



-Burners
-Flares
-Incinerators

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June 30, 2017

BUDGETARY COMMERCIAL

Technip Italy SpA
Viale Castello della Magliana, 68
Rome, Italy 00148

Ph: +39 06 6598 5928
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Attention: Giuseppe Corrado

Subject: Technip Italy SpA Ref.: 0703270C001
Zeeco Reference: T59200FB -- Rev. 1

Thank you for your interest in Zeeco, Inc. We look forward to the opportunity to work with you on this project. In response to your above referenced inquiry, we are pleased to provide you with our proposal for the combustion equipment designed specifically for your needs.

Zeeco's flare systems are designed to handle peak releases immediately, with no adverse effects on the flare itself or on the pilots or ignition system. Zeeco's design also offers exceptional reliability and life expectancy as well as provisions for easy maintenance and repair.

Zeeco appreciates the opportunity to propose our products to Technip Italy SpA. We are confident that we offer the best flaring equipment in the world at competitive prices. Should you have additional questions or require additional information, please feel free to contact us.

Best Regards,

Rachel Smith
Flare Application Engineer
(reach me by email at: rachel_smith@zeeco.com)

AVAILABLE ATTACHMENTS

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ATTACHMENTS

Attachment A Company Introduction

COMPANY INTRODUCTION

Since its inception in the early 1980's, Zeeco has been committed to providing quality combustion equipment and services for the petroleum, chemical, petrochemical, pharmaceutical and food processing industries worldwide. To fulfill this commitment, Zeeco built a modern facility on 193 acres just outside of Tulsa, Oklahoma. This complex is the home for Zeeco corporate headquarters, an ASME code manufacturing facility and a comprehensive combustion research and testing center.

Zeeco management knew that a world-class facility alone would not be enough to earn customer recognition as a leader in combustion technology. They knew that they also needed the talents of knowledgeable and innovative people. By recruiting a team of engineers with years of hands-on experience in the design and operation of complex combustion and pollution control equipment, Zeeco has achieved its goal of not merely matching the performance of equipment already on the market but creating the next generation of burners, flares, incinerators and combustion systems.

Zeeco feels strongly that its people and its commitment to quality products and services, set it apart from the competition. Zeeco is flexible enough to provide personalized attention to each customer whether the customer requires a small replacement part or multi-million dollar system. With its sound financial strength, modern facility and creative, knowledgeable staff, Zeeco is your logical choice for combustion equipment both now and in the future.

FLARE SYSTEMS

Having manufactured and installed many of the world's largest and most complex flare systems, Zeeco has consistently shown the ability to satisfy any customer requirement. In addition to standard utility flares, Zeeco offers a comprehensive selection of smokeless flares for new installations and retrofits including steam-assisted, air-assisted, gas-assisted, high-pressure/low-pressure, staged, sonic, ground and enclosed models. Zeeco manufactures flares for numerous applications including refineries, petrochemical and gas plants, offshore platforms, pulp and paper mills, landfills and food processing plants.

Zeeco also offers comprehensive engineering services to design, build and erect multi-million dollar flare projects. Zeeco systems include self-supported, guy-supported and derrick-supported flare stacks as well as offshore boom-mounted flares, portable flares and demountable flares.

Zeeco also has the ability to develop specialty flares for custom applications. For example, Zeeco accepted an industry challenge to develop a crude oil flare which could substantially reduce pollution by decreasing the level of smoke and hydrocarbon fallout produced during offshore well testing. The result was the introduction of the ZLF Flare, rated more than 99.99% efficient by independent industry testing firms.

Auxiliary flare system equipment available from Zeeco includes purge reduction devices, liquid seals, knock-out drums and the most reliable pilot ignition systems. Zeeco also refurbishes existing flares and provides spare parts for their flare equipment and that of other flare manufacturers.

ZEECO

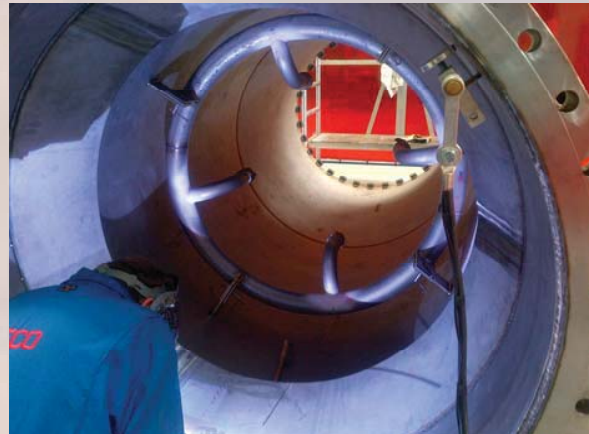
BURNERS FLARES INCINERATORS AFTERMARKET PRODUCTS & SERVICES



ZEECO EUROPE

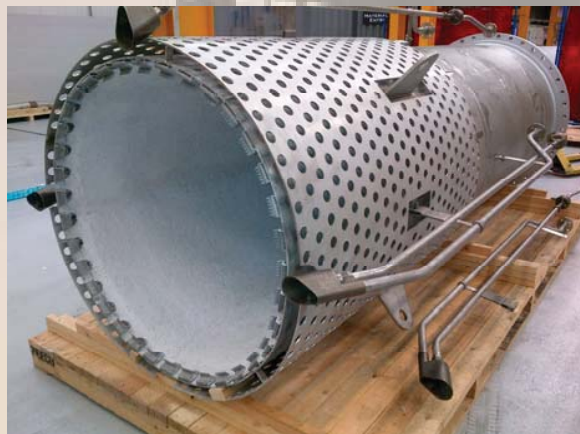
MANUFACTURING, PRODUCTION & SERVICES CAPABILITIES

Zeeco Europe continues its strong and steady growth in the manufacture of flare and power burner plant and has increased its staffing including its industry unique multi-skilled technician service supporting 'all products' from its state of the art European headquarters in Rutland.



UK, North Sea fields, Austria, Germany, Italy, Spain, Poland, Pakistan, KSA, Nigeria, Kazakhstan and South African markets. These for a client base including BP, Shell, Aramco, Sasol, Valero, Borealis, Petrofac, Respol and Ineos.

The major plant items manufactured include those above and, as one would expect from an industry leader, the standards compliance was maintained and all document requirements were met in line within the exacting client QC requirements. Industry standard equipment compliance is catered for through bespoke contractual development to ensure the client gets their unique requirements catered for at competitive market pricing. Our business model has been developed over 30 years of oil and gas sector industrial experience and our reference lists support this.



Projects have been executed within Refinery and Petrochemical applications since its emergence in manufacturing in 2010 within the

We also cater for end user support though and can support retrofits of for all our product ranges again to clients exacting needs.



The control in project management through Zeeco's ISO 9001 accredited QMS ensures an iterative process of review leading into a lean manufacturing process. The client has as much control as they require ensuring their inspection requirements are catered for; providing the control you demand within the overall manufacturing and/or service process. The product you therefore get and pay for is in every case, exacting and unique until you require end user support. At this point our document control and final paperwork will ensure you get exemplary performance, supply and support for your unique product on a repeatable basis.

In the case of pilot burners and igniters we can support factory testing of your product on your fuel using your ignition and flame monitoring equipment in service prior to shipment.



Your unique product can also be integrated with exemplary service supply. Zeeco support the full array of potential service requirements for any works program. From pre-shutdown assessment, project installation, supervision, commissioning and specialist support in emergency cases through to optimization, site training and any specific client programs.

Our progress and project management acumen has enabled the above developments to date but



we see further need and opportunity and again are about to expand within another area of expertise and our parent companies developed portfolio. This is in line with our original business model for our UK facility but 18 months ahead of schedule.



The next phase, the development of a wiring facility, to support full panel builds, BMS, HEI, FFG and the other major component builds that fire, monitor and control the associated flare and power burners we manufacture. Again this is being developed in line with current industry best practice and all the associated standards that will be required to meet compliance requirements for the European norms.



For us technical excellence and innovation goes hand in hand with commercial success and here at Zeeco we know our products and expertise will always be of the highest value in any market. We will not always be cheapest but we will always price effectively for the market and strive for best value. We are the World's number one flare vendor and a market leader in all of our other combustion and environmental solutions division through best business practices.



Within our European based UK facility your unique plant can be project managed and manufactured under your QC requirements thereby ensuring the final products are engineered in an environment purpose built for industry best practice. With material segregation, traceability, staging, 1st materials entry, raw material manipulation, fabrication, inspection, testing, finishing and shipping all built in.



Raw materials receiving with your project items post PMI, where required, in bespoke project bins staged prior to manufacture.



Jigs are used for set up manufacture wherever feasible to ensure you get a repeatable product.



Six fitted welding bays for major stainless and alloy processing. Builds within PED up to module H, ASME under stamps S – Sec I - Power Boilers, U – Sec. VIII Div. 1 – Pressure Vessels, R – 'Authorised for repair and alteration', NORSOK, SANS working under TA Luft and other National control boards, as required, through customer development individual build QC elements.



First materials entry is a segregated area with a negative air balance. Zeeco try in every case to maintain quality throughout the fabrication process. Quality you require and we demand.



All your work is undertaken by competent staff with all the associated coding your work requires. Inspected in house by our CSWIP Authorised Welding Coordinator to the Zeeco standard over and above any AIA requirements you may deem necessary to your QC program.



Mild steel working is undertaken in a 'separate building' in dedicated bays with separate tooling. Ensuring we maintain true segregation wherever feasibly practicable.



We want your program to be as smooth as possible and we undertake PM as a key strategy to ensure we can wherever be prepared. Planning at every stage is fundamental for us,

key for you and ultimately we believe will aid us in building reputation and we truly hope relationships with key clients such as yours.



Zeeco backs all its capabilities with bespoke technical support detailed to the industry product groups need. As an example development within our power burner provision has seen us support assessments and development upgrades ensuring compliance is met under the associated worldwide safety and emission standards. We have undertaken review and execution for all elements within this market so they know compliance and due diligence is never compromised.

General standards:

Zeeco Quality System is certified to ISO 9001:2008 with welding carried out in accordance with ISO 3834-2.

Zeeco design and fabricate in compliance with ANSI/ASME, PED, ATEX, NORSOK, SANS, TA-LUFT.



Zeeco is the trusted worldwide source for the design and manufacturing of combustion and environmental solutions for the refining, petrochemical, production, power and pharmaceutical industries since 1979. ZEECO® product lines include next generation ultra-low emission burners, gas and liquid flaring systems and hazardous waste incineration. Zeeco's corporate headquarters covers over 250 acres (1 km²) near Tulsa, Oklahoma (USA) in a modern debt-free facility that includes a 73,000 square-foot (6,700 m²) manufacturing facility and one of the industry's largest combustion research and testing facilities. Zeeco subsidiaries reside in Houston, TX, USA, Plainville, CT, South Korea, India, China, Saudi Arabia, Germany, Italy, Japan, Canada, Australia, and Brazil.

Please contact any of our offices for all your combustion needs in flaring and flare gas recovery, power and process burners, incinerators, thermal oxidisers, service, training or other support services to any of the aforementioned plant



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ATTACHMENTS

Attachment B Commercial Proposal

COMMERCIAL PROPOSAL

Scope of Supply

Our scope of supply will include:

- 1) General Arrangement Drawings for customer approval.
- 2) Operation & Maintenance Manual.
- 3) The equipment necessary for flaring the waste streams as specified in the inquiry documents, including:

ENCLOSED GROUND FLARE

BASE Package to Include the Following:

Burner Runners/Manifold

Premix High Stability Pilot Assemblies

Dual Element Type K Pilot Thermocouples (1 per pilot), Retractable with Pilot

Combination Primary Auto HEI w/ Back-up Manual FFG (HEI/FFG-2) Ign. System

Process Engineering & Design Work for the Complete Flare System

Conduit and Thermocouple Wiring from Wind Fence to Local Panel

Conduit and HEI Ignition Wiring from Wind Fence to Local Panel

Utility Piping & Supports Around the Flare Base to Pilots

Flare Gas Inlet Manifold from Inlet to Burner Riser Connections

Vertical Cylindrical Combustion Chamber with Supports

Ceramic Fiber Refractory Lining (Modules) for Combustion Chamber

System Staging Logic Diagrams and Narrative for DCS Programming.

