Engineered Heating Solutions

www.csiheat.com

ControTrace™ and SxSeal

The Above-Ground Sulfur Seal from the Makers of ControTrace®

CSI solves thermal problems

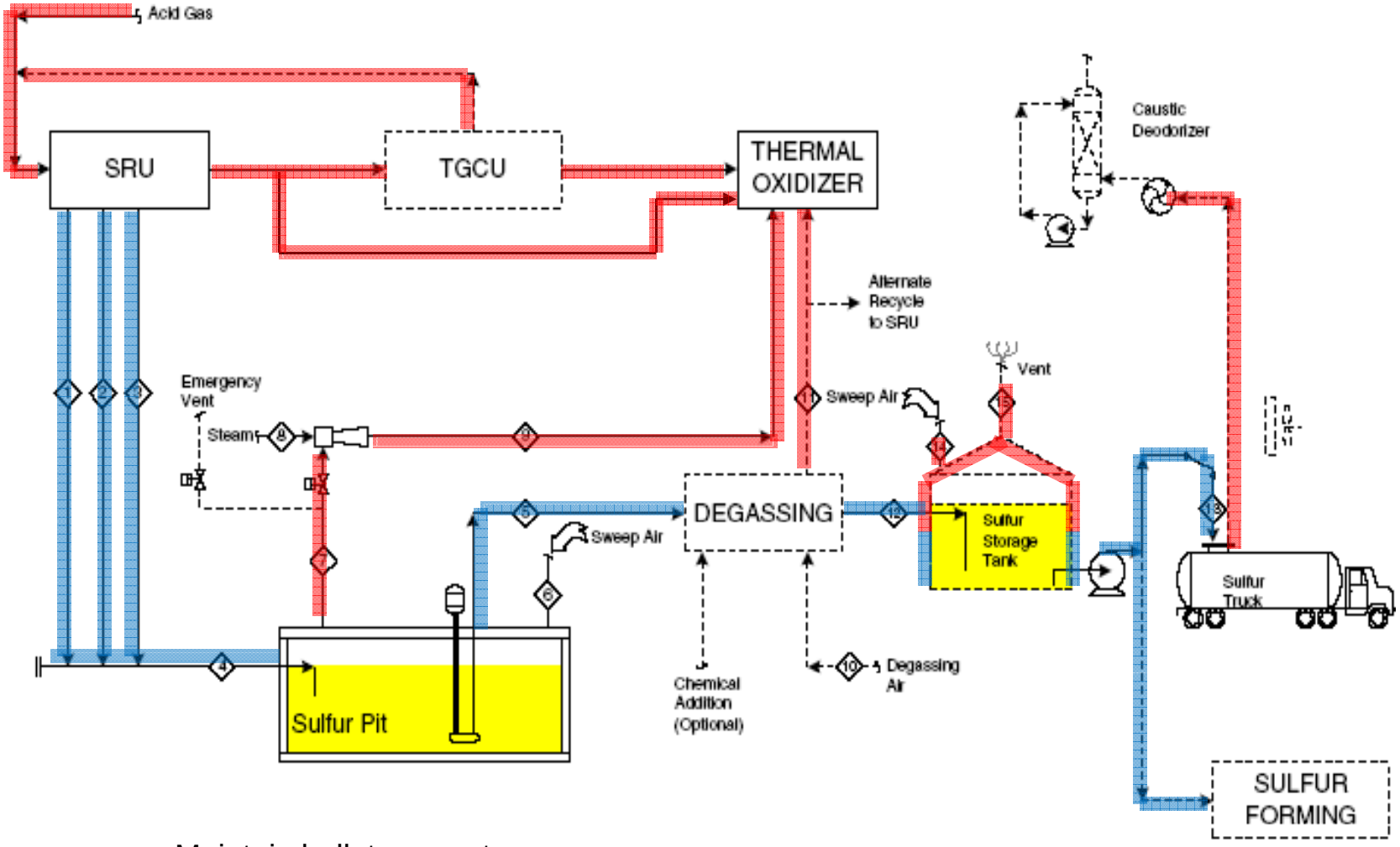
- Process heating is critical
- Root cause of issues often not well understood
- CSI approach = form fits function
- Match heating system to thermal objective

