Centerpoint
Fasttrax

designed for your specific needs

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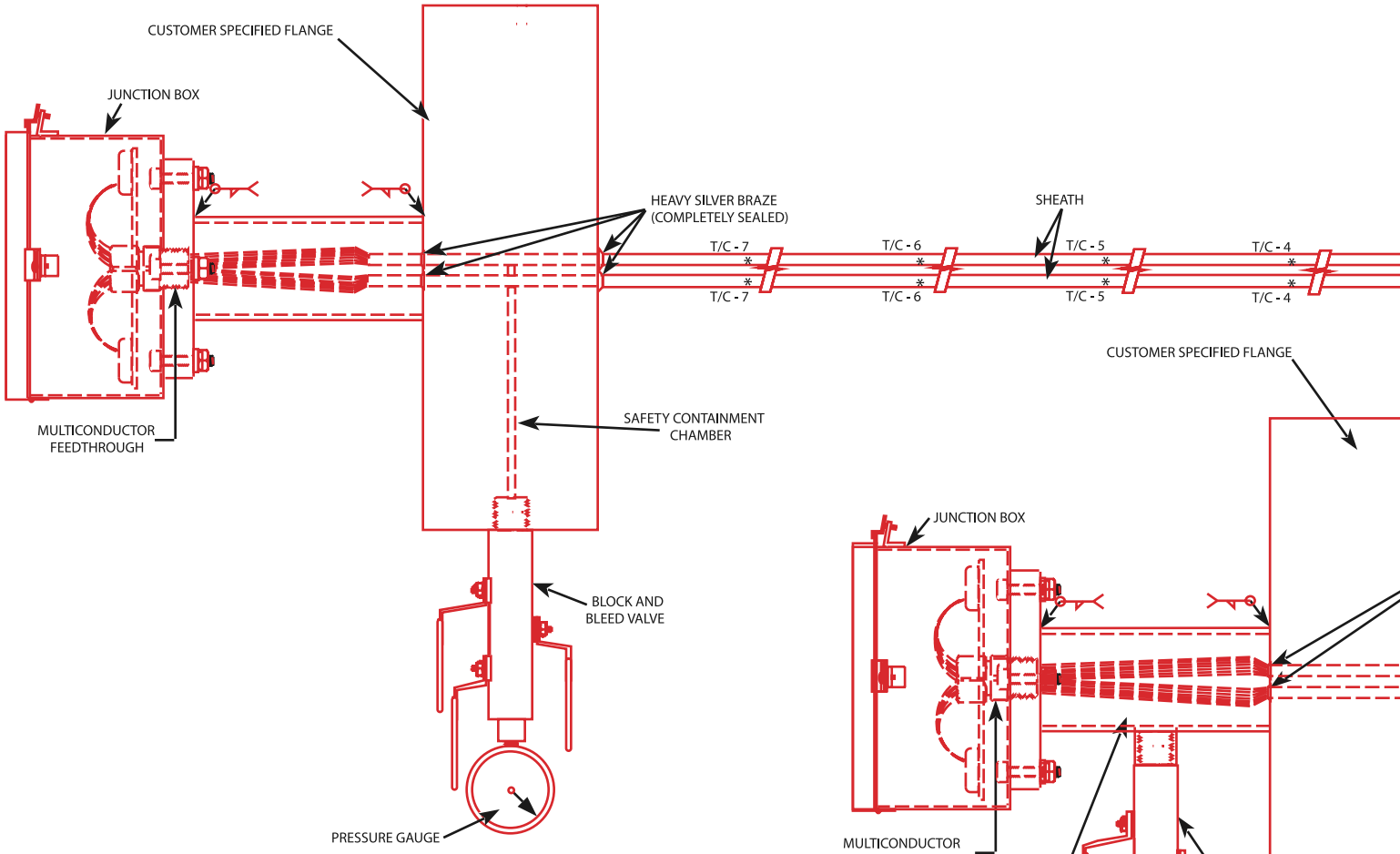
JMS SOUTHEAST INCORPORATED