Ladders & Platforms on Staging Manifold for Access

Staging Valves

Wind Fence

Interconnecting Piping, Wiring, Conduit Between Flare/LCP (LCP within 10' of WF)

Final Documentation Only Provided in Italian

COMMERCIAL PROPOSAL

Scope of Supply (Continued)

Our Scope of Supply does NOT include:

- 1) Stack or Piping External Insulation, Fireproofing, or Heat Tracing.
- 2) Field Assembly and / or Erection.
- 3) Commissioning, Start-up, Supervision, Training, etc. (PER DIEM BASIS).
- 4) Foundation Design / Supply or Civil Engineering.
- ~~5) Interconnecting Piping, Wiring or Conduit Between Stack Base and LCP.~~
- 6) Ocean or Inland Freight to Jobsite.
- 7) Shop Details / Fabrication Drawings of Proprietary Equipment.
- 8) Any Containerization of Equipment for Shipment or Storage Purposes.
- 9) Flare Stack Base Plate Templates.
- 10) Foundation Imbedded Anchor Bolts.
- 11) Spare Parts Quoted Separately and Priced Lists Included in Proposal.
- 12) Any Motor Starters or Motor Drivers or Motor Controls.
- 13) Any Third Party Inspection / Testing / Certification Services.
- 14) Any Shipment of the Equipment (OPTIONAL).
- 15) Knockout Drum.
- 16) IR Montiors / Flame Scanners.
- 17) Translation of Drawings (Except for Final).
- 18) Cladding
- 19) Performance Testing of Burners / EGF Unit.
- ~~20) Installation of Ceramic Fiber Lining.~~
- 21) Any Additional Wiring/Piping/Conduit (Distance b/t LCP and Enclosure is Assumed 10').
- 22) Liquid Seal Drums (Optional)
- 23) Any Bypass Staging Devices

ATTACHMENTS

Attachment C

Process Conditions



Process Conditions -- Metric Units

Client: Technip Italy SpA	Zeeco Ref.: T59200FB	Date: 30-Jun-17
Location: Italy	Client Ref.: 0703270C001	Rev. 1

	Mol %					
	Case 1A	Case 1B	Case 1C	Case 1D	Case 2A	Case 2B
METHANE	25.80	13.00	12.00		55.00	
ETHANE	2.20		3.00			
PROPANE	3.10					
BUTANE	15.00		2.00			7.00
PENTANE			2.50			
HEXANE						
HEPTANE						
OCTANE						
NONANE						
DECANE						
DODECANE						
TRIDECANE						
CYCLOPENTANE						
ETHYLENE	15.40		15.00			
PROPYLENE	17.20		5.00			
BUTYLENE						45.00
ACETYLENE						
BENZENE			2.50			
TOLUENE			3.00			
XYLENE			5.00			
STYRENE			4.00			
VINYL ACETATE						1.00
HYDROGEN SULFIDE						
SULFUR DIOXIDE						
AMMONIA						
AIR						
HYDROGEN	20.70	87.00	6.50		45.00	
OXYGEN						
NITROGEN	0.60			100.00		
WATER			38.00			
BUTADIENE			1.50			46.50
METHANOL						
Total	100	100	100	100	100	100
Mol. Wt.	27.03	3.84	34.08	28.01	9.73	55.33
L. H. V. (kcal/nm ³):	13,692	3,355	12,805	0	5,865	26,581
Temperature (Deg. C):	201.0	201.0	201.0	201.0	152.0	152.0
Avail. Static Pressure (kg/cm ²)g:	0.3	0.306	0.306	0.306	0.306	0.306
Flow Rate (kg/hr):	1,500	1,500	1,500	1,500	10,000	10,000
Smokeless Rate (kg/hr):	1,500	1,500	1,500	1,500	10,000	10,000



Process Conditions -- Metric Units

Client: Technip Italy SpA	Zeeco Ref.: T59200FB	Date: 30-Jun-17
Location: Italy	Client Ref.: 0703270C001	Rev. 1

	Mol %					
	Case 3A	Case 3B	Case 4A	Case 4B	Case 5A	Case 5B
METHANE	93.00		91.30	26.00		
ETHANE					9.00	
PROPANE		2.80			3.00	
BUTANE		0.50				6.50
PENTANE						
HEXANE						
HEPTANE						
OCTANE				4.00		
NONANE				36.00		
DECANE				16.00		
DODECANE						
TRIDECANE						
CYCLOPENTANE						
ETHYLENE			3.20			
PROPYLENE						
BUTYLENE						
ACETYLENE						
BENZENE						
TOLUENE						
XYLENE						
STYRENE						
VINYL ACETATE						1.70
HYDROGEN SULFIDE						
SULFUR DIOXIDE						
PROPADIENE		76.20			87.00	
AIR						
HYDROGEN	7.00		5.50	6.50	1.00	
OXYGEN						
NITROGEN						
WATER				11.50		
BUTADIENE		20.50				91.80
METHANOL						
Total	100	100	100	100	100	100
Mol. Wt.	15.1	43.2	15.7	79.9	38.9	54.9
L. H. V. (kcal/nm ³):	8,136	21,225	8,404	37,394	19,283	26,282
Temperature (Deg. C):	83.0	83.0	276.0	276.0	75.0	75.0
Avail. Static Pressure (kg/cm ²):	0.31	0.306	0.306	0.306	0.306	0.306
Flow Rate (kg/hr):	15,000	15,000	25,000	25,000	35,000	35,000
Smokeless Rate (kg/hr):	15,000	15,000	25,000	25,000	35,000	35,000



Process Conditions -- Metric Units

Client: Technip Italy SpA	Zeeco Ref.: T59200FB	Date: 30-Jun-17
Location: Italy	Client Ref.: 0703270C001	Rev. 1

	Mol %					
	Case 6A	Case 6B	Case 7A	Case 7B	Case 8A	Case 8B
METHANE			4.00	0.01	72.00	
ETHANE			22.00	18.83		
PROPANE		100.00		0.00		
BUTANE						
PENTANE						
HEXANE						
HEPTANE						
OCTANE						
NONANE						
DECANE						
DODECANE						
TRIDECANE						
CYCLOPENTANE						
ETHYLENE	100.00		73.94	79.96		28.00
PROPYLENE				0.12	28.00	72.00
BUTYLENE						
ACETYLENE				1.08		
BENZENE						
TOLUENE						
XYLENE						
STYRENE						
VINYL ACETATE						
HYDROGEN SULFIDE						
SULFUR DIOXIDE						
PROPADIENE						
CYCLOPENTADIENE						
HYDROGEN			0.06	0.00		
OXYGEN						
NITROGEN						
WATER						
BUTADIENE						
METHANOL						
Total	100	100	100	100	100	100
Mol. Wt.	28.05	44.10	28.00	28.43	23.33	38.15
L. H. V. (kcal/nm ³):	14,106	21,795	14,123	14,316	11,910	18,738
Temperature (Deg. C):	223.0	223.0	43.0	43.0	88.0	88.0
Avail. Static Pressure (kg/cm ²)g:	0.306	0.306	0.306	0.306	0.306	0.306
Flow Rate (kg/hr):	80,000	80,000	130,000	130,000	130,000	130,000
Smokeless Rate (kg/hr):	80,000	80,000	130,000	130,000	130,000	130,000

ATTACHMENTS

Attachment D

Specification Sheets:

- Ground Flare Tip Specification Sheet
 - Flare Pilot Specification Sheet
 - Enclose Ground Flare Specification Sheet
- Combo HEI / FFG Ignition Specification Sheet
- Utility Piping Scope of Supply Specification Sheet
 - Enclosed Flare System Description
- Typical High-Temp Thermocouple Wiring Spec Sheet
 - Typical High-Temp Ignition Wiring Spec Sheet
 - General Refractory Information

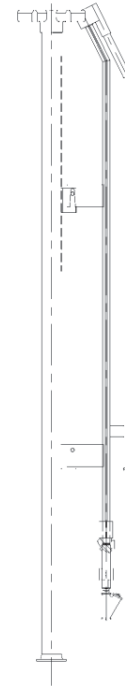


Flare Tip Specification Sheet

Client: Technip Italy SpA	Zeeco Ref.: T59200FB	Date: 30-Jun-17
Location: Italy	Client Ref.: 0703270C001	Rev. 1

General Information:

Tag No.:	F-1	
Model:	MJ-4	Type: MultiJet
Length:	3.05	m
Weight:	29	kg
No. of Tips:	140	



(Typical drawing only)

Design Case:

Governing Case:	Case 8A
Molecular Weight:	23.3
L. H. V. :	11,910 kcal/nm ³
Temperature:	88 Deg. C
Available Static Pressure:	0.31 kg/cm ²
Design Flow Rate:	130,000 kg/hr
Approximate Exit Velocity:	152 m/s
Mach No.:	0.01
Approx. Tip Press. Drop:	0.09 kg/cm ²

Construction:

Riser Material:	316 SS - Welded	Casting Material:	A-297 HK
Riser Diameter:	4"	Flame Retention Ring:	n/a
Riser Thickness:	Schedule 10S	Lifting Lugs:	NO

Surface Finish (Carbon Steel Surfaces):

Surface Preparation:	None	Primer:	None
Paint (c. s. surfaces):	None		

Connections:

	Qty.	Size	Type	Material
N1 - Flare Gas Inlet:	140	4 "	Weldolet	304 SS

Miscellaneous Notes:

1. Burners and Riser pipes are welded together in the shop and shipped to the field.
2. Burners are field welded to the burner runners at the jobsite.
3. The first stage (3 total burners) will be steam assisted for smokeless operation.



Pre-Mix Flare Pilot Assembly Specification Sheet

Client: Technip Italy SpA	Zeeco Ref.: T59200FB	Date: 30-Jun-17
Location: Italy	Client Ref.: 0703270C001	Rev. 1

General Information:

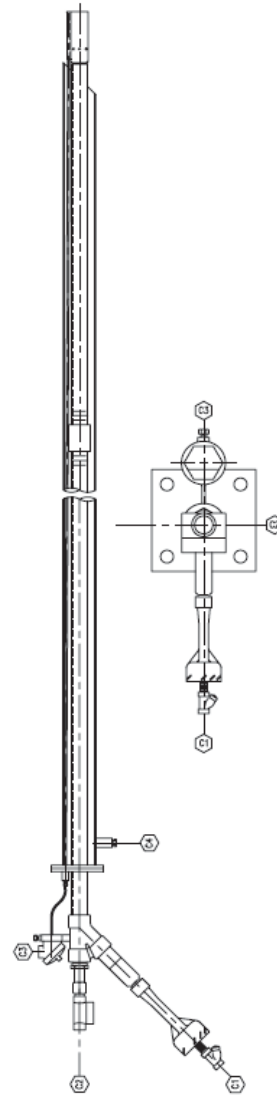
Tag No.:	FP-1
Model:	HSLF
Length:	2.78 m
Weight:	31 kg
Pilot Type:	Pre-Mix High Stability
Ignition Type:	Flame Front Generator / High Energy Spark

Process Design Data:

Design Heat Release:	16,391 kcal/hr
Fuel Gas MW:	18.00
Fuel Gas LHV:	9,372 kcal/nm ³
Fuel Gas Temperature:	37.8 Deg. C
Fuel Gas Inlet Pressure:	1.05 kg/cm ²
Fuel Gas Flow rate:	1.74 nm ³ /hr
Design Wind Velocity:	67.1 m/s
Design Rainfall:	254.00 mm/hr
Mounting Position:	Vertical
Thermocouple Type:	K Ungrounded

Construction:

Pilot Firing Tip:	HK
Windshield Assembly:	HK
Integral Thermowell:	HK
FFG Ignition Line:	310 SS
Mounting Brackets:	HK
Premix Fuel Line:	310 SS
Thermocouple Sheath:	310 SS
Thermocouple Head:	Cast Iron w/ Ceramic Term.
Fuel Mixer / Spud Assembly:	CF-3M / 18-8
Fuel Strainer Assembly:	CF-8M
HEI Probe and Support:	310 SS
HEI Junction Head:	Cast Iron w/ Ceramic Term.



Connections:	Qty.	Size	Type	Material
C1 - Fuel Gas Inlet:	1	1/2"	FNPT	CF8M
C2 - FFG Ignition Inlet:	1	1 "	SW	310 SS
C3 - Thermocouple:	1	3/4"	Conduit	Cast Iron
C4 - HEI Ignition:	1	3/4"	FNPT	Cast Iron

Misc. Notes: (see ignition system datasheet for type applicable to this quote)

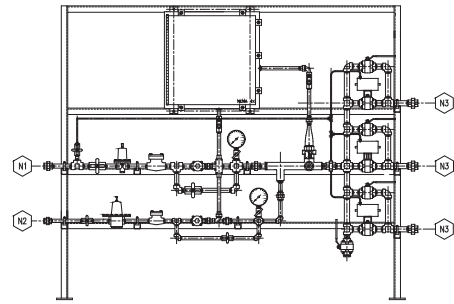
1. Pilot mixer assembly is investment cast, high efficiency computer modeled venturi section.
2. Thermocouples are simplex fixed type, but removable with the retractable pilot design.



High Energy Electronic Ignition / Flame Front Generator Specification Sheet

Client: Technip Italy SpA	Zeeco Ref.: T59200FB	Date: 30-Jun-17
Location: Italy	Client Ref.: 0703270C001	Rev. 1

General Information:	
Tag No.:	HEI/FFG-1
Model No.:	HEIC/LMM-10-DT/S
Operation:	Manual/Automatic
No. of Pilots Ignited:	10
Area Classification:	Zone 2 IIC T3
Spark Intensity:	Approx. 1,000 Volts
Fuel Gas Data:	
Molecular Weight:	18.0
L. H. V.:	9,410 kcal/nm ³
Temperature:	37.8 Deg. C
Pressure:	1.05 kg/cm ² g
Utility consumption:	
Pilot Gas (Per Pilot):	1.74 nm ³ /hr
Pilot Gas (Total):	17.41 nm ³ /hr
Ignition Gas (Intermittent):	2.95 nm ³ /hr
Ignition Air (Intermittent):	29.47 nm ³ /hr
Power Available:	220 Volt, 1 Phase, 50 Hertz



(Typical drawing only)

Construction:			
Fuel Gas Piping:	Carbon Steel	Ignition Probe Mat'l:	310 SS
Mounting Rack:	Carbon Steel	No. Thermocouples/Pilot:	1
Enclosure:	Ex'p	Thermocouple Type:	K
Sun / Rain Shield:	No	Ignition Probes per Pilot:	1
		Propane Backup:	No

Surface Finish (Carbon Steel Surfaces):			
Surface Preparation:	SSPC-SP1	Primer:	Red Oxide
Paint (c. s. surfaces):	Grey Enamel	Enclosure Paint:	Manufact. Std.