CSI customers

Oil & Gas	Petrochemicals / Chemicals	Engineering & Construction	Other
bp	BASF The Chemical Company	AkerSolutions	arboris pine tree extracts
Chevron	Daiken New Zealand Limited	KBR	ALCOA
ConocoPhillips	DuPont	CBI	Bayer
EXXON	Eastman	Fluor	bhpbilliton
GS Caltex	GE Plastics	JGC JGC Corporation	Cargill
Marathon	Henkel	Bechtel	CertainTeed
SK energy	Invista	Jacobs	Corning
Suncor Energy	Lyondell	SNC·Lavalin	GAF
Takreer	NatureWorks	L&T	Hershey's
Saudi Aramco	PotashCorp	SK E&C	Honeywell
Shell	Toray	Technip	United States Sugar Corporation
GASCO Abu Dhabi Gas Industries Ltd.	SABIC	Foster Wheeler	Southern Company
Valero		Saipem	
Total		Tecnimont	
ADNOC		Daelim Best Value, Better Life	
		Hyundai Engineering & Construction	
		WorleyParsons	

一般的なｻﾙﾌｧｰﾘｶﾊﾞﾘｰﾕﾆｯﾄです。絶えずﾒﾝﾃﾅﾝｽが必要な工程で、石油精製工場でも最も悩みの多い工程です。

SRU thermal maintenance needs



Maintain bulk temperature

Maintain wall temperature

Prevent plugging & corrosion

Vapor space
Keep walls above 250°F to prevent:
- Sulfur solidification
- Corrosion
- Pyrophoric FeS
- Fire/explosion

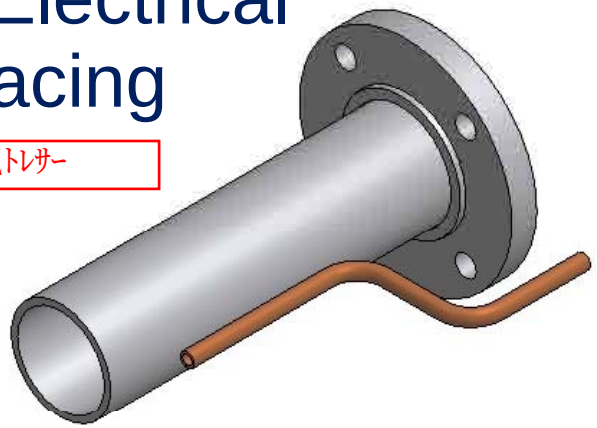
Molten sulfur
Keep above 275°F to maintain flow-ability

