

**ZEECO ULTRA-LOW NOX FREEJET GAS
BURNER**

OPERATING AND MAINTENANCE MANUAL

ZEECO

RD Juniper

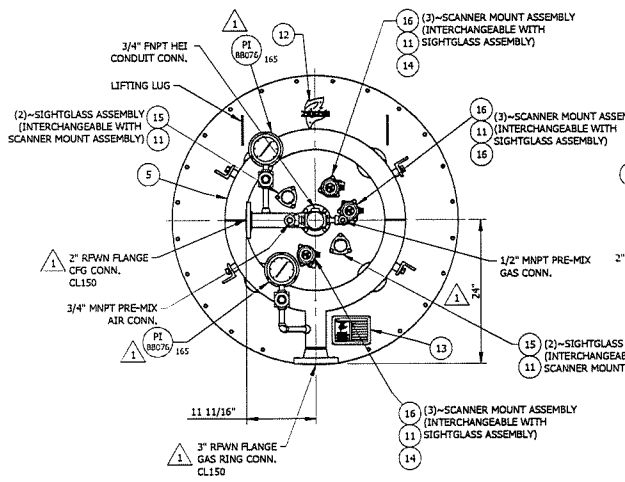
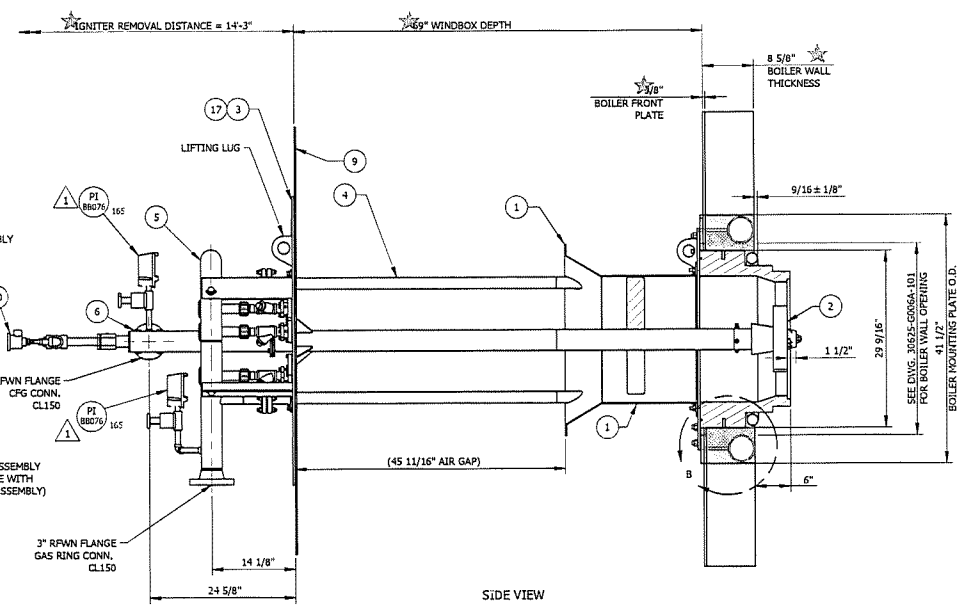
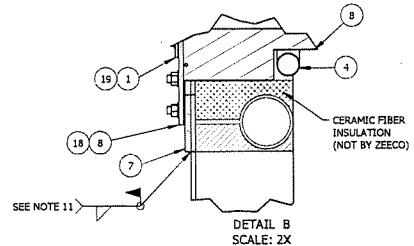
WESTLAKE, LA

RENTECH PO# 70045241

ZEECO SO# 30625

HEAT RELEASE INFORMATION		
HEAT RELEASE		
GAS		
MAX INPUT (MMBTU/hr)		74.3
MIN INPUT (MMBTU/hr)		7.43
NHV: 1057 BTU/ft ³		
MAX DRAFT LOSS (INCHES W.C.)		5.9

PARTS LIST					
ITEM	QTY	DESCRIPTION	PART NUMBER	MATERIAL	MATERIAL I.D.
1	1	AIR REGISTER ASSEMBLY	30625-A006A-150		
2	1	SWIRLER ASSEMBLY	30625-A006A-190		
3	1	REMOVEABLE CENTER ASSEMBLY	30625-A006A-200		
4	1	RING TIP ASSEMBLY	30625-A006A-320		
5	1	EXTERIOR GAS RING ASSEMBLY	30625-A006A-330		
6	1	CENTER FIRED GAS ASSEMBLY	30625-A006A-350		
7	1	BOILER MOUNTING RING ASSEMBLY	30625-A006A-400		
8	1	BURNER TILE ASSEMBLY	30625-A006A-450		
9	1	WINDBOX ASSEMBLY	30625-A006A-600		
10	1	AR/GS-1 IGNITER	UB-1469		
11	5	SCANNER / SIGHT GLASS GASKET	AA-770	PTFE	
12	1	STANDARD ZECCO LOGO	AA-839	304 SS	
13	1	NAMEPLATE (LARGE)	AA-885	304 SS	
14	3	PROFLAME SCANNER (SEE MECH. EQUIP. LIST)	ZPF-120		
15	2	SIGHTGLASS	JE-5375		
16	3	SCANNER MOUNT W/ Y-BRANCH (SEE EQUIPMENT LIST)	JE-7381		
17	1	ROPE GASKET: 1/4" DIA. X 12'-6" LG.		FIBERGLASS	031003-0026
18	1	ROPE GASKET: 1/4" DIA X 10'-6" LG.		FIBERGLASS	031003-0026
19	1	ROPE GASKET: 1/4" DIA. X 7'LG.		FIBERGLASS	031003-0026