Connections:				
	Qty.	Size	Type	Material
N1 - Instrument Air Inlet:	1	1 "	3000# Thrd. Union	Galvanized C.S.
N2 - Pilot Gas Inlet:	1	1/2"	3000# Thrd. Union	Carbon Steel
N3 - Ignition Gas Outlet:	10	1 "	3000# Thrd. Union	Carbon Steel
Pilot Gas Out. (Not Shown):	1	1/2"	3000# Thrd. Union	Carbon Steel
Ignition Probe Inlet (On Pilot):	1	3/4"	FNPT	Cast Iron

Miscellaneous Notes:

1. Control is through customer DCS. PLC control has been provided as an option only.



Enclosed Flare Stack Specification Sheet

Client: Technip Italy SpA	Zeeco Ref.: T59200FB	Date: 30-Jun-17
Location: Italy	Client Ref.: 0703270C001	Rev. 1

General Information:

Tag No.:	EF-1
Overall Height:	47.2 m
Model No.	EF-115/50/135
Approximate Heat Release:	5,900 MMBTU/hr

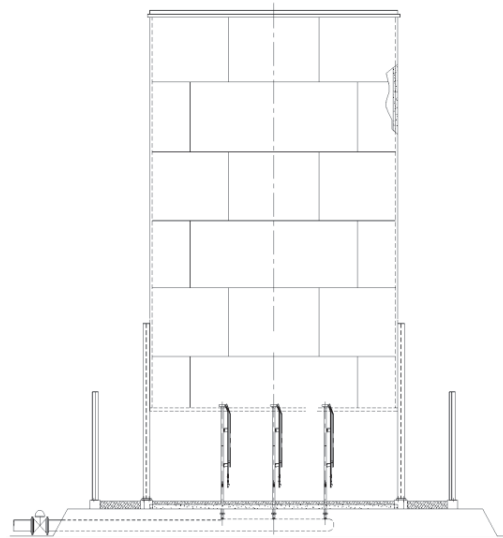
Design Criteria:

Wind Design Code:	BS
Wind Speed (Structural):	33.00 m/s
Importance Factor:	1.00
Seismic Design Code:	UBC
Seismic Zone:	0
Structural Design Code:	EN1991-1,-3 / EN1993-1,-3,-4,-6

Manifold Max. Design Temperature:	280 Deg. C
Manifold Min. Design Temperature:	-140 Deg. C
Chamber Max. Design Temp.:	70 Deg. C
Chamber Min. Design Temp.:	-5 Deg. C

Manifold/Runner Design Pressure:	3.50 barg
Chamber Design Pressure:	Atmospheric

Manifold/Runner Corrosion Allow.:	0.00 mm
Chamber Corrosion Allow.:	0.00 mm



(Typical drawing only)

Construction:

Chamber Diameter:	15.2 m	Runner/Manifold Material:	304 SS or EQ.
Chamber Height:	35 m	Chamber Material:	Carbon Steel
Refractory Lining:	Ceramic Fiber Modules	Walkway Over Runners:	None
		Ladders & Platforms:	Yes

Surface Preparation:	SSPC-SP-6	Primer:	Inorganic Zinc
Int. Coat:	Anti-acid Coating	Finish Paint:	Yes

Utility piping:

Per Attached Utility Piping Scope of Supply

Miscellaneous Notes:

1. Combustion chamber enclosure is comprised of rolled sections for field assembly.
2. Ceramic fiber modules materials are shipped loose for field installation. Anchor pins will be pre-fabricated in shop.



Utility Piping Scope of Supply

Client: Technip Italy SpA		Zeeco Ref.: T59200FB		Date: 30-Jun-17								
Location: Italy		Client Ref.: 0703270C001		Rev. 1								
Flare Tag No.	Description	Qty	Pipe Size	Pipe Sch.	Pipe Material	Origination Point	Termination Point	Termination Rating	Termination Type	Termination Material	Paint	Insulation
F-1	Pilot Gas Line	Lot	1"	Std.	Carbon Steel	Ignition Rack	Runners	3000#	Thrd. Union	Carbon Steel	Inorganic Zinc	n/a
F-1	Pilot Gas Line	Lot	0.5"	Std.	Carbon Steel	Runners	1st Pilot on Each Runner	3000#	Thrd. Union	Carbon Steel	Inorganic Zinc	n/a
F-1	Ignition Gas Line	Lot	1"	Std.	SS	Base of Stack	Flare Tip	3000#	Thrd. Union	Carbon Steel	Inorganic Zinc	n/a
F-1	Steam Assist	Lot	2"	Std.	Carbon Steel	Inlet Manifold	Stage 1 Burners	150#	RF	Carbon Steel	Inorganic Zinc	n/a
F-1	Nitrogen Purge	Lot	Various	Std.	Carbon Steel	Inlet Manifold	Runners	150#	RF	Carbon Steel	Inorganic Zinc	n/a
F-1	Instrument Air	Lot	Various	Std.	Carbon Steel	Inlet Manifold	Staging Valves	3000#	Coupling	Carbon Steel	Galvanized	n/a
F-1	Flare Gas Manifold	Lot	Various	Std.	316 SS	Inlet Manifold	Staging Valve Outlet	150#	RF	SS	n/a	n/a
F-1	Flare Gas Runners	Lot	Various	Std.	316 SS	Stagin Valve Outlet	Burner Risers	150#	RF	SS	n/a	n/a
F-1	TC/HEI Conduit	Lot	2.5"	Std.	Carbon Steel	Ignition Rack	Pilot	n/a	Coupling	Carbon Steel	Galvanized	n/a

Notes:

1. All utility piping larger than 2" will be supplied in pre-fabricated spools.
2. Piping 2" and smaller will be supplied in random lengths for field fabrication and installation by others.
3. Base of Stack = Approximate Flare Stack Inlet Elevation.

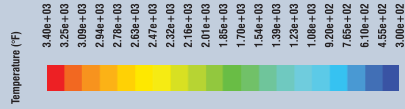
ENCLOSED GROUND FLARE

Enclosed Flame, Open Record.

Enclosed smokeless flaring of waste gases in populated, tightly controlled, or small footprint plants calls for our proven ZEECO® Enclosed Ground Flare. Designed and staged to fully utilize the available pressure in the waste stream, our enclosed ground flare operates smokelessly without steam, even when flaring hydrocarbon gases as heavy as butadiene. If your plant is near a population center, environmentally sensitive area or if your space is limited, the experienced team at Zeeco will custom design an enclosed ground flare system to minimize visible flaring impacts at the plant boundary. From the ground up, our enclosed ground flares protect facilities, employees, reputations, and the environment worldwide.

Proprietary, proven Zeeco investment cast burner heads using free-jet theory promote smokeless flaring with easy maintenance. Our innovative labyrinth shield design eliminates any line of sight into the combustion chamber. Our shield design creates more efficient air induction, allowing our flare to achieve higher destruction efficiencies than competing technologies. In fact, our enclosed ground flare is engineered for better air intake and is the quietest flare choice without any radiation at grade.

As a worldwide leader in combustion technology, Zeeco has both the extensive engineering experience and intensive testing capabilities you need to ensure a superior enclosed ground flare solution. These systems are complex; choose a provider with proven expertise in the design, installation, and commissioning of the equipment. With Zeeco, you can be certain your flare will operate smokelessly under varying amounts of pressure, flow, and gas compositions. Reduce noise and eliminate radiation at grade without sacrificing land or compromising efficiency.



CFD No Wind Results - Centerline Temperature (F)

Our testing smokes the competition.

Zeeco's expert engineering group goes the extra mile with every smokeless enclosed ground flare solution we design. Our standard approach is anything but "standard." We use advanced Computational Fluid Dynamics (CFD) to model your specific process conditions against the actual equipment design, allowing us to accurately simulate flame behavior and interaction under varying wind and weather conditions, fuel types, and flows. We use wind tunnel testing to accurately predict how wind will affect live performance. The result? A system with reliable, superior results and one that lasts significantly longer.

The same commitment to excellence applies to our complete combustion testing process. Our Combustion Research and Test Facility was the first in the world to become ISO 9001-2000 certified, and our staff strives to stay ahead of rapidly changing regulations and emission requirements. With our flare testing facilities and multi-fuel capabilities from natural gas to butadiene and more, Zeeco can simulate flare system performance in a variety of conditions.



The Zeeco difference.

Our only business is the combustion business. By concentrating on what we do best, Zeeco has grown into a worldwide leader in combustion solutions. We are a privately held company whose ownership stays highly involved in daily operations, with upper management comprised of the world's leading combustion experts.

When you call Zeeco, we answer. When you make a request, you get a quick, efficient response. Our sales, engineering, and purchasing groups work hand-in-hand to deliver highly competitive quotes and heroic turnaround times. We stand ready and willing to travel anywhere in the world to discuss upcoming projects firsthand, and to ensure that every existing project runs seamlessly.

Design Features

- Engineered for longer life and reliable service
- Lower maintenance cost from investment cast burner heads

Typical Applications

- Small plant footprints
- Populated areas
- Locations requiring reduced environmental impact



100% Xylene Testing in Zeeco's Test Facility

Enclosed Ground Flare with Interior Chamber Cast Burner Heads



ZEECO

Zeeco, Inc.
22151 East 91st Street
Broken Arrow, Oklahoma 74014
Tel: +1 918 258 8551
zeeco.com



Zeeco High Temperature Thermocouple Extension Wire

Part Number	KX-16-EGG
Conductors	
Size:	16 AWG
Construction:	Solid (Parallel)
Material:	Chromel / Alumel
Insulation Material:	Enamel with Fiberglass Braid
Number of Conductors:	2
Conductor Color Code:	Yellow (+), Red (-)
Inner Jacket Material	Fiberglass Braid
Outer Jacket Material	FEP Pulling Jacket
Jacket Color	Yellow
Finished Diameter (nom)	0.115" x 0.185" [2.9mm x 4.7mm]
Maximum Operating Temp	900° F / 482° C
Agency Approvals	Construction to ISA MC96.1
Options	Color Coding To IEC



Zeeco High Temperature Thermocouple Extension Wire

ZEECO

Zeeco, Inc.
22151 East 91st Street
Broken Arrow, Oklahoma 74014
Tel: +1 918 258 8551
zeeco.com



Zeeco High Temperature HEI Ignition Wire

Part Number	MG122FEP600V
Conductors	
Number of Conductors:	2
Size:	12 AWG
Construction:	Stranded (65/30)
Material:	NPC27%
Insulation Material:	Fiberglass Braid
Insulation Thickness (nom):	0.025" / 0.006" [0.635mm / 0.152mm]
Conductor Color Code:	(1) Tan, (1) Tan with Black Stripe
Jacket Material	FEP Pulling Jacket
Jacket Thickness (nom)	0.010" [0.254mm]
Jacket Color	Clear
Finished Diameter (nom)	0.334" [8.484mm]
Maximum Operating Temp	840° F / 450° C
Agency Approvals	UL5107 / CSA Inner Conductors
Special Notes	Overall Mica Glass Tape Binder Over Cabled Core & Fillers for Added Insulation
Options	10 AWG (long distance applications)



Zeeco High Temperature HEI Ignition Wire

Anchor-Loc^{®2} Ceramic Fiber Modules

Introduction

Anchor-Loc^{®2} ceramic fiber modules extend the successful performance of standard Anchor-Loc folded modules to a product form featuring laminated fiber blanket construction. This product combines advancements in fiber chemistry, manufacturing technology, and attachment hardware design to provide an economical lining system for a wide range of heat processing vessels.

The Fibermass[®] manufacturing technique used to fabricate Anchor-Loc² modules bonds layers of refractory ceramic fiber blanket into a strong pliable fiber block. Spun ceramic fiber blankets which feature high tensile strength for improved resistance to mechanical abuse, vibration, and gas velocity are used in the construction of Anchor-Loc² Fibermass blocks. A proprietary fiber treatment decreases fiber dusting and irritation while increasing block flexibility, making the module easy to compress into place. Modules are available in two temperature grades based on construction from Durablanket[®] HP-S or Durablanket 2600. The availability of standard or high density blocks in each temperature grade results in a product which meets a wide range of application needs.

In all Anchor-Loc² modules, Fibermass blocks are secured to the metallic module anchor with a pair of stainless steel support tubes. Flanges on one end of the support tubes effectively lock the position of the tubes relative to the anchor at the time of installation.

Weld-Loc^{®2} Ceramic Fiber Modules

The standard Anchor-Loc² modules are supplied with the Weld-Loc[®] attachment system for maximum design flexibility and high installation rates.

During installation, the special Weld-Loc stud assembly is fused to the furnace casing and a hex nut is torqued on the weld stud, drawing the module to the casing plate.

Advantages which are offered by the Weld-Loc attachment system include:

- High installation speed
- Ease and simplicity of installation
- Random placement of modules on the casing
- Positive torque test of the weld



Thread Loc^{®2} Ceramic Fiber Modules

To meet customer specifications or the special design requirements of furnace builders, refineries or petrochemical plants, Anchor-Loc² modules are available on special order with the prewelded Thread Loc^{®2} attachment system.

The Thread Loc² attachment system features a fully threaded weld stud and nut to permit block installation on a pre-engineered stud pattern. The Thread Loc² attachment system for Anchor-Loc² modules offers several advantages:

- Compatibility with mastic coatings, backup insulation, and foil vapor barriers.
- Module design compensates for variations in stud placement.
- Access to the welded fastener for full testing before the module is installed.

Power-Loc^{®2} Ceramic Fiber Modules

This attachment system provides the advantages of quick, reliable module installation with minimal installation equipment set-up in the MRO (maintenance, repair, and overhaul) market segment.

A hardened steel pin mechanically secures each Power-Loc² module to the steel casing plate. The anchor pin is installed with a special Hilti[®] powder actuated fastening tool and powder booster. Advantages which are offered by the Power-Loc² ceramic fiber module include:

- High installation speed
- Casing preparation is eliminated
- Permits random placement of modules on the casing
- Ease and simplicity of installation
- Positive mechanical/attachment of modules to the casing plate
- Setup time is reduced

Refer to the product Material Safety Data Sheet (MSDS) for recommended work practices and other product safety information.

Hilti[®] is a trademark of Hilti Tool Corporation.

Typical Product Parameters

Chemical Analysis

Anchor-Loc₂ Modules

	2200°F	2600°F
Al ₂ O ₃	43% - 47%	29% - 31%
SiO ₂	53% - 57%	53% - 55%
ZrO ₂	—	15% - 17%
Na ₂ O	<.5%	—

Available Anchor-Loc₂ Ceramic Fiber Modules

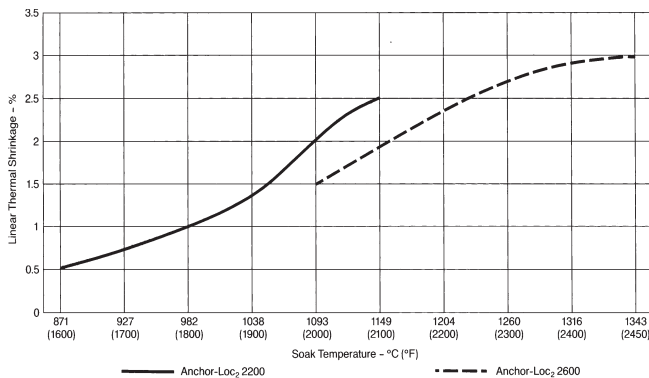
305 mm x 305 mm (12" x 12"), 305 mm x 152.5 mm (12" x 6"),
305 mm x 406 mm (12" x 16"), 2200 Grade Only

Construction	Module Density
Edge Grain Durablanket HP-S	128 kg/m ³ (8 lb/ft ³)
	160 kg/m ³ (10 lb/ft ³)
Edge Grain Durablanket 2600	160 kg/m ³ (10 lb/ft ³)
	192 kg/m ³ (12 lb/ft ³)

Typical Product Properties

Thermal Shrinkage

Anchor-Loc₂ Thermal Shrinkage Data*



*Shrinkage test performed at soak temperature for 24 hours

Module Type	Temperature Grade	Recommended Operating Temperature
Anchor-Loc ₂ 2200 Ceramic Fiber Module	1260°C (2300°F)	1149°C (2100°F)
Anchor-Loc ₂ 2600 Ceramic Fiber Module	1427°C (2600°F)	1343°C (2450°F)

The recommended operating temperature of Fiberfrax products is determined by irreversible linear change criteria, not melting point.