従来の温度ﾒﾝﾃﾅﾝｽです

Heating Approaches

Tube/Electrical Tracing

銅管によるｽﾁｰﾑﾄﾚｻｰ/電気ﾄﾚｻｰ



1. Heat Transfer
2. Tubing $$$
3. HM Infrastructure $$
   Trap Quantity

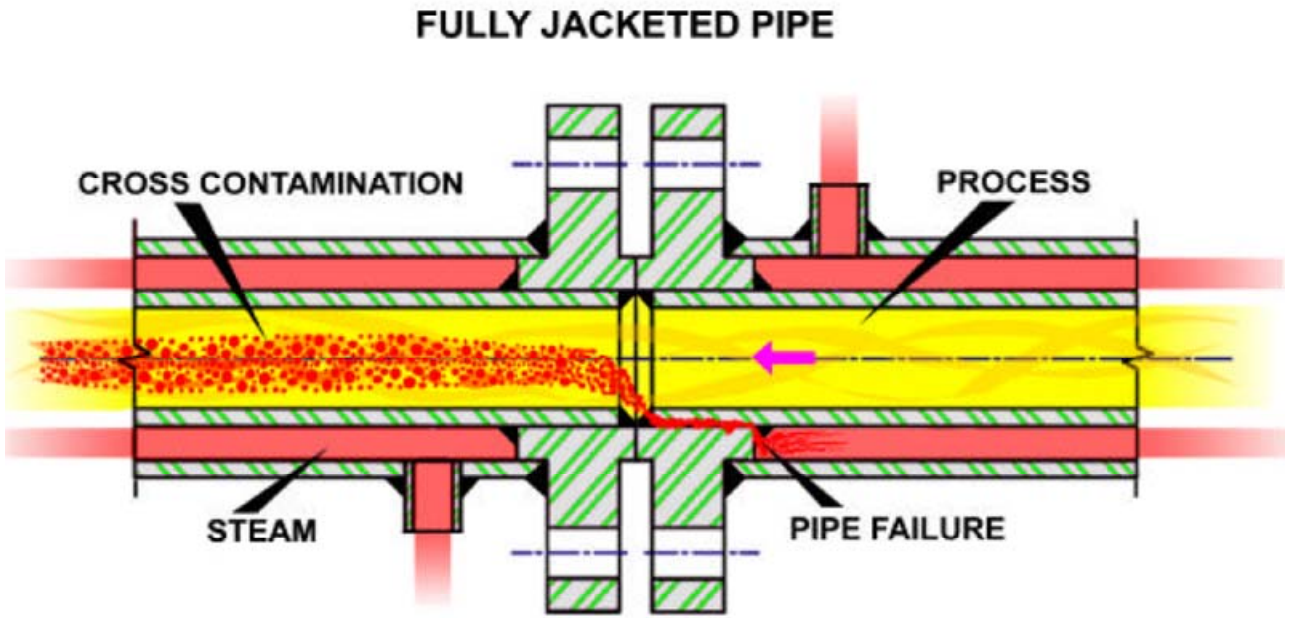
Jacketed Pipe

2重管

1. Heat Transfer
2. $$$$$
3. Cross-Contamination
4. Traps 6-12m

2重管だと漏れによる、ﾌﾟﾛｾｽ流体とｽﾁｰﾑ流体の混入が生じ品質、安全面に支障をきたすｹｰｽがあります

Cross contamination



- One NA refinery safety incident
  - Core weld failure in jacketed sulfur run-down piping
  - H_2S leaked into steam system during turn-around
  - Condensate vented upon start-up
  - Operator exposed to dangerous H_2S levels

銅管ﾁｭｰﾌﾞﾄﾚｰｽだと 必要な温度を満たすためには、多くのﾁｭｰﾌﾞが必要です。

More Tubes = More HM Infrastructure

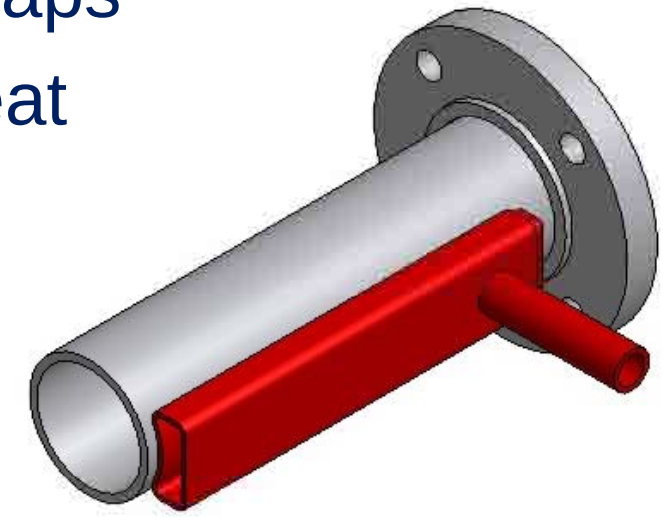
- More tubes means more manifolds
- More tubes mean more Supply and Return Tubing
- More HM Infrastructure=More $$$

Typical spacing with TT

ControTrace

- 2”X1” rectangular tubing is banded onto piping
- Designed with ASME Section VIII
- Contoured to fit pipe OD
- Heating medium flows through tracing
- HTC used to remove air gaps
- Add elements for more heat

