Parts in stock. Constant review/improvement of parts used.



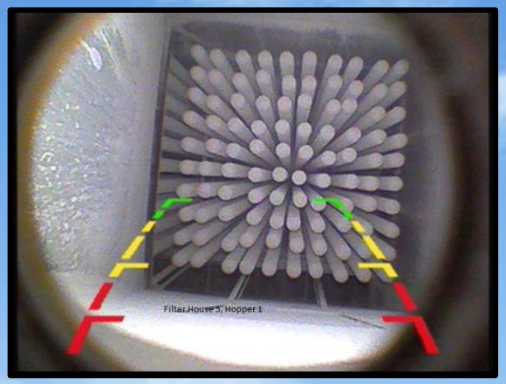


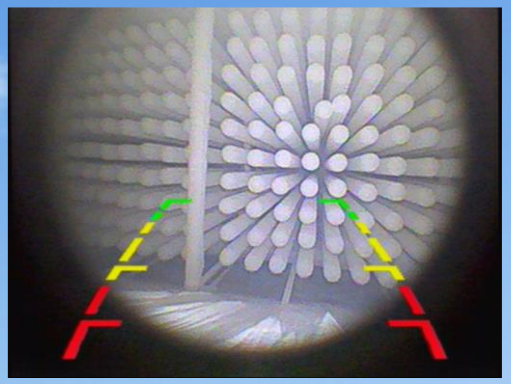
High Temp Camera

Proprietary hi-T camera allowing on-line inspections

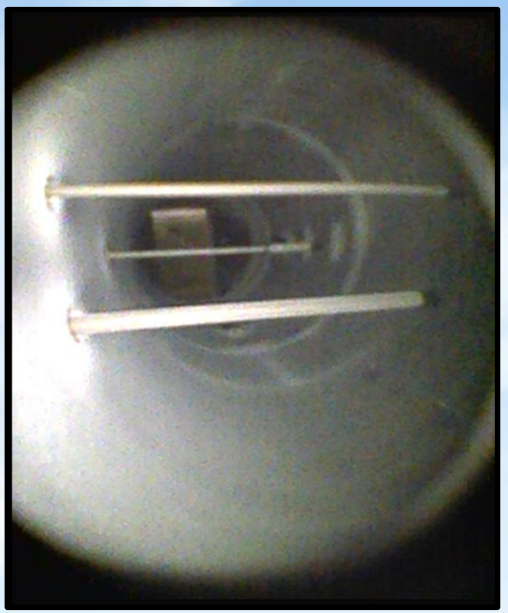
- Any operational concerns in the UCF should be lead with a camera inspection.
- Changing a filter requires 4 to 6 hours, most of that is cool down time; after service gradual heat-up is unnecessary
- Special ports allow safe hi-T inspections