Data are average results of tests conducted under standard procedures and are subject to variation. Results should not be used for specification purposes.

Product Advantages

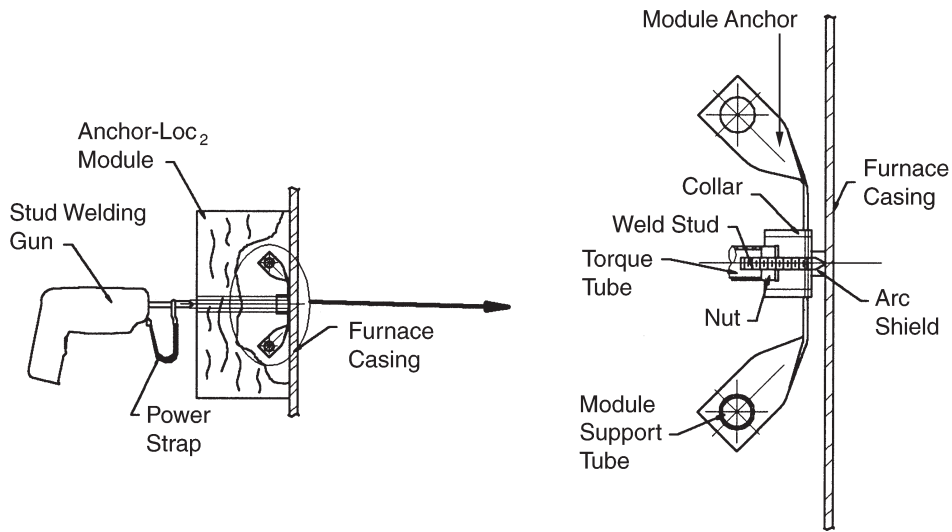
Anchor-Loc₂ ceramic fiber modules offer the same advantages as other Fiberwall furnace linings when compared to refractory construction. They are:

- Faster temperature cycling
- Lower heat storage
- Lower fuel costs
- Increased productivity
- Lower installed cost
- Easier repairs
- Resistance to thermal shock

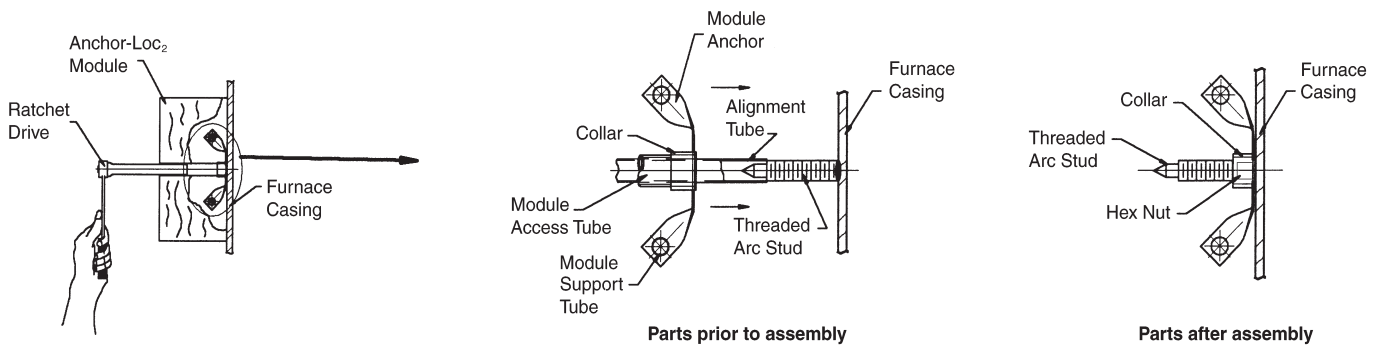
Applications

- Stress relieving furnaces
- Annealing furnaces
- Car bottom heat treating furnaces
- Process heaters
- Reheat furnaces
- Furnace, kiln and boiler linings
- Incineration equipment and stack linings
- Soaking pit covers
- Ladle covers
- Ladle preheaters
- Forge furnaces

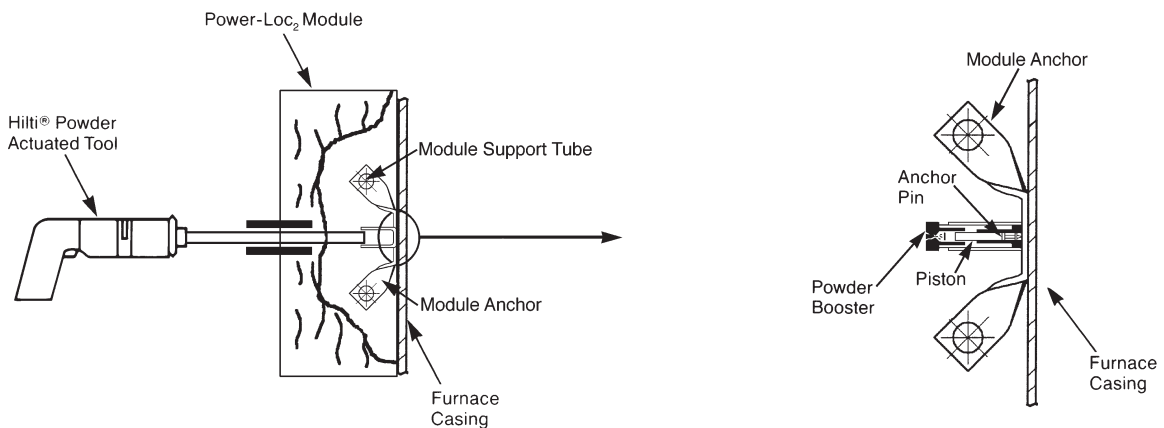
A. Weld-Loc^{®2} Attachment System



B. Thread Loc^{®2} Attachment System



C. Power-Loc^{®2} Attachment System



Anchor-Loc₂ Modules

Anchor-Loc₂ 2200 Modules – 128 kg/m³ (8 lbs/ft³)

Hot Face °C (°F)	Insulation Thickness – mm (in) Cold Face Temperature –	102 (4) °C (°F)	152 (6) °C (°F)	203 (8) °C (°F)	254 (10) °C (°F)
649 (1200)		75 (167)	61 (143)	53 (126)	49 (121)
871 (1600)		111 (232)	88 (192)	76 (169)	68 (155)
1093 (2000)		155 (312)	123 (255)	105 (221)	92 (199)

Anchor-Loc₂ 2200 Modules – 160 kg/m³ (10 lbs/ft³)

Hot Face °C (°F)	Insulation Thickness – mm (in) Cold Face Temperature –	102 (4) °C (°F)	152 (6) °C (°F)	203 (8) °C (°F)	254 (10) °C (°F)
649 (1200)		97 (160)	58 (137)	51 (125)	47 (117)
871 (1600)		104 (220)	83 (183)	72 (162)	64 (148)
1093 (2000)		143 (291)	114 (238)	97 (202)	86 (187)

Anchor-Loc₂ 2600 Modules – 160 kg/m³ (10 lbs/ft³)

Hot Face °C (°F)	Insulation Thickness – mm (in) Cold Face Temperature –	152 (6) °C (°F)	203 (8) °C (°F)	254 (10) °C (°F)	305 (12) °C (°F)
1149 (2100)		122 (252)	103 (219)	91 (197)	83 (182)
1260 (2300)		139 (283)	118 (245)	104 (220)	94 (202)
1316 (2400)		148 (299)	126 (259)	111 (232)	100 (212)

Anchor-Loc₂ 2600 Modules – 192 kg/m³ (12 lbs/ft³)

Hot Face °C (°F)	Insulation Thickness – mm (in) Cold Face Temperature –	152 (6) °C (°F)	203 (8) °C (°F)	254 (10) °C (°F)	305 (12) °C (°F)
1149 (2100)		117 (243)	100 (212)	88 (191)	80 (176)
1260 (2300)		133 (272)	113 (236)	100 (212)	90 (194)
1316 (2400)		141 (287)	120 (248)	106 (223)	95 (204)

All heat flow calculations are based on a surface emissivity factor of .90, an ambient temperature of 27°C (80°F) and zero wind velocity, unless otherwise stated.

All thermal conductivity values for Fiberfrax® materials have been measured in accordance with ASTM Test Procedure C-177. When comparing similar data, it is advisable to check the validity of all thermal conductivity values and ensure the resulting heat flow calculations are based on the same condition factors. Variations in any of these factors will result in significant differences in the calculated data.

For additional information about product performance or to identify the recommended product for your application, please contact the Unifrax Application Engineering Group at 716-278-3899.



Pyro-Bloc Y and Y² Modules

Product Information

Physical Properties	R	ZR	C
Color	white	white	blue/green
Density, pcf (<i>kg/m³</i>)	8, 10, 12, 15 (128, 160, 192, 240)	10, 12, 15 (160, 192, 240)	12 (192)
Thickness, in. (<i>mm</i>) (standard)	3 - 12 (76 - 305)	3 - 12 (76 - 305)	3 - 12 (76 - 305)
Maximum temp. rating, °F (°C)	2400 (1316)	2600 (1427)	2600 (1427)
Melting point, °F (°C)	3200 (1760)	3200 (1760)	3200 (1760)
Continuous use limit, up to °F (°C)	2200 (1204)	2450 (1343)	2500 (1371)

Chemical Analysis (Nominal, %)

Alumina, Al ₂ O ₃	47	37.5	43
Silica, SiO ₂	53	47	54
Zirconia, ZrO ₂	—	15.5	—
Chromia, Cr ₂ O ₃	—	—	3
Loss on ignition, L.O.I.	trace	trace	trace
Other	trace	trace	trace

Thermal Conductivity,

Btu•in./hr•ft²•°F (*w/m•k*) (ASTM C 201)

	8pcf (128kg/m ³)	10pcf (160kg/m ³)	12pcf (192kg/m ³)	15pcf (240kg/m ³)
Mean temperature				
@ 500°F (260°C)	0.53 (0.08)	0.52 (0.07)	0.50 (0.07)	0.49 (0.07)
@ 1000°F (538°C)	1.13 (0.16)	1.04 (0.15)	0.96 (0.14)	0.84 (0.12)
@ 1500°F (816°C)	1.97 (0.28)	1.81 (0.26)	1.66 (0.24)	1.43 (0.21)
@ 2000°F (1093°C)	2.95 (0.43)	2.69 (0.39)	2.45 (0.35)	2.19 (0.32)

Installation

Modules are installed by the instant action of our industry standard Pyro-Bloc stud and stud gun. In one easy step the module is positioned against the furnace shell, securely welded*, and tightened into place in less than three seconds. This unique process self checks and quality tests each and every weld for absolute integrity. The Pyro-Bloc modules installation procedure eliminates the need for a time consuming stud layout and prewelding of anchors or brackets. Modules are easy to cut and fit in the field for special shape requirements.

* Independent test results on the strength of the Pyro-Bloc stud are available upon request.

The values given herein are typical average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Therefore, the data contained herein should not be used for specification purposes. Check with your Thermal Ceramics office to obtain current information.

Thermal Ceramics, Superwool and 607 are trademarks of The Morgan Crucible Company plc. Pyro-Bloc, Y and Y² are trademarks of Thermal Ceramics Inc.

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F: +56 (2) 854 1952

Colombia

T: +57 (2) 2282935/2282803/2282799

F: +57 (2) 2282935/2282803/23722085

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F: +50 (2) 4730 601

Venezuela

T: +58 (241) 878 3164

F: +58 (241) 878 6712

Website: www.thermalceramics.com



The Pyro-Bloc Y and Y² modules are manufactured from a high purity blend of raw materials which are used to produce R Grade (alumina-silica), ZR Grade (alumina-zirconia-silica), and C Grade (alumina-silica-chromia) ceramic fibers. The modules utilize a specially designed 316 stainless steel internal support system and industry standard Pyro-Bloc stud system. In addition, it has no hot face, cold face, or side constrictions which permit maximum module-to-module compression during installation. The modules use the proven center-fire, one-step weld system which eliminates the need for pre-laid out stud patterns.

Pyro-Bloc Y modules are edge-grained ceramic fiber blocks used for lining industrial furnaces. The Pyro-Bloc Y modules are manufactured from R grade, ZR grade and C grade ceramic fiber. The Y Module comes complete with internal support system and stud already in place.

- 12" x 12" (305mm x 305mm) modules
- 6" x 12" (152mm x 305mm) split long fiber modules
- 12" x 6" (305mm x 152mm) split short fiber modules
- Module thickness from 3" to 12" (76mm to 305mm) in 1" (25.4mm) increments

Pyro-Bloc Y² modules (16" x 16" [406mm x 406mm]) are a larger format edge-grained ceramic fiber block used for lining industrial furnaces. The Pyro-Bloc Y² modules are manufactured from R grade and ZR grade ceramic fiber. The 16" (406mm) square size offers up to 78% more installed square feet per module than 12" x 12" (305mm x 305mm) modules. In addition, the 16" (406mm) square size is much easier to handle when compared to 24" x 24" (610mm x 610mm) modules.