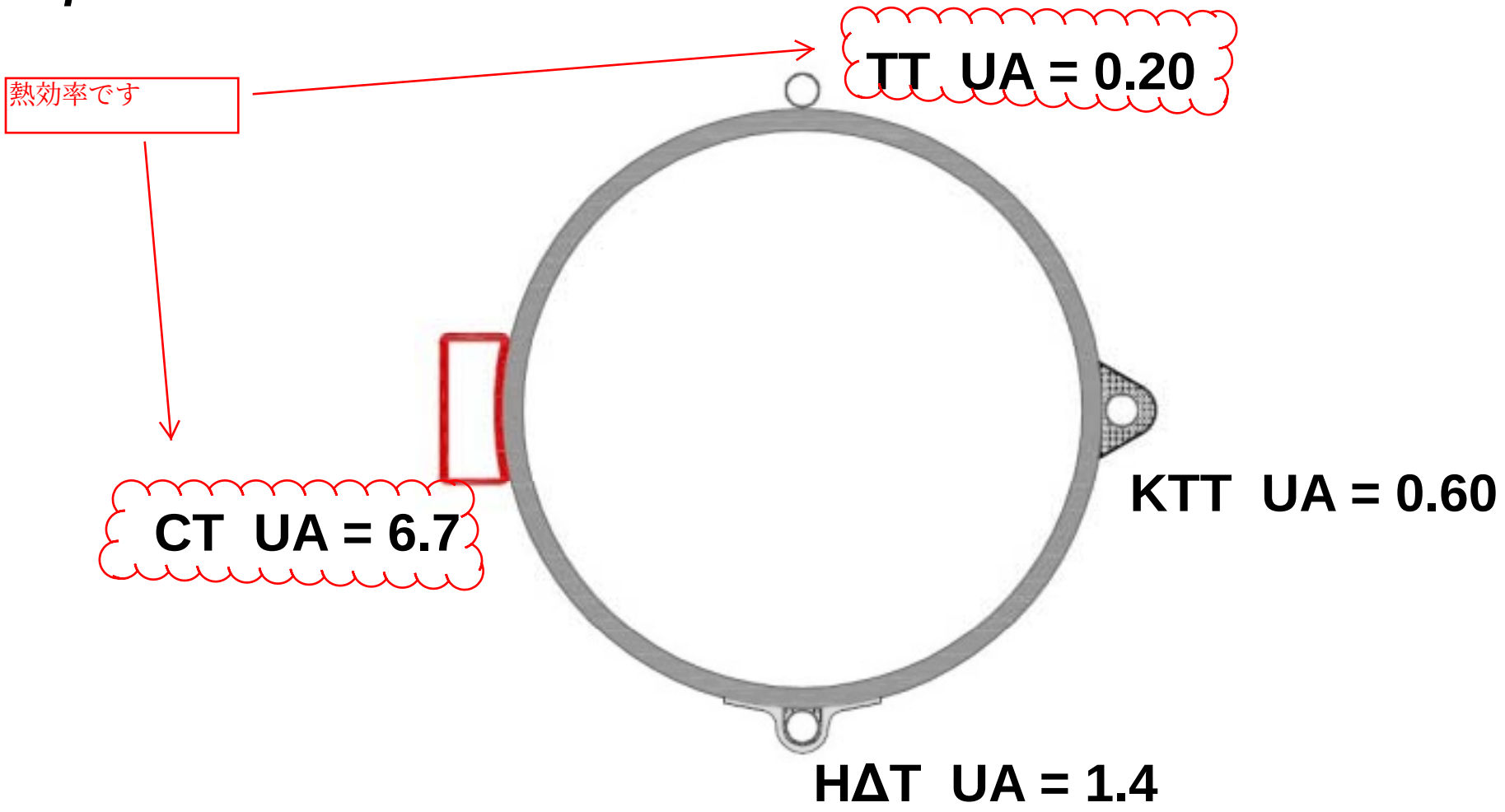
$$q = U \times A \times \Delta T$$



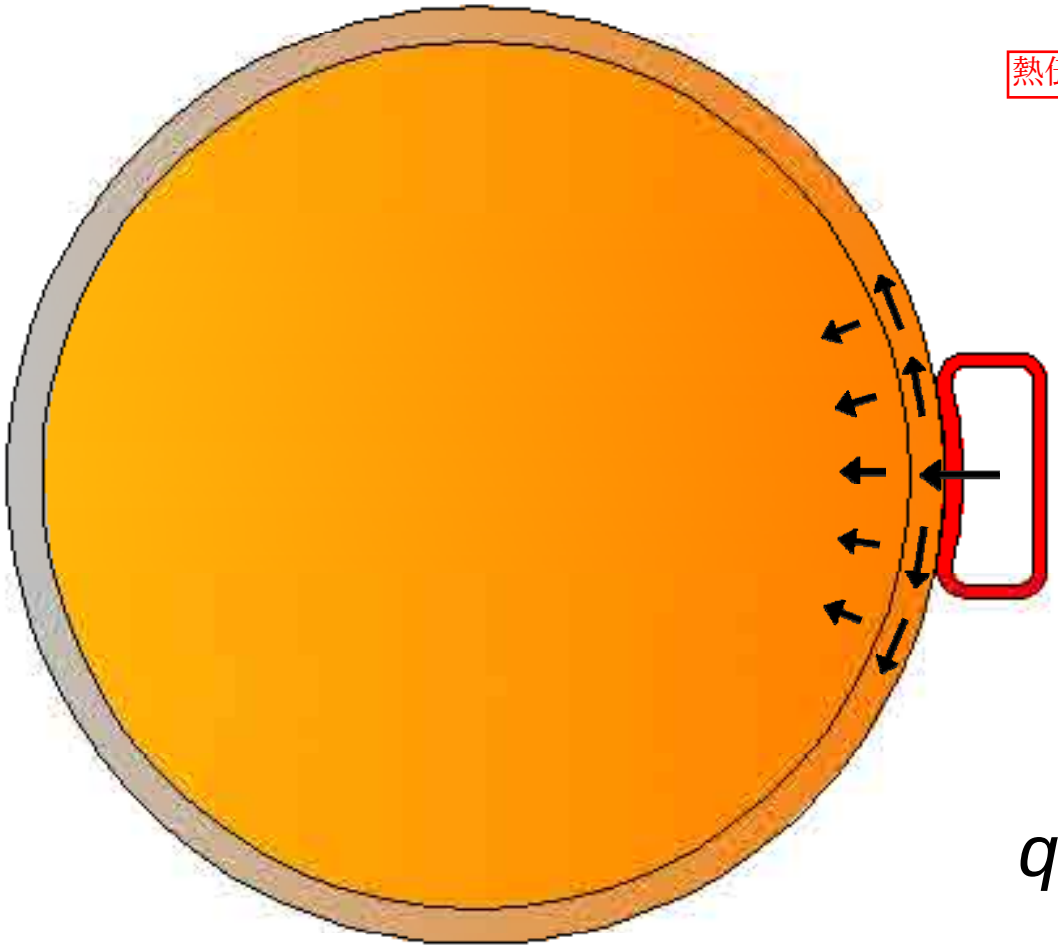