JMS Centerpoint

Flexible multipoint thermocouples for process reactors



MI Cable Design and Construction

DESIGN

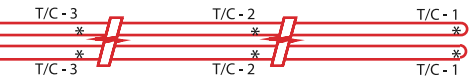
- *CenterPoint MI cables are 0.070" thick, double-wall design*
- *First wall is 0.035" overlapping second wall of 0.035"*
- *Second wall acts as a flexible protective Thermowell wrapped around a flexible heavy walled thermocouple*
- *Single CenterPoint MI cable can house 16 points of temperature indication, greatest in the industry*
- *CenterPoint sheath materials are available in all standard thermocouple materials*
- *Thermocouples are available in any calibration*
- *A single CenterPoint assembly can be designed for complete coverage of a single catalyst bed*

Each CenterPoint assembly is custom designed to meet the specification of the Process Licensor, Engineering Company and End User

CONSTRUCTION

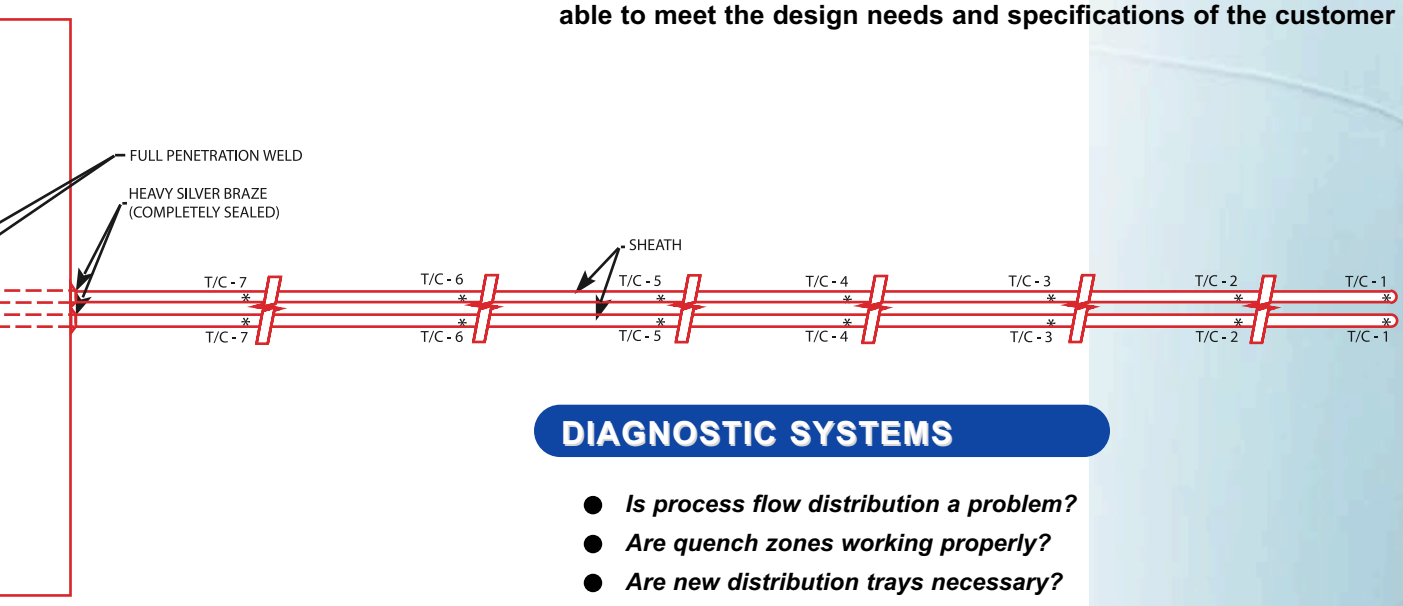
- *Double wall construction allows the MI cable to be welded to the flange face without damage to the cable caused by localized heat buildup during the welding procedure*
- *Drawing and Annealing sheath material provides a flexible housing for the thermocouples*
- *Restricting process flow (should the sheath integrity become breached) is tightly packed Magnesium Oxide insulation*
- *No special tools necessary for making long bends*
- *Tubing benders required for tight radius bends*