- 16" x 16" (406mm x 406mm) modules (1.78 sf per module [0.165m²])
- Module thickness from 3" to 12" (76mm to 305mm) in 1" (25.4mm) increments

Features

- Monolithic, edge-grained ceramic fiber module
- Available in uncompressed densities from 8 - 15 pcf (128-240 kg/m³)
- One-shot center-fired stud
- Extremely fast, efficient installation
- High density fiber resists mechanical abuse

Applications

- Annealing furnaces
- Heat treating furnaces
- Process heaters
- Reformers
- Ethylene furnaces
- Forge furnaces
- Steam flood units
- Homogenizing furnaces
- Incinerators

ATTACHMENTS

Attachment E

Spare Parts

- Spare Parts for Start-up & Commissioning
 - Spare Parts for Two Years Operation



Spare Parts for Start-up and Commissioning

Client:	Technip Italy SpA	Zeeco Ref.:	T59200FB	Date:	30-Jun-17
Location:	Italy	Client Ref.:	0703270C001	Rev.	1

Part No.	Qty	Description	Unit Price	Delivery (Weeks)
	1	Pilot Temperature Switch	\$367.00	4
	1	Pilot Thermocouple	\$558.00	4
	1	Ignition Plug	\$50.00	4
	1	Ignition Transformer	\$160.00	4
	1	Sight Glass Assembly	\$470.00	4
	1	Electric Ignitor Probe Assembly	\$1,858.00	4
	1	HEI Ignition Module	\$1,667.00	4
	2	Pilot Light Bulb	\$75.00	4

Net Price: U. S. Dollars
Minimum Invoice: \$250.00
F.O.B. Point: Shop Door - Broken Arrow, OK, USA
Terms: Net 30 Days
Notes:
1. Prices are subject to change without notice.
2. The spare part items and quantities listed above are preliminary and are subject to change upon determination of final scope of supply.



Spare Parts for Two Years Operation

Client:	Technip Italy SpA	Zeeco Ref.:	T59200FB	Date:	30-Jun-17
Location:	Italy	Client Ref.:	0703270C001	Rev.	1

Part No.	Qty	Description	Unit Price	Delivery (Weeks)
	2	Pilot Temperature Switch	\$367.00	4
	2	Pilot Thermocouple	\$558.00	4
	1	HSLF-Z-HEI-T/C Pilot Assembly	\$8,635.00	4
	2	Ignition Plug	\$50.00	4
	1	Ignition Transformer	\$160.00	4
	1	Sight Glass Assembly	\$470.00	4
	1	Electric Ignitor Probe Assembly	\$1,858.00	4
	2	HEI Ignition Module	\$1,667.00	4
	4	Pilot Light Bulb	\$75.00	4

Net Price: U. S. Dollars
Minimum Invoice: \$250.00
F.O.B. Point: Shop Door - Broken Arrow, OK, USA
Terms: Net 30 Days
Notes:
1. Prices are subject to change without notice.
2. The spare part items and quantities listed above are preliminary and are subject to change upon determination of final scope of supply.

ATTACHMENTS

Attachment F Clarifications and Exceptions



Clarifications & Exceptions

Client: Technip Italy SpA	Zeeco Ref.: T59200FB	Date: 30-Jun-17
Location: Italy	Client Ref.: 0703270C001	Rev. 1

Please note that it is Zeeco's intention to comply with the specifications received with this inquiry, except as noted below. Please also note that we have done our best to clearly specify what our proposal includes in order to avoid confusion. In the event that any portion of our quotation other than the list below does not meet your specifications or fit your needs, please notify us immediately so that we may rectify the situation.

No.	Specification	Item	Clarification / Exception
1	General	Applicable Specifications	Zeeco is not responsible for specifications not included in the inquiry package or revised after the issuance of the PO. We can provide a cost impact (if any) to meet any particular new or revised specification after receiving the specification.
2	General	Special Tools	No special tools are required for operation or maintenance of the proposed system.
3	General	Spare Parts	Spare parts are listed and quoted separately.
4	General	Assistance / Training	Assistance / training at the job site, or attendance to any meetings outside Zeeco, is available based on our attached per diem rate sheet.
5	General	Sizing	Sizes / dimensions / weights / models noted in this quotation are preliminary only and subject to change upon final equipment design after an order is received.
6	General	Documentation	All required non-drawing documentation will be supplied as nominal 8.5 inch by 11 inch paper size and will be supplied in nominal USA letter size 3-ring binders. Specific documents to be submitted will be mutually agreed upon during the project kickoff meeting.
7	General	Performance Bonds / Guarantees	Any performance bond or bank guarantee issued by Zeeco for this project will be in the form of a standby letter of credit. The format of this standby letter of credit is to be mutually agreeable to both Zeeco and our customer, subject to the requirements outlined in ICC Publication 500 (Uniform Customs and Practices for Documentary Credits).
8	General	Terms & Conditions	All Terms & Conditions shall be mutually agreed upon prior to issuance of PO.
9	General	Pricing	Unless noted, all prices are US Dollars.
10	General	Limit of Liability	Sellers total liability for this purchase order, whether in contract, tort, or otherwise, shall in no event exceed the total amount of the purchase order. In no event shall seller be liable to the buyer for delays, curtailment of plant operation, process failure, loss of profits, or any indirect, incidental, special or consequential damages.

Clarifications & Exceptions Continued

11	General	Warranty	Consumables such as, but not limited to, bulbs, fuses, thermocouples, gaskets, etc. shall be outside the scope of the above warranties. All warranty work is considered applicable "at grade" for elevated flare systems. Warranty is for material and workmanship only. Except as defined in the contract, there are no warranties, express or implied, of merchantability, fitness for use or otherwise.
12	General	Noise Measurement	Noise is predicted as +/- 3 dB(A) considering a background noise level of 6 dB(A) less than the measurement point in each frequency.
13	Clarification	Flare Tip Inlet Flange Material	Please note that our proposal is based on supplying a tip inlet connection flange that is the same material as the connection flange on the top of the stack in an effort to minimize the thermal expansion differences within the flange material and thus lower the possibility of gas leakage at the flange.
14	Clarification	Smokeless Flaring	Smokeless requirement is estimated as Ringelmann 1.0 or less at one flame length from the end of the flame per EPA Test Methods 9, at steady state process and environmental conditions.
15	General	Ignition Rack Pipe Testing	B31.3 requires a hydrostatic leak test unless "The Owner" considers a hydrostatic test impractical. We do not hydrostatic-test the piping components of the ignition system. The use of water can damage some of the components as well as cause internal corrosion, which could be detrimental to the operation of the equipment. It is Zeeco's policy to pneumatically pressure test the piping using shop air (90 psig max) and soapy-water on our ignition rack piping.
16	Clarification	Nozzle Loads	The offered equipment has been designed considering maximum nozzle loads as stated in API 537 standard "Flare Details for General Refinery and Petrochemical Service".
17	General	Inspection and Testing	Testing, NDE, and inspection performed for all Zeeco designed proprietary components of the system (pilot, mixer, flare tip, ignition chamber, etc.) will be per Zeeco standards unless specifically noted otherwise.
18	General	Chamber / Manifold Designs	Stack risers are structural members open to atmosphere and therefore are not considered as piping or pressure vessels. Any piping specification, applicable pipe class to the flare header or pressure vessel specification is not applicable to the flare stack riser. Only the flare stack inlet flange will meet the pipe class applicable to the flare header. In addition, the flare stack riser will follow B31.3 for thickness, internal pressure and NDE (spot RT). Hydrostatic, PWHT or impact testing of the stack risers in the shop is not required and has not been included.

Clarifications & Exceptions Continued

19	General	Equipment Storage	If equipment is not picked up or shipped from Zeeco's shop or other designated sub-fabricators / suppliers within 6 weeks from the notification date that equipment is ready to ship, storage and handling fees will be applied based on the size and storage requirements of the equipment.
20	General	Export Packing / Crating / Containerization	Export crating, when included or offered as an option, provides for break bulk packing of smaller materials in wooden crates or pallets, and skid mounting and bundling of larger components for deck shipment. Packaging for large items is not designed for stacking. Containerization of any material is not included. If materials are quoted as FOB Port of Export basis, or if optional pricing is provided to move the goods to the port of export, this is understood to mean the port nearest to the point of manufacture of the goods, unless an alternative port of export is clearly defined in the inquiry documents.
21	Clarification	Pilot Ignition Rack	Zeeco's proposal is based on the pilot ignition rack located within 600 Feet (183 Meters) from the pilots. For this project, 10 feet from the wind fence has been considered for the LCP.
22	General	Motor Starters	Our proposal does not include for any motor starters, variable frequency drives, or motor controls unless specifically stated otherwise.
23	General	Lifting Lugs	Zeeco recommends handling flare tip assemblies using slings and straps. If flare tip lifting lugs are supplied, they will be defined as being included on the Zeeco flare tip datasheet. Any lifting lugs supplied on a flare tip are designed for vertical lifting only, lifting along the major axis of the flare tip. Lifting lugs will be carbon steel designed for use when initially installing the flare tip prior to any use of possible heat damage to same. Lifting lugs should not be re-used after the flare tip has been in operation due to safety issues.
24	General	Piping	Piping 2" and smaller will be supplied in random lengths with loose fittings, for field fabrication and installation by others. Fittings are supplied without paint. Pipe joints are prime painted only.
25	Deleted		
26	General	Radiographic Examination	Radiographic examination, when included, shall be performed by gamma-ray (Iridium 192) radiography. The radiographic sensitivity shall be equal to or better than that specified in the ASME Boiler & Pressure Vessel Code, Section VIII-1 and B31.3. Please confirm customer preferred type of examination for cost impact.

Clarifications & Exceptions Continued

27	General	Damages	In no event shall seller be liable to the buyer for delays, curtailment of plant operation, process failure, loss of profits, or any indirect, incidental, special or consequential damages.
28	General	Written Communication	Zeeco Inc.'s offer is based on all resulting orders and documents and correspondence with Zeeco Inc. being in the English language.
29	General	Approved Manufacturer's Lists (AML)	All proprietary items including flare tip assemblies, flare tip accessories (steam / gas risers, steam / gas manifolds, etc.), liquid seal internals, gas seals, pilot assemblies, etc. shall follow Zeeco's AML in conjunction with Zeeco's ISO requirements. All process and utility connections for flare tip assemblies, gas seals, pilots, etc. shall meet any applicable project AML.
30	General	Stack Design	Applicable Eurocodes to be applied during firm bidding stage.
31	General	Pipe Specification Conformation	Any project pipe specification will be applicable up to the pilot inlet connections only: FFG Ignition Connection and Pilot Gas Manifold Connection (more than one pilot) or Pilot Gas Connection (when no manifold is included).
32	Clarification	Coating	Zeeco has included our standard recommended coating system for enclosed ground flare systems, which is specified in our GA drawing. We have not included for any paint of stainless steel components. Our experience has shown this to be a very good paint system.
33	Clarification	Runner/Manifold Material	All materials in contact with the flare gas will be 304 SS or equivalent.
34	Clarification	Thermocouples	Zeeco's base offer includes one (1) dual element thermocouple per pilot.
35	Clarification	Shipping Terms	Zeeco has provided OPTIONAL shipping FCA (Point of Manufacturer) per Incoterms 2010.
36	Clarification	Excluded	Zeeco assumes that any UPS / DCS backup system will be provided by others. We also assume that any area lighting will be provided by others.
37	Clarification	Weldolets	Zeeco recommends (and has included for) weldolets for the riser to runner connection.
38	Clarification	Cover over Runners	Our offering is based on the use of radiation shields over the runners inside the combustion chamber.

Clarifications & Exceptions Continued

39	Clarification	Valve Connections	Zeeco offer is based on socket-weld construction for valves 1.5" and smaller connected to the flare line.
40	Clarification	Shop Combustion Testing	Zeeco has not included for any testing of burners in its test facility in its base scope of supply.
41	Clarification	Thermocouples	Retractable thermocouples have not been considered as the pilots are fully retractable from the flare. The thermocouples can be serviced once the pilot has been removed.
42	Clarification	Velocity Seal	Velocity seals are not typically applicable or included for multipoint ground flares. Therefore they have not been included in Zeeco's proposal.
43	Clarification	Ignition Rack Placement	Zeeco's proposal is based on the ignition system being placed within 10 feet of the chamber. Interconnecting piping/wiring/conduit included.
44	Clarification	Temperature Control	Temperature control of the unit has not been considered.
45	Clarification	Ceramic Fiber Refractory	Zeeco is supplying ceramic fiber refractory modules per requested by client for field installation by others. The anchor pins will be shop prefabricated per client request.
46	Clarification	Hazardous Area	Zeeco has considered hazardous area classification of Zone IIC T3. The LCP quoted is Ex'p'.
47	Clarification	HIC Materials	Please note that Zeeco has not quoted any HIC materials.
48	Clarification	Wiring	Zeeco's proposal is based on wiring ran in conduit and not cable in cable trays.
49	Clarification	Chamber	Zeeco has considered field welded chamber. If a bolted chamber is required, Zeeco can provide cost impact upon customer request.
50	General	Fabrication Location	Zeeco has considered India for non-proprietary equipment (chamber, piping, wind fence, etc.) fabrication location. Zeeco can provide cost impact upon request if other fabrication country is preferred.
51	Clarification	Final Paint & Int. Coating	Please provide specification for final paint and intermediate coating in English so that we may evaluate and apply to the system.

ATTACHMENTS

Attachment G

Start-up & Maintenance Services



ATTACHMENT A
START-UP/MAINTENANCE SERVICES, EQUIPMENT DATA/DRAWINGS
AND STANDARD TERMS AND CONDITIONS



I. START-UP/MAINTENANCE SERVICES

RATES	DOMESTIC (Within UK)	FOREIGN (Outside UK)
Base Rates for Start-Up/Maintenance personnel on all non-holiday (U.K Government recognized) Monday through Friday, inclusive, up to a maximum of eight (8) hours per day.	\$1,600.00 per day	\$2,300.00 per day
Hours in Excess of eight (8) hours per day Monday through Friday, non-holiday.	\$300.00 per hour	\$431.00 per hour
Saturdays and Sundays - up to a maximum of eight (8) hours per day	\$2,400.00	\$3,450.00 per day
Hours in Excess of eight (8) hours per day Saturday and Sunday, non-holiday	\$450.00 per hour	\$647.00 per hour
Holidays (U.K Government Recognized) - up to a maximum of eight (8) hours per day	\$3,200.00	\$4,600.00 per day
Hours in Excess of eight (8) hours per day Holidays	\$600.00 per hour	\$863.00 per hour
Air Travel (Class)	Coach	Business
Ground Transportation	Mid-Sized Rental Car	Mid-Sized Rental Car
Engineering Rates	\$375.00 per hour	\$375.00 per hour
Design / Drafting Rates	\$185.00 per hour	\$185.00 per hour

Note: The above rates do not include off-shore assistance. Please contact Zeeco if you are interested in obtaining rates for off-shore assistance.