Higher UA with ControTrace

$$q = U \times A \times \Delta T$$

熱効率です



How ControTrace Works

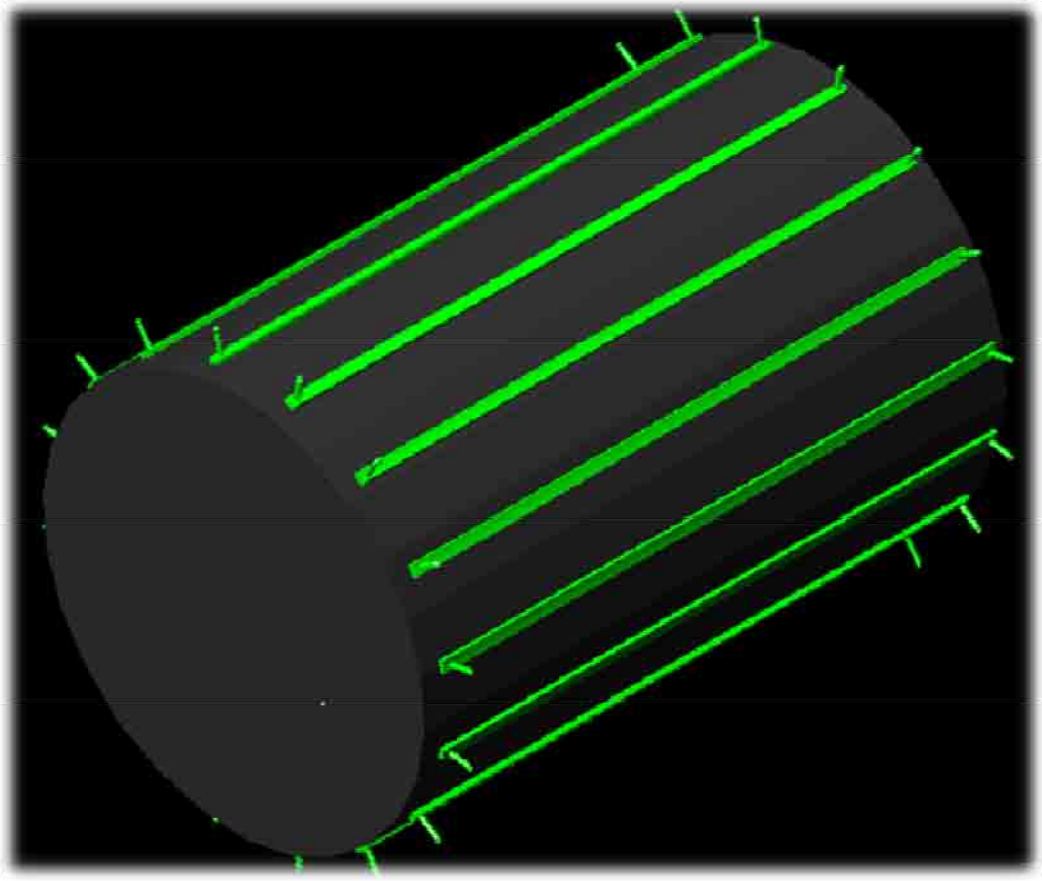


$$q = U \times A \times \Delta T$$

Process Temperature Maintenance

Tail Gas

How does ControTrace save so many traps?