Filter Element Inspection



Duct Inspection

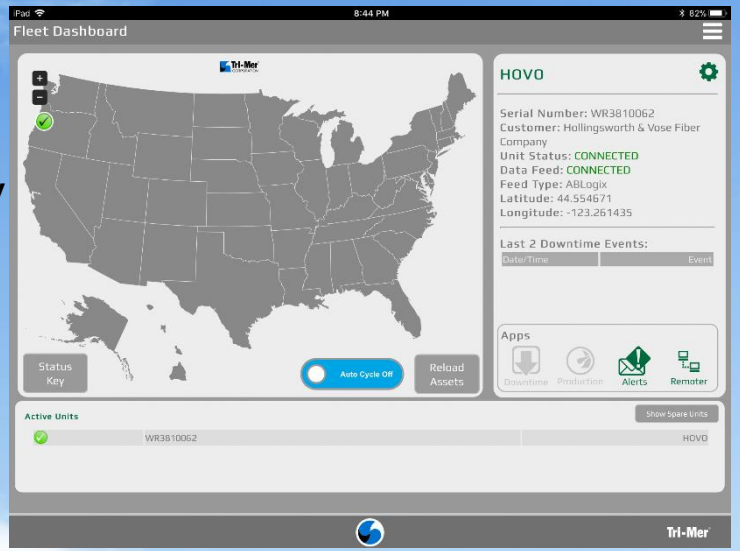


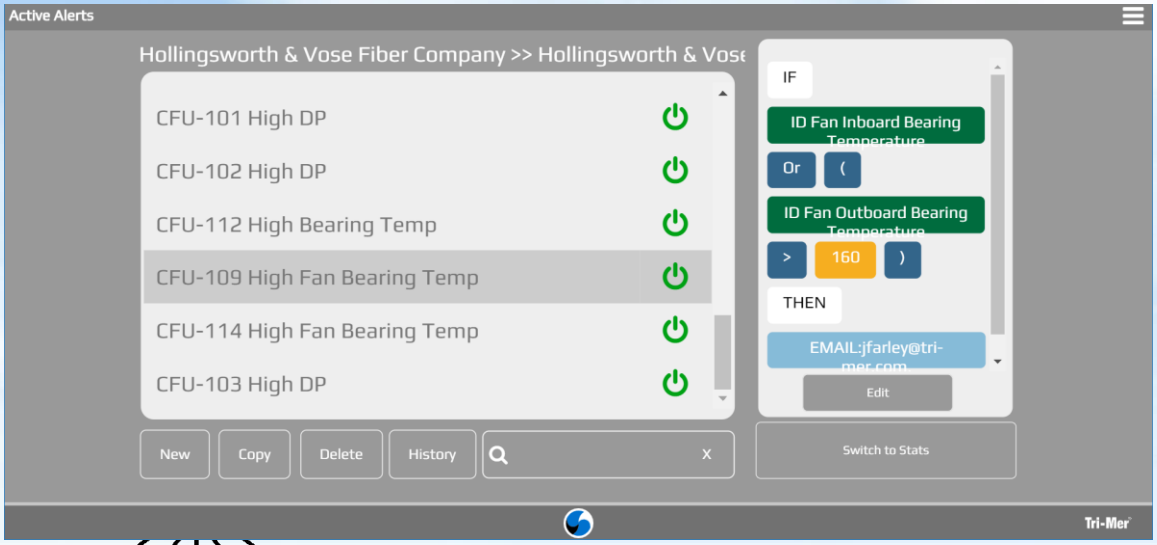
Damper Inspection

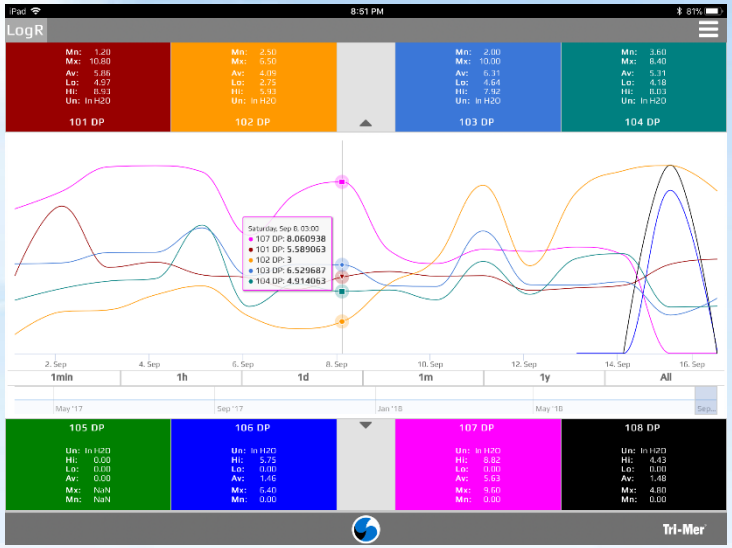
Tri-Link

Remote control / visualization system

- Suitable for all PLC / DCS
- Can be used by plant engineering people and/or by Tri-mer's technical service
- Allows multiple plant control
- Allows predictive maintenance and warning
- Reduces costs for on site interventions after warranty period







Contact

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