Compensable Days

Per diem rates will apply from, and including, the day the start-up/maintenance personnel leaves his basing point up to, and including, his date of return to the basing point.

Expenses

Zeeco shall be reimbursed at actual cost plus 15% for all non-Buyer provided living and travel expenses incurred, which are related to the supply of services rendered.

Engineering / Drafting Charges

Engineering and/or drafting charges will apply for all work performed by Zeeco personnel as required to support Start-Up/Maintenance personnel. These charges will apply at the rate indicated in the chart above.

Independent Contractor

Zeeco personnel shall be considered an independent contractor with respect to services provided hereunder and the start-up/maintenance personnel shall in no respect be considered an employee of the Buyer. Zeeco reserves the right to recall, replace, or return the personnel at Zeeco's sole discretion.

II. EQUIPMENT DATA/DRAWINGS

A. STANDARD QUANTITY

Priced quotation for equipment include three (3) print copies of approval drawings; three (3) print copies and one (1) reproducible copy of the final drawings; and three (3) copies of an operational manual. Additional copies of drawings will be provided at \$30.00 per print and \$45.00 per reproducible. Additional operational manuals will be priced on application, and based on the complexity of the equipment. Drawings and data provided hereunder are the property of Zeeco Europe and may not be used for any purpose other than the repair, operation and maintenance of the equipment depicted.

III. TERMS AND CONDITIONS

- A. All service and data provided under this Attachment are in accordance with Zeeco's Standard Terms and Conditions of Sale.
- B. All rates quoted herein are subject to change without notice.
- C. Zeeco will require a purchase order from the Buyer accepting the terms and condition set forth herein, as well as an estimate of duration and nature of the work to be done.
- D. Prior to dispatch of Zeeco personnel, Buyer may be required to provide a deposit equal to the charges for the anticipated duration of service, or two weeks of service, whichever is greater. This requirement will be enforced at the discretion of Zeeco Europe.
- E. The transportation modes and carriers and all arrangements therefore, and the choice of lodgings and all arrangements therefore, will be at the sole discretion of Zeeco Europe.
- F. Where on-site room and board are furnished by the customer, Zeeco Europe expects their personnel to be roomed and boarded in a comfortable environment similar to Buyer's personnel or mutually agreed upon accommodations.
- G. The timing of the working day commences from Zeeco personnel's departure from their accommodation until their return there and includes all travelling and meal times in this period.
- H. It is the Buyer's responsibility to secure all work permits, licenses, and other documents required to allow our personnel to complete their assignment in accordance with local government regulations and labour laws.
- I. All tools, materials, and equipment for use by Zeeco personnel will be furnished by the Buyer, unless other mutually agreed upon arrangements have been made.

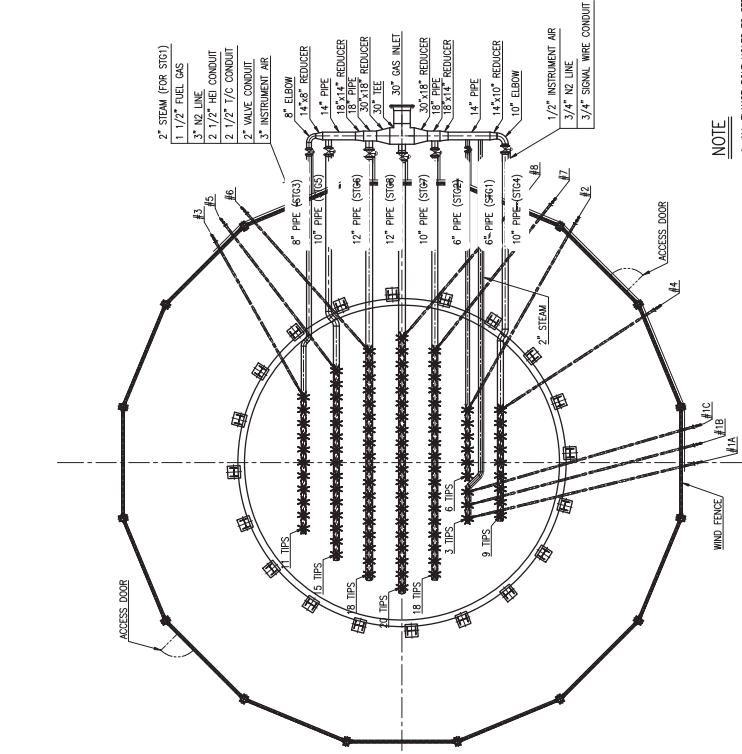
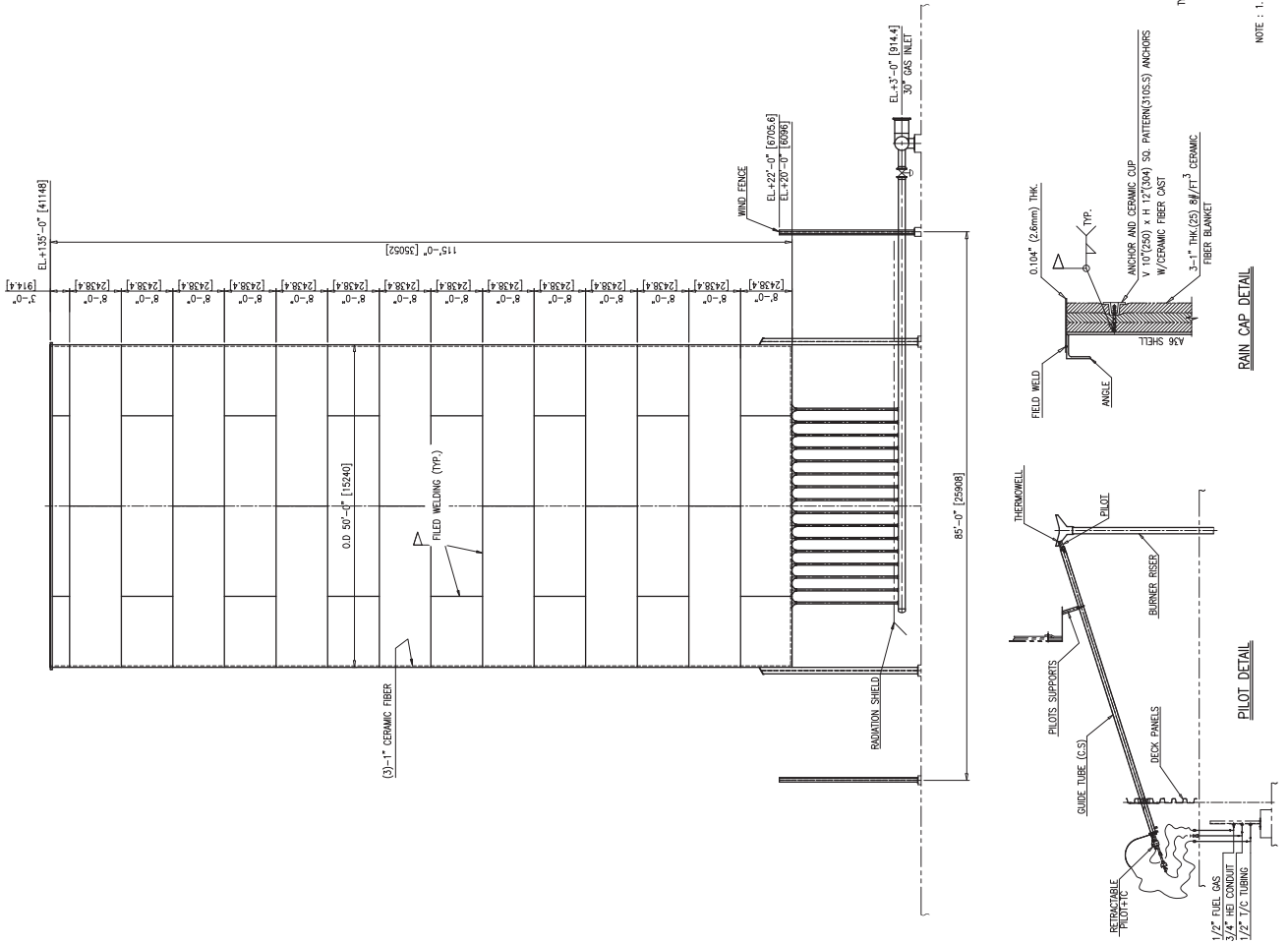
ATTACHMENTS

Attachment H

Typical GA Drawing

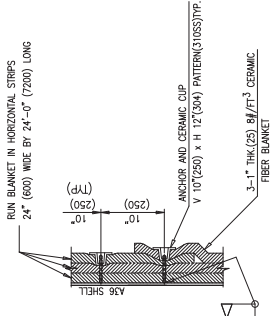
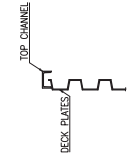
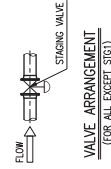
Typical P&ID to be provided job specific during firm bidding

TYPICAL: Quoted system has 137 unassisted flare burners with 3 burners steam assisted.



NOTE

- ALL FLANGE BOLT HOLES TO STRADDLE THE NEUTRAL CENTRELINE UNLESS NOTED OTHERWISE.
- ALL STRUCTURAL MEMBERS SHALL BE USED AS FOLLOWS.
 - MANIFOLD : 304 S.S OR EQ.
 - RUNNER : A312-IP304 OR EQ.
 - FLANGE : A182-F304
 - PIPE SUPPORTS : A312-IP304
 - COMPRESSION WELDS : ASB OR EQ.
 - UTILITY PIPING : A108-B
 - CONDUIT : GALVANIZED C.S
 - RADIATION SHIELD : 304 S.S
 - FENCE SUPPORT : C.S + GALVANIZED
- PAINTING
 - EXTERNAL CARBON STEEL SURFACE FOR CHAMBER & UTILITY PIPING
 - PRIMER : INORGANIC ZINC
 - SURFACE PREPARATION : SSPC-SP6
 - FINISH : HIGH HEAT ALUMINUM
 - EXTERNAL STAINLESS STEEL SURFACE FOR MANIFOLD & RUNNER : NO PAINT
- DESIGN CODE
 - STRUCTURAL DESIGN CODE : ASME STS-1 / ASC
 - WIND CODE : ASCE 7-05
 - SEISMIC CODE : IBC-97
- DESIGN DATA
 - WIND DATA : $V=130$ / 6-EXP-4C, $LH=1.0$
 - SEISMIC DATA : ZONE-2A, $LH=1.25$
 - DESIGN TEMPERATURE FOR MANIFOLD & RUNNER : $-140^{\circ}\text{C} / 200^{\circ}\text{C}$
 - DESIGN TEMPERATURE FOR CHAMBER : $-5^{\circ}\text{C} / 45^{\circ}\text{C}$
 - DESIGN PRESSURE FOR MANIFOLD & RUNNER : 3.5 barg
 - DESIGN PRESSURE FOR CHAMBER : ATM.
 - CORROSION ALLOWANCE FOR C.S : 1.5 mm
 - CORROSION ALLOWANCE FOR S.S : 0.0 mm



NOTE : 1. ALL CERAMIC FIBER BLANKET SHOULD BE INSTALLED IN FIELD. (TYP.)



DATE	30JUN17
BROWN	JK
CHK	JSLIM
SCALE	RAS
REVISION	REV 0
DRAWING NUMBER	T52900FB
PROJECT	TECHNIP
GENERAL ASSEMBLY DWG.	
ENCLOSED	

ATTACHMENTS

Attachment I Typical Equipment Pictures



















ATTACHMENTS

Attachment J

ISO & ASME Sec. VIII Code Certificates

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2008

This is to certify that:

Zeeco Europe Ltd
The Woolfox Depot
Great North Road
Stretton
Oakham
LE15 7QT
United Kingdom

Holds Certificate Number:

FS 600622

and operates a Quality Management System which complies with the requirements of ISO 9001:2008 for the following scope:

The manufacture and installation management of flares and incinerators. The design manufacture and installation management of burners.

For and on behalf of BSI:



Gary Fenton, Global Assurance Director

Originally registered: 07/05/2014

Latest Issue: 29/05/2014

Expiry Date: 06/05/2017



003

Page: 1 of 1

...making excellence a habit.™



Certificate of Registration

This certifies that the Quality Management System of

Zeeco, Inc.

22151 E. 91st Street
Broken Arrow, Oklahoma, 74014, United States

has been assessed by NSF-ISR and found to be in conformance to the following standard(s):

ISO 9001:2008

Scope of Registration:

Design, manufacture, installation, and testing of flares, burners, and incinerators.

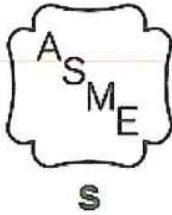


Certificate Number: 0Z911-ISR5
Certificate Issue Date: 22-JUL-2015
Registration Date: 07-AUG-2015
Expiration Date*: 06-AUG-2018

Carl Blazik,
Director, Technical
Operations & Business Units,
NSF-ISR, Ltd.

NSF International Strategic Registrations

789 North Dixboro Road, Ann Arbor, Michigan 48105 | (888) NSF-9000 | www.nsf-isr.org



CERTIFICATE OF AUTHORIZATION

The named company is authorized by the American Society of Mechanical Engineers (ASME) for the scope of activity shown below in accordance with the applicable rules of the ASME Boiler and Pressure Vessel Code. The use of the certification mark and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any construction stamped with this certification mark shall have been built strictly in accordance with the provisions of the ASME Boiler and Pressure Vessel Code.

COMPANY:

**Zeeco, Inc.
22151 East 91st Street
Broken Arrow, Oklahoma 74014**

SCOPE:

Manufacture and assembly of power boilers at the above location and field sites controlled by the above location

AUTHORIZED: **July 1, 2015**
EXPIRES: **August 20, 2018**
CERTIFICATE NUMBER: **29,790**

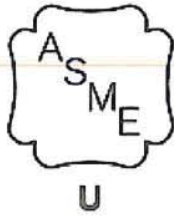
A handwritten signature in black ink, appearing to read 'Bryan A. Eiler'.

Vice President, Conformity Assessment

A handwritten signature in black ink, appearing to read 'Joseph J. Lovick'.