18 individual ControTrace elements

Tail Gas

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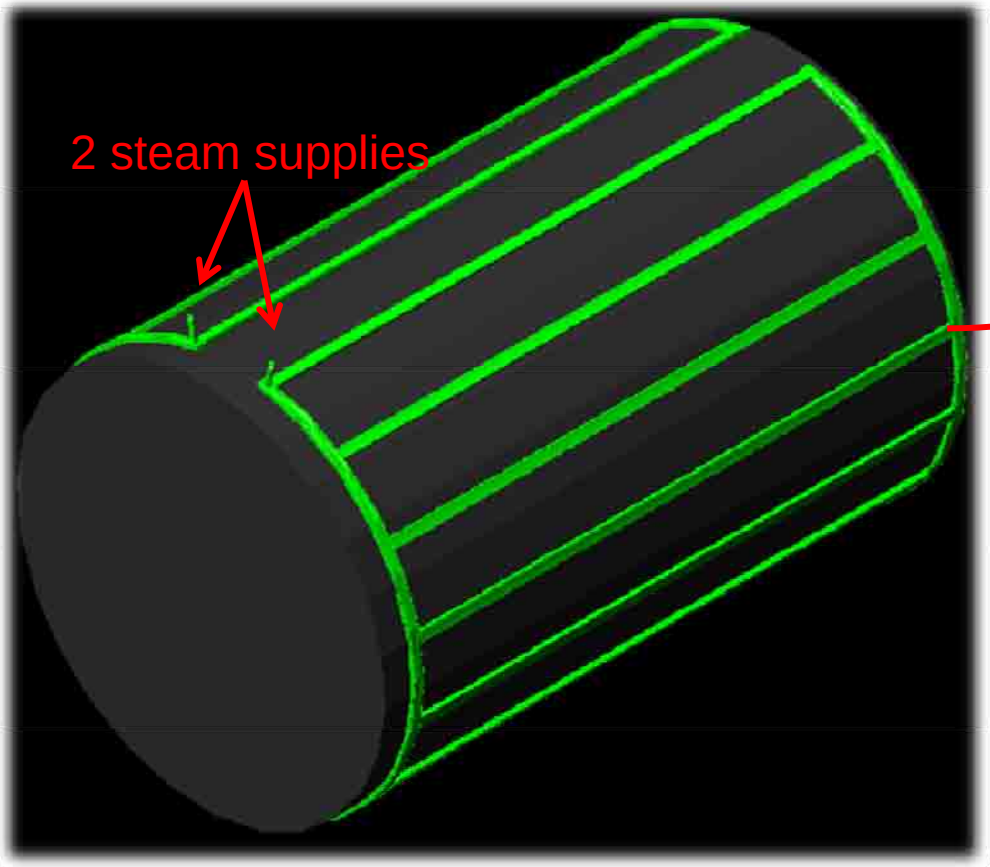
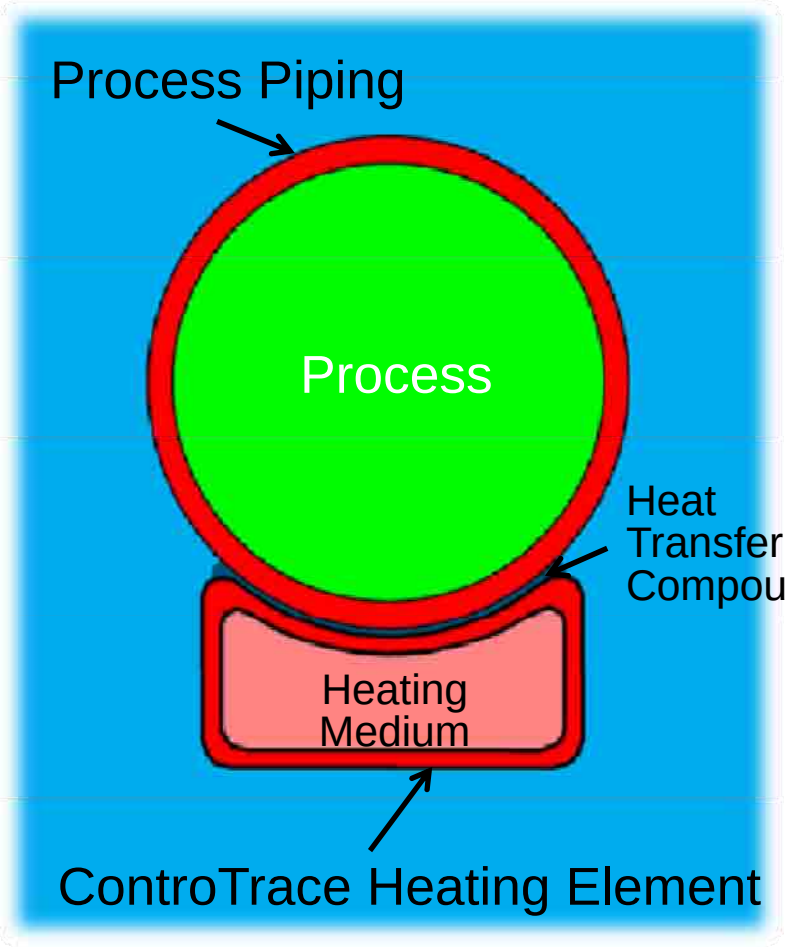


Flexible metal jumper hoses will connect these panels to the next panels to extend circuit length

18 headered ControTrace elements.
Never more than 2 steam circuits per length of pipe!

ControTrace on Piping



$$q = U \times A \times \Delta T$$

Engineered System = Predictable Performance

ControTrace on Tanks/Vessels

Thank you!