COLD END DESIGN



- *Pressure gauge directly tied to a flange penetration, safety containment chamber (or both) creating primary (and secondary) safety systems*
- *Eliminates the need for additional welded or flanged safety chamber*
- *Reduced flange face penetrations maintains flange integrity*
- *Double block and bleed valve designed to bleed off trapped hydrogen or process fluids*
- *Each junction is equipped with a 8,000 psi pressure fitting,*
- *All welds are full penetration welds*

CenterPoint provides optional secondary containment chambers available to meet the design needs and specifications of the customer



DIAGNOSTIC SYSTEMS

- *Is process flow distribution a problem?*
- *Are quench zones working properly?*
- *Are new distribution trays necessary?*
- *Is process channeling occurring?*
- *Does the reactor exhibit areas of localized catalyst coking?*
- *Are heat related problems causing out-of-specification products?*

SAFETY BENEFITS

- *Rapid Speed of Response time: Real time temperature measurements*
- *Eliminates temperature excursions*
- *Radial spread determines "hotspot" locations near reactor walls*
- *Reduce/ replace many reactor skin thermocouples*
- *Can be tied into the EMS system*
- *Redundancy – A duplicate sheath can be installed alongside the original at time of installation*

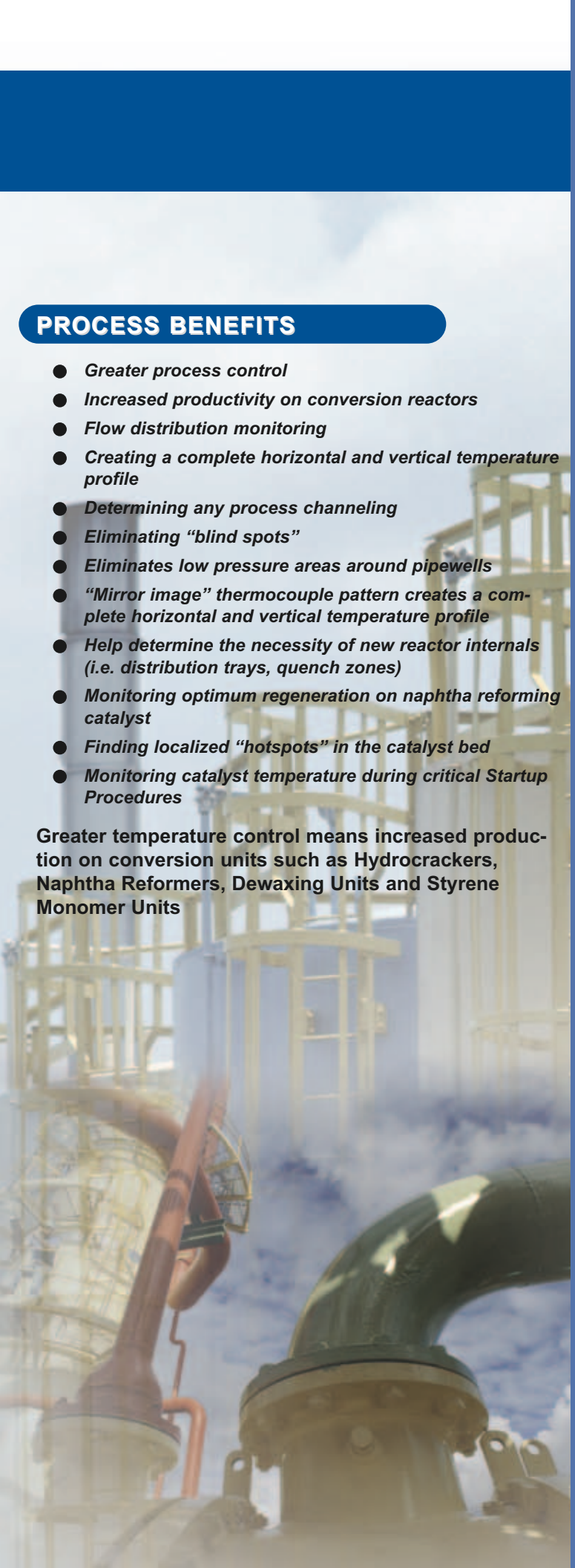
Can put as many temperature sensors into the reactor bed at any discreet point location in the catalyst bed where you want "real-time" temperature indication.