Director, Conformity Assessment





CERTIFICATE OF AUTHORIZATION

The named company is authorized by the American Society of Mechanical Engineers (ASME) for the scope of activity shown below in accordance with the applicable rules of the ASME Boiler and Pressure Vessel Code. The use of the certification mark and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any construction stamped with this certification mark shall have been built strictly in accordance with the provisions of the ASME Boiler and Pressure Vessel Code.

COMPANY:

**Zeeco, Inc.
22151 East 91st Street
Broken Arrow, Oklahoma 74014**

SCOPE:

Manufacture of pressure vessels at the above location and field sites controlled by the above location (This authorization does not cover impregnated graphite)

AUTHORIZED: **July 1, 2015**
EXPIRES: **August 20, 2018**
CERTIFICATE NUMBER: **29,791**

Handwritten signature of Bryan A. Eiler in black ink.

Vice President, Conformity Assessment

Handwritten signature of Joseph L. Lora in black ink.

Director, Conformity Assessment





CERTIFICATE OF AUTHORIZATION

The named company is authorized by the American Society of Mechanical Engineers (ASME) for the scope of activity shown below in accordance with the applicable rules of the ASME Boiler and Pressure Vessel Code. The use of the certification mark and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any construction stamped with this certification mark shall have been built strictly in accordance with the provisions of the ASME Boiler and Pressure Vessel Code.

COMPANY:

**Zeeco, Inc.
22151 East 91st Street
Broken Arrow, Oklahoma 74014**

SCOPE:

Manufacture of pressure vessel pressure relief devices at the above location only

AUTHORIZED: **April 8, 2015**
EXPIRES: **March 30, 2018**
CERTIFICATE NUMBER: **43,417**

A handwritten signature in black ink, appearing to read 'Bryan A. Eiler'.

Vice President, Conformity Assessment

A handwritten signature in black ink, appearing to read 'Joseph L. ...'.

Director, Conformity Assessment



**THE NATIONAL BOARD
OF
BOILER & PRESSURE VESSEL INSPECTORS**

Certificate of Authorization



This is to certify that

**Zeeco, Inc.
22151 East 91st Street
Broken Arrow, Oklahoma 74014
UNITED STATES**

is authorized to use the "R" SYMBOL in accordance with the provisions of the National Board.

The scope of Authorization is limited as follows:

METALLIC REPAIRS AND/OR ALTERATIONS AT THE ABOVE LOCATION AND EXTENDED FOR FIELD REPAIRS AND/OR ALTERATIONS CONTROLLED BY THIS LOCATION

CERTIFICATE NUMBER: R-4891

ISSUE DATE: JUNE 29, 2015

EXPIRATION DATE: AUGUST 20, 2018



Executive Director

**THE NATIONAL BOARD
OF
BOILER & PRESSURE VESSEL INSPECTORS**

Certificate of Authorization



This is to certify that

Zeeco, Inc.

22151 East 91st Street

Broken Arrow, OK 74014

UNITED STATES

*is authorized to apply the "NB" mark to specified **PRESSURE RELIEF DEVICES** in accordance with the provisions of the National Board. The scope of Authorization is limited to National Board Certified devices which have been manufactured, assembled and stamped with the following construction codes:*

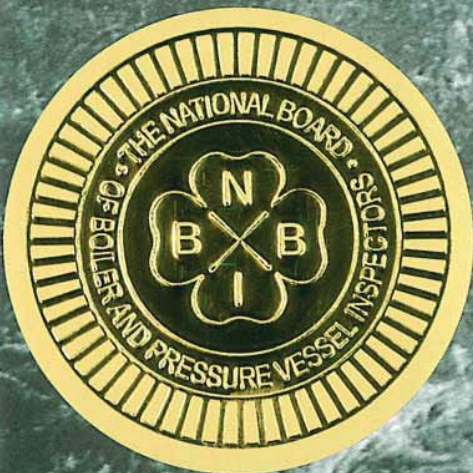
ASME Section VIII, Division 1: "UD" Stamp

ISSUE DATE: May 1, 2015

EXPIRATION March 30, 2018

Executive Director

A handwritten signature in black ink, appearing to read 'D. G. ...', positioned above the title 'Executive Director'.



ATTACHMENTS

Attachment K Sample Inspection and Test Plan



Zeeco, Inc. Quality Assurance Manual, Volume II
Inspection and Test Plan
Document # - ZQS-QUA-IV-160
Created By: Bobby Martin

		PROJECT: ZEECO STANDARD ITP		ITP NUMBER: 0		LEGEND		
		SHOP ORDER NUMBER:		REVISION NUMBER: 0		W-WITNESS		
		PURCHASE ORDER NUMBER:		PAGES: 4		R-REVIEW		
		TAG NUMBER:				H-HOLD		
		SUPPLIER CONTACT:				V-VERIFY		
		DESCRIPTION:				M-MONITOR		
						L-IN HOUSE		
						S-SUBCONTRACTORS		
						SW-SPOT WITNESS		
						Revision: 0		
						Revision Date: 7/1/03		
TASK NUMBER	TASK DESCRIPTION	LOCATION CODE (I OR S)	ZEECO SIGNOFF	PROCEDURE	ACCEPTANCE CRITERIA	VERIFYING DOCUMENT	INSPECTION REQUIREMENTS V/W/H/R/O	NOTES
A	PRE-INSPECTION MEETING	I		PROJECT	PROJECT	PROJECT	H	
A1	CONTRACT REVIEW	I		ZQS-APP-IL010	CONTRACT	ZQS-APP-IV-020	H	NOTE 3
A2	DESIGN	I		ZQS-DES-IL010	PROJECT	DRAWING	H	NOTE 3
A3	PROCUREMENT	I		ZQS-PRO-IL010	POBOM	POBOM	H	NOTE 3
A4	DOCUMENT CONTROL	I		ZQS-DOC-IL050	DRAWING	DRAWING	H	NOTE 3
A5	WPS & PQR	I		ASME SECT. IX	ASME SECT IX	QW-482 & 483	H	NOTE 1
A6	WELDER QUALIFICATION	I		ASME SECT. IX	ASME SECT IX	QW-484	H	NOTE 2
A7	NDE PROCEDURES	S		GLOBE	ASME	PROCEDURES	H	
ZEECO USA								
AIR FLARE TIP								
1.0	MATERIAL CONFORMANCE	I		ASTM	ASTM	PO/BOM	R	
1.1	MATERIAL IDENTIFICATION	I		ASTM	ASTM	MTR	V	
1.2	DIMENSIONAL INSPECTION	I		DRAWING	DRAWING	REPORT	W	
1.3	VISUAL INSPECTION	I		DRAWING	DRAWING	REPORT	W	
1.4	WELDING INSPECTION	I		WPS	ASME IX	REPORT	W	
1.5	RADIOGRAPHY-SPOT	S		GLOBE LB	ASME VIII-1, UW-52	REPORT	R	NOTE 6
1.6	DYE PENETRANT	S		GLOBE III-A	ASME VIII-1, APP. 8	REPORT	W	LIFT LUG WELDS
1.7	SURFACE PREPARATION	I		DRAWING	SSPC	REPORT	R	CS ONLY
1.8	MEK RUB TEST	I		ASTM D4752	ASTM D4752	REPORT	H	INORGANIC ZINC PRIMER
1.9	COATING INSPECTION	I		DRAWING	DFT/MILLAGE	REPORT	W	CS ONLY
1.10	MATERIAL CONFORMANCE	I		ASTM	ASTM	PO/BOM	R	
1.11	MATERIAL IDENTIFICATION	I		ASTM	ASTM	MTR	V	
1.12	DIMENSIONAL INSPECTION	I		DRAWING	DRAWING	REPORT	W	
1.13	VISUAL INSPECTION	I		DRAWING	DRAWING	REPORT	W	
1.14	WELDING INSPECTION	I		WPS	ASME IX	REPORT	W	
1.15	RADIOGRAPHY-5% PER WELDER	S		GLOBE LB	ASME B 31.3	REPORT	R	NOTE 5
1.16	SURFACE PREPARATION	I		DRAWING	SSPC	REPORT	R	CS ONLY
1.17	MEK RUB TEST	I		ASTM D4752	ASTM D4752	REPORT	H	INORGANIC ZINC PRIMER
1.18	COATING INSPECTION	I		DRAWING	DFT/MILLAGE	REPORT	W	CS ONLY
1.19	MATERIAL CONFORMANCE	I		ASTM	ASTM	PO/BOM	R	ZEECO USA
2.0	MATERIAL IDENTIFICATION	I		ASTM	ASTM	MTR	V	
2.1	DIMENSIONAL INSPECTION	I		DRAWING	DRAWING	REPORT	W	
2.2	VISUAL INSPECTION	I		DRAWING	DRAWING	REPORT	W	
2.3	WELDING INSPECTION	I		WPS	ASME IX	REPORT	W	
2.4	RADIOGRAPHY-5% PER WELDER	S		GLOBE LB	ASME B 31.3	REPORT	R	BUTTWELDS (IF ANY) NOTE 5
2.5	TEST FIT TO TIP	I		DRAWING	DRAWING	PICTURES	W	CS ONLY
2.6	SURFACE PREPARATION	I		ASTM D4752	ASTM D4752	REPORT	R	INORGANIC ZINC PRIMER
2.7	MEK RUB TEST	I		DRAWING	DFT/MILLAGE	REPORT	H	CS ONLY
2.8	COATING INSPECTION	I		DRAWING	DFT/MILLAGE	REPORT	W	

PROJECT: ZIEECO STANDARD ITP		ITP NUMBER: 10		LEGEND						
SHOP ORDER NUMBER:		REVISION NUMBER: 0		W-WITNESS						
PURCHASE ORDER NUMBER:		PAGES: 4		R-REVIEW						
TAG NUMBER:				H-HOLD						
SUPPLIER CONTACT:				V-VERIFY						
DESCRIPTION:				S-SUBCONTRACTORS						
				SW-SPOT WITNESS						
TASK NUMBER	TASK DESCRIPTION	LOCATION CODE (I OR S)	ZIEECO SIGNOFF	PROCEDURE	ACCEPTANCE CRITERIA	VERIFYING DOCUMENT	MFG	ZIEECO	INSPECTION REQUIREMENTS V/W/H/R/O	NOTES
3.0	IGNITION RACK ASSEMBLY									ZIEECO USA
3.1	MATERIAL CONFORMANCE	I		ASTM	ASTM	PO/BOM		R		
3.2	MATERIAL IDENTIFICATION	I		ASTM	ASTM	MTR		W		
3.3	DIMENSIONAL INSPECTION	I		DRAWING	DRAWING	REPORT		W		
3.4	VISUAL INSPECTION	I		DRAWING	DRAWING	REPORT		W		
3.5	WELDING INSPECTION	I		WPS	ASME IX	REPORT		W		
3.6	RADIOGRAPHY -5% PER WELDER	S		GLOBE I-B	ASME B 31.3	REPORT		R		BUTTWELDS (IF ANY) NOTE 5
3.7	PNEUMATIC TEST BEFORE PAINT	I		ZQS-QUA-II-070	LEAKAGE	REPORT		W		70-120 PSIG MAX
3.8	FUNCTIONAL TEST	I		FUNCTIONAL	DATA SHEET	CHECKLIST		W		
3.9	SURFACE PREPARATION	I		DRAWING	SSPC	REPORT		R		CS ONLY
3.10	COATING INSPECTION	I		DRAWING	DFT/MILLAGE	REPORT		W		CS ONLY
3.11	PNEUMATIC TEST AFTER PAINT	I		ZQS-QUA-II-070	LEAKAGE	REPORT		W		70-120 PSIG MAX
4.0	BUYOUT ITEMS									
4.1	BLOWER	S		DATA SHEET	DATA SHEET	CERTIFICATE		R		
	FINAL INSPECTION @ ZIEECO									
	DOCUMENTATION REVIEW	I			PO	MDR		H		
	FINAL VISUAL	I		DRAWING	DRAWING	DRAWING		H		
	FINAL DIMENSIONAL	I		DRAWING	DRAWING	DRAWING		H		
	CLEANING/PAINT TOUCH-UP	I		DRAWING	DRAWING	DRAWING		H		
	MARKING/TAGGING	I		PO/BOM	PO/BOM	PICTURES		H		
	PACKING INSPECTION	I		SPECIFICATION	DRAWING	PACKING LIST		H		
	INSPECTION RELEASE	I		PROJECT	PROJECT	RELEASE		H		
	FINAL DOCUMENTATION	I		SPECIFICATION	SPECIFICATION	MDR		H		