NEW CONSTRUCTION BENEFITS

PROCESS BENEFITS

- *Greater process control*
- *Increased productivity on conversion reactors*
- *Flow distribution monitoring*
- *Creating a complete horizontal and vertical temperature profile*
- *Determining any process channeling*
- *Eliminating "blind spots"*
- *Eliminates low pressure areas around pipewells*
- *"Mirror image" thermocouple pattern creates a complete horizontal and vertical temperature profile*
- *Help determine the necessity of new reactor internals (i.e. distribution trays, quench zones)*
- *Monitoring optimum regeneration on naphtha reforming catalyst*
- *Finding localized "hotspots" in the catalyst bed*
- *Monitoring catalyst temperature during critical Startup Procedures*

Greater temperature control means increased production on conversion units such as Hydrocrackers, Naphtha Reformers, Dewaxing Units and Styrene Monomer Units



PROCESS LICENSORS

— Reduced number of nozzles and size

— Reduces cost of manufacturing

— Reduced number of penetrations

— Less Exposure risks

— Increased structural integrity of reactor

—For a 1" nozzle: up to 48 temperature indication points

— Enhanced operational information and process control of unit

— Eliminates large bundles of Thermocouple cables and pathways for process flow that they can create

ENGINEERING COMPANIES

— Reduced number of nozzles

— Reduces cost of thermometry and maintenance platforms

— Locate nozzles on one side of reactor for ease of design and maintenance

— Reduced cost compared to other flexible thermocouple technology

— Increased number of temperature points

— Reduced installation cost

— Eliminates expensive cranes used to install pipewells

— Reduced number of MI cable reduces assembly cost

END USERS

— Reduces the overall cost of building

— Often times can install 3 times as many TI points for the same cost as using traditional thermometry

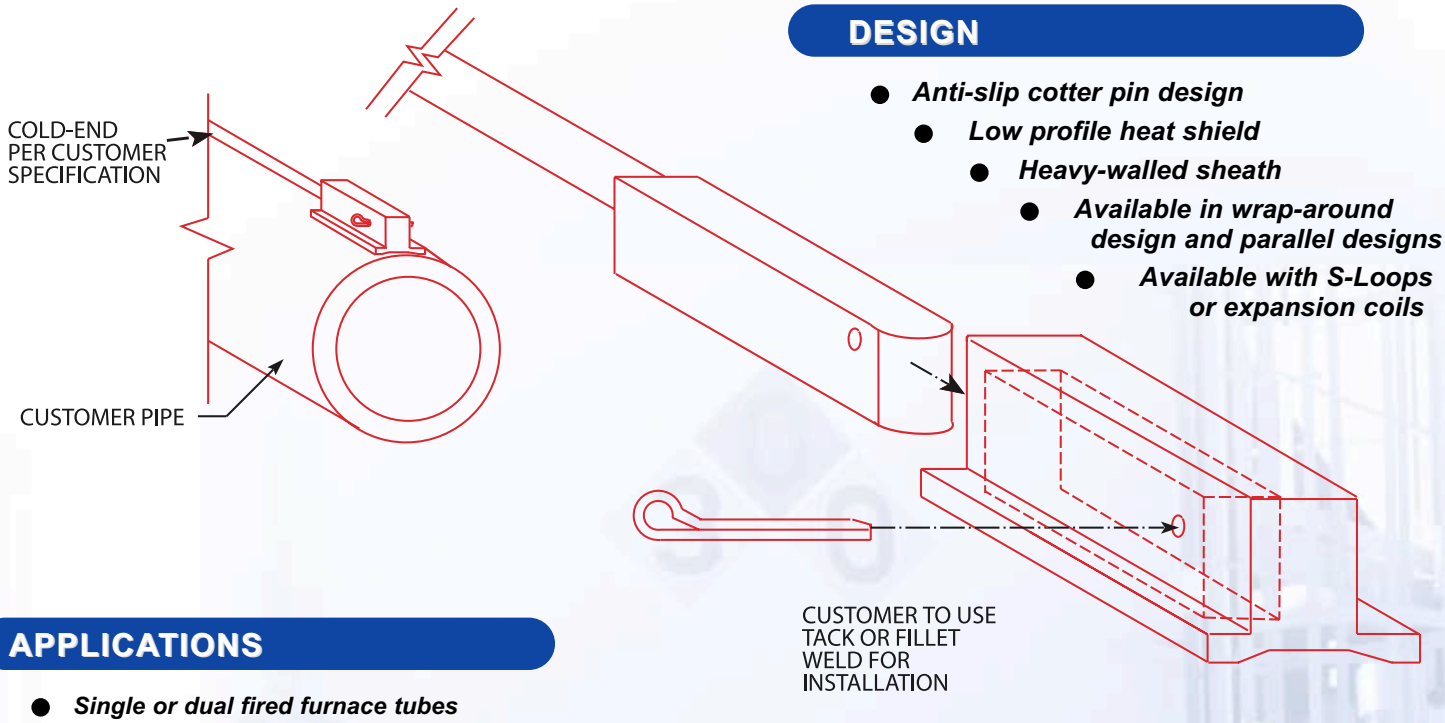
— Ease of catalyst loading and unloading, system stays in place and will not interfere with dense loader

— No removal / replacement of horizontal pipewells when loading catalyst

— Will not create a "shadow" side on back of pipewell when loading catalyst

JMS Fasttrax

High accuracy removable Tube Skin Thermocouples



DESIGN

- *Anti-slip cotter pin design*
- *Low profile heat shield*
- *Heavy-walled sheath*
- *Available in wrap-around design and parallel designs*
- *Available with S-Loops or expansion coils*

APPLICATIONS

- *Single or dual fired furnace tubes*
- *Top, side, or bottom fired furnace tubes*
- *Boiler tubes in power plants*
- *Catalyst Tubes/Tube Sheath Reactors (i.e. Steam Methane Reformers, Polygas Units, Acrylic Acid Units)*
- *Steam Tracing Lines*
- *Coker Units*
- *External Skin Temperature for Hydroprocessing units (i.e. Hydrocracking,Hydrotreating Reactors)*

INSTALLATION

- *Installation or supervision available through JMS*
- *Supervision recommended*
- *E&I Tech can replace Fasttrax probe using only a ladder and a pair of pliers*

LOW-COST REPLACEMENT

- *Install Hardware ONE TIME*
- *No need to scaffold furnace*
- *No grinding off existing TSTC*
- *No grinding down to base metal for welding (causes additional tube thinning*
- *No welders necessary*
- *No moving Tubeskin TC out of the initial zone you want to measure because you cannot weld near last Tubeskin TC*
- *Re-order ONLY the replaceable probe*

HIGH RELIABILITY

- *Fully protected probe*
- *S-Loops keep thermocouple sheath hidden and out of flame*
- *Clips placed on tube help hold thermocouple in place while process acts as a heat sink*
- *Wire contact will NOT slip from contact point due to JMS cotter pin design*
- *Safety*
- *Measure tube temperature, not process temperature*
- *Recognize tube wear and tube thinning*
- *Small offset allows you to push process furnace without sacrificing safety*
- *Highly accurate for safety*

HIGH ACCURACY

- *High accuracy direct contact with tube surface*
- *Bare wire is the standard by which all tube skin thermocouples are tested for accuracy*
- *Low profile heat shield*
- *Reduces effects of radiant heat on thermocouple*

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$0.50