TASK NUMBER	TASK DESCRIPTION	LOCATION CODE (1 OR S)	ZIECO SIGNOFF	PROCEDURE	ACCEPTANCE CRITERIA	VERIFYING DOCUMENT	INSPECTION REQUIREMENTS		LEGEND							
							MFG	ZIECO	W-WITNESS	R-REVIEW	H-HOLD	V-VERIFY	M-MONITOR	I-IN HOUSE	S-SUBCONTRACTORS	SW-SPOT WITNESS
SUBVENDOR																
AIR RISER																
5.0																
5.1	MATERIAL CONFORMANCE	S		ASTM	ASTM	PO/BOM	M		R							
5.2	MATERIAL IDENTIFICATION	S		ASTM	ASTM	MTR	M		W							
5.3	FIT-UP	S		DRAWING	DRAWING	DRAWING	M		SW							
5.4	DIMENSIONAL INSPECTION	S		DRAWING	DRAWING	REPORT	M		W							
5.5	VISUAL INSPECTION	S		DRAWING	DRAWING	REPORT	M		W							
5.6	WELDING INSPECTION	S		WPS	ASME IX	REPORT	M		W							
5.7	RADIOGRAPHY-SPOT	S		PROCEDURE	ASME VIII-1, UW-52	REPORT	M		R							
5.8	MAGNETIC PARTICLE-100%	S		PROCEDURE	ASME V	REPORT	M		W							
5.9	TEST FIT INDIVIDUAL SECTIONS	S		DRAWING	DRAWING	PICTURES	M		R			NOTE 6				
5.10	SURFACE PREPARATION	S		DRAWING	SSPC	REPORT	M		R			LIFT LUG WELDS				
5.11	MEK RUB TEST	I		ASTM D4752	ASTM D4752	REPORT	M		H			MATCH MARK				
5.12	COATING INSPECTION	S		DRAWING	DFT/MILLAGE	REPORT	M		W			CS ONLY				
6.0																
PRIMARY GAS RISER																
6.1	MATERIAL CONFORMANCE	S		ASTM	ASTM	PO/BOM	M		R							
6.2	MATERIAL IDENTIFICATION	S		ASTM	ASTM	MTR	M		W							
6.3	FIT-UP	S		DRAWING	DRAWING	DRAWING	M		SW							
6.4	DIMENSIONAL INSPECTION	S		DRAWING	DRAWING	REPORT	M		W							
6.5	VISUAL INSPECTION	S		DRAWING	DRAWING	REPORT	M		W							
6.6	WELDING INSPECTION	S		WPS	ASME IX	REPORT	M		W							
6.7	RADIOGRAPHY-SPOT	S		PROCEDURE	ASME VIII-1, UW-52	REPORT	M		R							
6.8	TEST FIT INDIVIDUAL SECTIONS	S		DRAWING	DRAWING	PICTURES	M		R			NOTE 6				
6.9	SURFACE PREPARATION	S		DRAWING	SSPC	REPORT	M		R			MATCH MARK				
6.10	MEK RUB TEST	I		PROCEDURE	ASTM D4752	REPORT	M		H			CS ONLY				
6.11	COATING INSPECTION	S		DRAWING	DFT/MILLAGE	REPORT	M		W			INORGANIC ZINC PRIMER				
7.0																
SECONDARY RISER																
7.1	MATERIAL CONFORMANCE	S		ASTM	ASTM	PO/BOM	M		R							
7.2	MATERIAL IDENTIFICATION	S		ASTM	ASTM	MTR	M		W							
7.3	FIT-UP	S		DRAWING	DRAWING	DRAWING	M		SW							
7.4	DIMENSIONAL INSPECTION	S		DRAWING	DRAWING	REPORT	M		W							
7.5	VISUAL INSPECTION	S		DRAWING	DRAWING	REPORT	M		W							
7.6	WELDING INSPECTION	S		WPS	ASME IX	REPORT	M		W							
7.7	RADIOGRAPHY-5% PER WELDER	S		PROCEDURE	ASME B31.3	REPORT	M		R			NOTE 5				
7.8	TEST FIT INDIVIDUAL SECTIONS	S		DRAWING	DRAWING	PICTURES	M		R			MATCH MARK				
8.0												SHIP LOOSE				
8.1	MATERIAL CONFORMANCE	S		ASTM	ASTM	PO/BOM	M		R							
8.2	MATERIAL IDENTIFICATION	S		ASTM	ASTM	MTR	M		W							
8.3	DIMENSIONAL INSPECTION	S		DRAWING	DRAWING	DRAWING	M		W							
8.4	VISUAL INSPECTION	S		DRAWING	DRAWING	DRAWING	M		W							
8.5	SURFACE PREPARATION	S		DRAWING	SSPC	REPORT	M		R			CS ONLY				
8.6	COATING INSPECTION	S		DRAWING	DFT/MILLAGE	REPORT	M		W			CS ONLY				

PROJECT: ZIECO STANDARD ITP		ITP NUMBER: 10		LEGEND						
SHOP ORDER NUMBER:		REVISION NUMBER: 4		W-WITNESS	M-MONITOR					
PURCHASE ORDER NUMBER:		PAGES: 4		R-REVIEW	I-IN HOUSE					
TAG NUMBER:				H-HOLD	S-SUBCONTRACTORS					
SUPPLIER CONTACT:				V-VERIFY	SW-SPOT WITNESS					
DESCRIPTION:										
TASK NUMBER	TASK DESCRIPTION	LOCATION CODE (1 OR S)	ZIECO SIGNOFF	PROCEDURE	ACCEPTANCE CRITERIA	VERIFYING DOCUMENT	MFG	ZIECO	INSPECTION REQUIREMENTS V/W/H/R/O	NOTES
9.0	LADDERS & PLATFORMS									
9.1	MATERIAL CONFORMANCE	S		ASTM	ASTM	PO/BOM	M	R		
9.2	MATERIAL IDENTIFICATION	S		ASTM	ASTM	MTR	M	W		
9.3	FIT-UP	S		DRAWING	DRAWING	DRAWING	M	SW		MATCH MARK
9.4	DIMENSIONAL INSPECTION	S		DRAWING	DRAWING	REPORT	M	W		PER OSHA
9.5	VISUAL INSPECTION	S		DRAWING	DRAWING	REPORT	M	W		
9.6	WELDING INSPECTION	S		WPS	ASME IX	REPORT	M	W		
9.7	TEST FIT TO STACK	S		DRAWING	DRAWING	PICTURES	M	W		MATCH MARK
9.8	GALVANIZING INSPECTION	S		ASTM 123	ASTM 123	REPORT	M	W		
	FINAL INSPECTION @ SUBVENDOR									
	DOCUMENTATION REVIEW	S		PO/BOM	PO	MDR	H	H		
	FINAL VISUAL	S		DRAWING	DRAWING	DRAWING	H	H		
	FINAL DIMENSIONAL	S		DRAWING	DRAWING	DRAWING	H	H		
	CLEANING/PAINT TOUCH-UP	S		DRAWING	DRAWING	DRAWING	H	H		
	MARKING/TAGGING	S		PO/BOM	PO/BOM	PICTURES	H	H		
	PACKING INSPECTION	S		SPECIFICATION	DRAWING	PACKING LIST	H	H		
	INSPECTION RELEASE	S		PROJECT	PROJECT	RELEASE	H	H		
	FINAL DOCUMENTATION	S		SPECIFICATION	SPECIFICATION	MDR	H	H		
General Notes:										
1	ZIECO USA WPS LIST: 111, 135A, 135B, 136A, 136B, 190, 203, 501, 900, 901									
2	ZIECO USA SUB-CONTRACTS ALL NDE TO GLOBE X-RAY SERVICES									
3	ZIECO USA ISO PROCEDURES BEGIN WITH ZQS.									
4	SUBVENDOR WPS LIST- TO FOLLOW									
5	ASME B31.3: 5% OF EACH WELDERS WELD (BUTT WELDS) SHALL BE 100% RADIOGRAPHED.									
6	ASME VIII, UW-52 SPOT: MINIMUM ONE 6" SPOT EXAMINED FOR EACH 50' OF WELD FOR EACH WELDER. LOCATION OF RADIOGRAPH SHALL BE AT THE T-SECTION: ONE 6" FILM ON THE LONG SEAM AND ONE 6" FILM ON THE CIRCUMFERENTIAL SEAM.									
Revision	Description	Made By	Date							
0	Initial Issue									
1										
				Uncontrolled - Reference Only						
				Controlled Copy #						
				Authorized By: BM						
				Page 4 of 4						

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ATTACHMENTS

Attachment L

Partial Users List

Zeeco Inc.

Partial Users List for Enclosed Flare Systems

SO#	Zeeco Customer	Jobsite Location Country	Service	Maximum Flow Rate (lb/hr)
6609	Coastal Fuels	Jacksonville, FL USA	Truck Loading	2,000
6814	Coastal Fuels	Port Everglades , FL USA	Truck Loading	2,000
8098	St. Service	Imperial, CA USA	Truck Loading	2,000
8141	Louis Dreyfus	Port Everglades , FL USA	Truck Loading	5,000
8323	Coastal Fuels	Cape Canaveral, FL USA	Truck Loading	2,000
8347	Coastal Fuels	Port Manatee, FL USA	Truck Loading	2,000
8408	Phillips Petroleum	Albuquerque, NM USA	Truck Loading	3,000
8459	Star Enterprises	Port Everglades , FL USA	Truck Loading	4,000
8487	S.T. Services	Columbus, GA USA	Truck Loading	1,500
8521	S.T. Services	Milwaukee, WI USA	Truck Loading	1,500
8525	Marathon Oil	Garyville, LA USA	Chemicals	35,000
8681	Williams Pipeline	Des Moines, IA USA	Truck Loading	7,500
8714	Williams Pipeline	Omaha, NE USA	Truck Loading	5,000
8740	City of Brampton	Ontario, Canada	Landfill	1,000
8763	S.T. Services	Jacksonville, FL USA	Truck Loading	4,000
8802	City of Brampton	Ontario, Canada	Landfill	1,000
8845	Star Enterprises	Port Everglades , FL USA	Truck Loading	4,000
8880	Fuel Storage	Manchester, NH USA	Truck Loading	1,500
8963	Heetco	Ontario, Canada	Landfill	500
8984	Louis Dreyfus	Birmingham, AL USA	Truck Loading	9,000
9110	Williams Pipeline	Kansas City, KS USA	Truck Loading	6,000
9487	Amoco	Dubuque, IA USA	Truck Loading	2,000
9550	Northern Star Co.	Minneapolis, MN USA	Truck Loading	3,000
9615	S.T. Services	Salina, KS USA	Truck Loading	3,000
10107	Texaco	St. Thomas, Virgin Islands	Truck Loading	1,000
10153	Miller Brewing	Fort Worth, TX USA	Truck Loading	900
10200	Tidelands Oil	Oregon, OH USA	Truck Loading	1,800
10553	Formosa Plastics	Port Comfort, TX USA	Truck Loading	1,500
10573	Kelt Cameroon	Cameroon	Production	8,000
10585	Formosa Plastics	Mai Liao, Taiwan	Chemicals	45,000
10651	Tidelands Oil	Long Beach, CA USA	Truck Loading	3,000
10652	Tidelands Oil	Long Beach, CA USA	Truck Loading	2,000
12962	Shell	Nigeria (So. Bank)	Gas Plant	25,000
12962	Shell	Nigeria (No. bank)	Gas Plant	30,000
12962	Shell	Nigeria (Yokri FS)	Gas Plant	40,000
12962	Hyundai Heavy Industries	Nigeria	Production	38,700
12962	Hyundai Heavy Industries	Nigeria	Production	48,000
12962	Hyundai Heavy Industries	Nigeria	Production	35,400
13143	Williams Corp	Bloomfield, NM USA	Production	990
13360	Petremee	Australia	Chemicals	7,590
13375	Bioengineering Resources, Inc.	Fayetteville, AR USA	Landfill	1,000
13375	Bioengineering Resources, Inc.	USA	Biogas	1,315
13418	Perenco Guatemala	Guatemala	Landfill	500
13418	Kelt Energy Inc.	Guatemala	Production	543
13418	Kelt Energy Inc.	Guatemala	Production	543
13695	Jacobs / BP	Grangemouth, Scotland	Chemicals/Ethylene	198,500
14024	Great Lakes Chemical	USA	Truck Loading	680
14063	Shell	Bonny, Nigeria	Production	35,000
14063	Hyundai Heavy Industries	Nigeria	Production	69,075
14414	BHP Billiton Petroleum	Australia	Production	94,000
15211	Arabian BEMCO Contracting Co.	U.A.E.	Utilities Production	22,050
15551	Vogelbusch USA	Saudi Arabia	Production	575
15633	Process Group Int'l	U.A.E.	Utilities Production	22,050
16030	Dynamotive Energy Systems	Canada	Production	4,500
16518	Process Group International	U.A.E.	Utilities Production	22,050
16853	PGI/DEWA	U.A.E.	Utilities Production	22,050
17717	SAFWAM	Kuwait	Production	38,058

Zeeco Inc.
Partial Users List for Enclosed Flare Systems

SO#	Zeeco Customer	Jobsite Location Country	Service	Maximum Flow Rate (lb/hr)
17718	Williams Corp	USA	Production	250
17929	HHI	Bahrain	Utilities Production	22,050
18431	Dow Chemical	China	Production	18,500
18596	UTE	Russia	Chemicals	330,000
18632	CNX Gas	Pennsylvania	Gas Plant	835
18666	Rayong Terminal Co LTD	Thailand	Chemicals	17,870
18744	Zeeco Rental	USA	Various	Various
18926	Control Process	Poland	Refining	5,070
18926A	Control Process	Poland	Refining	17,000
18926B	Control Process	Poland	Refining	7,935
18926C	Control Process	Poland	Refining	10,928
18926D	Control Process	Poland	Refining	4,960
18926E	Control Process	Poland	Refining	30,400
18926F	Control Process	Poland	Refining	6,780
18926G	Control Process	Poland	Refining	6,145
18926H	Control Process	Poland	Refining	9,200
19476	Texas Gas Transmission	USA	Dehy Unit	275
19987	Petro Vietnam	Vietnam	LPG	28,500
20028	Kuwait Oil Company	Kuwait	Refining	20,794
20032	Hitachi Plant Technologies	Singapore	Chemicals	13,000
20105	Zeeco Rental	USA	Various	Various
20162	Apache	USA	Wellhead Service	130
20246	Williams	USA	Production	242
20289	Williams	USA	Production	250
20290	Williams	USA	Production	200
20440	Zeeco Rental	USA	Wellhead Service	Various
20527A	PTTPE	Thailand	Chemicals	264,552
20527B	PTTPE	Thailand	Chemicals	264,552
20600	Gasification International	USA	Wellhead Service	263
20779	Climax Global	USA	Wellhead Service	630
21171	Mountain Gathering	USA	Wellhead Service	1292
21172	Mountain Gathering	USA	Wellhead Service	1292
21384	Apache Corporation	USA	Wellhead Service	130
21385	Apache Corporation	USA	Wellhead Service	130
21249	Saulsbury	USA	Wellhead Service	23
21429	Jurong Aromatics	Singapore	Aromatics	88,000
21829A	PetroChad	Africa	Production	46,006
21829B	PetroChad	Africa	Production	14,074
22212	SYZRANSKIY	Russia	Chemicals	539,472
22794	PT Chevron	Indonesia	Various	51,532
22823A	ADMA-OPCO	U.A.E.	Production	247,963
22823B	ADMA-OPCO	U.A.E.	Production	247,963
25337	Turkish Petroleum	Turkey	Gas Storage	156
26729	TSI	USA	Gas Compressor Station	18,624
28700	BoRyeong LNG	Korea	LNG Terminal	66,138
29205AA	Bechtel	USA	Chemical	330,690
290205BB	Bechtel	USA	Chemical	330,690
30211	Costa Norte LNG	Panama	LNG Terminal	113,096
30515	AGL	USA	Production	9,241
30604	Discovery DP	USA	Production	27,128