SEE DRAWING 30625-G006A-101 FOR TILE VIEW, BOILER WALL OPENING & GENERAL NOTES
 SEE DRAWING 30625-G006A-102 FOR WINDBOX ARRANGEMENT

MANUFACTURER, DIMENSIONS AND IDENTIFICATION ARE TO BE CONFIRMED BY THE CLIENT TO ENSURE PROPER INTERFACING OF THE ZECCO EQUIPMENT TO THE EXISTING EQUIPMENT.

THIS INFORMATION IS TO BE REVIEWED AND CONFIRMED BY THE CLIENT TO ENSURE PROPER INTERFACING OF THE ZECCO EQUIPMENT TO THE EXISTING EQUIPMENT.

NO.	DATE	REVISION DESCRIPTION	BY	CHKD.	APP.
2	08MAY17	AS BUILT			
1	27JAN17	UPDATED ITEM TAGS, REMOVED ITEMS 20-23, ROTATED GAS RING CONN & CFG CONN & WHERE NOTED	JLB	DSM	JG
0	04JAN17	RELEASED FOR CUSTOMER APPROVAL	CED	CTD	JG

RENTECH NO. 16-39
 CUSTOMER: RENTECH BOILER SYSTEMS
 JOBSITE: WESTLAKE, LA
 END USER: RD JUNIPER
 P.O. NO.: 70645241

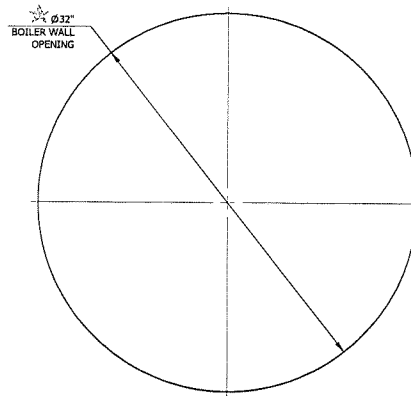
FREDJET P16
 GENERAL ARRANGEMENT
 (1- Required)

STATUS	
Released	
3 RD ANGLE PROJ	
DATE	07-Jan-16
DRAWN	CED
CHECKED	CTD
SCALE	NONE
SHEET NO.	1 OF 1
REV. NO.	2

SQ. NO.	DESC. CAT.	QTY	UNIT	REV. NO.
30625	G 006	A	100	2

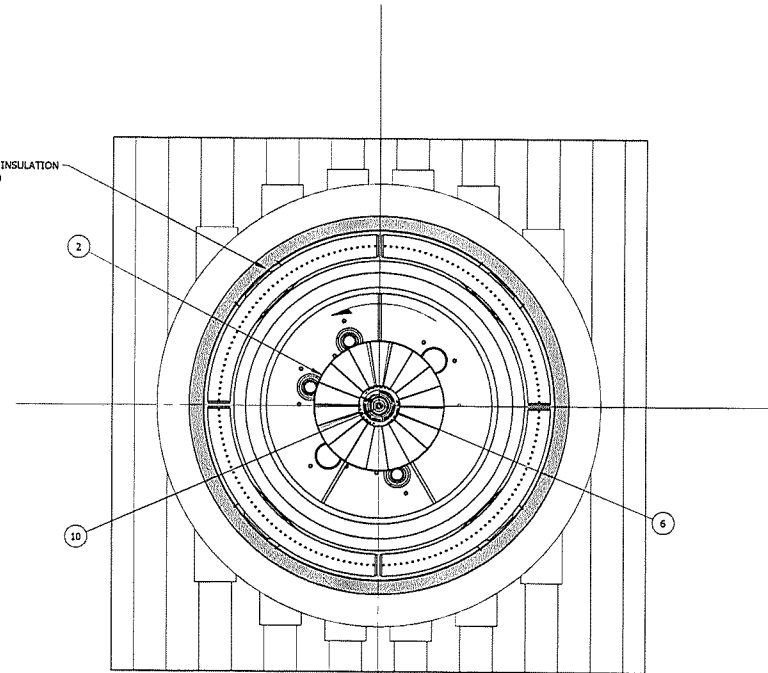
NOTES:

1. ALL EXTERNAL CARBON STEEL SURFACES TO BE SURFACE PREPPED PER SSPC-SP-6 AND PAINTED WITH BASE COAT Sherwin Williams MACROPOXY 646 FAST DRY EPOXY 646 (5.0-10.0 MILS DFT (125-250 Microns)), TOP COAT (LIGHT BUFF) with Sherwin Williams ACROLON 218HS ACRYLIC POLYURETHANE (3.0-6.0 MILS DFT (75-150 Microns)) OR EQUAL. WINDBOX COLOR: ANSI 61 GRAY; BURNER COLOR: RAL 2004 Reinorange
2. ALL INTERNAL CARBON STEEL SURFACES TO BE SURFACE PREPPED PER: SSPC SP-1 AND PAINTED WITH 1 COAT (1.0 MILS DFT (25 MICRON)) OF DAMPNEY COMPANY INC. THURMALOX 270M (METALLIC CHARCOAL) OR EQUAL.
3. ALL IGNITER CARBON STEEL SURFACES TO BE SURFACE PREPPED PER: SSPC SP-1 AND PAINTED WITH 1 COAT (1.0 MILS DFT (25 MICRON)) OF DAMPNEY COMPANY INC. THURMALOX 270-02 SATIN (BLACK) OR EQUAL.
4. POSITION FOR SWIRLER, IGNITER, OIL UNIT, ETC. ARE SHOWN IN INITIAL "FACTORY" SETTINGS AND MAY REQUIRE ADJUSTMENT DURING COMMISSIONING TO ACHIEVE OPTIMUM PERFORMANCE. FINAL POSITIONS SHOULD BE MARKED AND NOTED FOR FUTURE REFERENCE.
5. BOILER FRONT PLATE TO BE FLAT, SQUARE AND TRUE WITH BURNER CENTERLINE AND PROPERLY STIFFENED TO SUPPORT WEIGHT OF WINDBOX AND BURNER. BURNER TO BE INSTALLED WITH A CONCENTRICITY OF $\pm 1/8"$ BETWEEN BURNER FRONT PLATE DIAMETER AND BOILER FRONT PLATE OPENING.
6. WINDBOX IS TO BE SEAL WELDED TO BOILER FRONT WALL BY OTHERS.
7. BURNER THROAT TRAILING EDGE TO BE SHARP NOT ROUNDED.
8. DO NOT SCALE THIS DRAWING. DIMENSIONS SHOWN ARE IN INCHES.
9. FOR COMPONENT DETAILS AND MATERIAL SPECIFICATIONS, REFER TO THE ZEECO POWER BURNER MECHANICAL/INSTRUMENT DATA SHEETS.
10. ADDITIONAL LOAD MUST NOT BE PLACED ON WINDBOX BY SUPPORTING EQUIPMENT OTHER THAN SHOWN.
11. ALL FIELD WELDED INTERFACE POINTS (I.E. DUCT BURNER FRAME JOINTS, FRONT PLATE ALIGNMENT WELDS, BOILER MOUNTING FLANGE) TO BE SURFACE PREPPED PER NOTES 1, 2 & 3.
12. ALL INTERCONNECTING PIPING TO BE SUPPLIED & INSTALLED BY OTHERS.
13. ALL EXISTING EQUIPMENT SHOWN IN PHANTOM FOR CLARITY.
14. FOR BURNER DESIGN SPECIFICATIONS SEE ZEECO POWER BURNER DESIGN DATA SHEET.
15. COMBUSTION AIR FAN AND SILENCER SHIPPED LOOSE FOR FIELD INSTALLATION. SILENCER TO BE SUPPORTED IN THE FIELD BY OTHERS AND SHOULD NOT BE SUPPORTED OFF OF THE WINDBOX.
16. INSTALL ALL HOSES WITHOUT UNDUE TENSION OR KINKS.
17. ALL FLANGE BOLT HOLES TO STRADDLE NORMAL CENTERLINES.
18. DEPTH FROM BOILER MOUNTING FLANGE TO REFRACTORY SURFACE IS CRITICAL TO BURNER OPERATION. ENSURE DEPTH IS MAINTAINED.
19. ESTIMATED BURNER/WINDBOX WEIGHT: 3,500 lbs \triangle
20. CUSTOMER TO SUPPORT ITEMS ABOVE EXPANSION JOINT, ESTIMATED WEIGHT: 1,865 lbs \triangle



BOILER WALL OPENING

CERAMIC FIBER INSULATION
(NOT BY ZEECO)



TILE VIEW
(AS VIEWED FROM INSIDE BOILER)

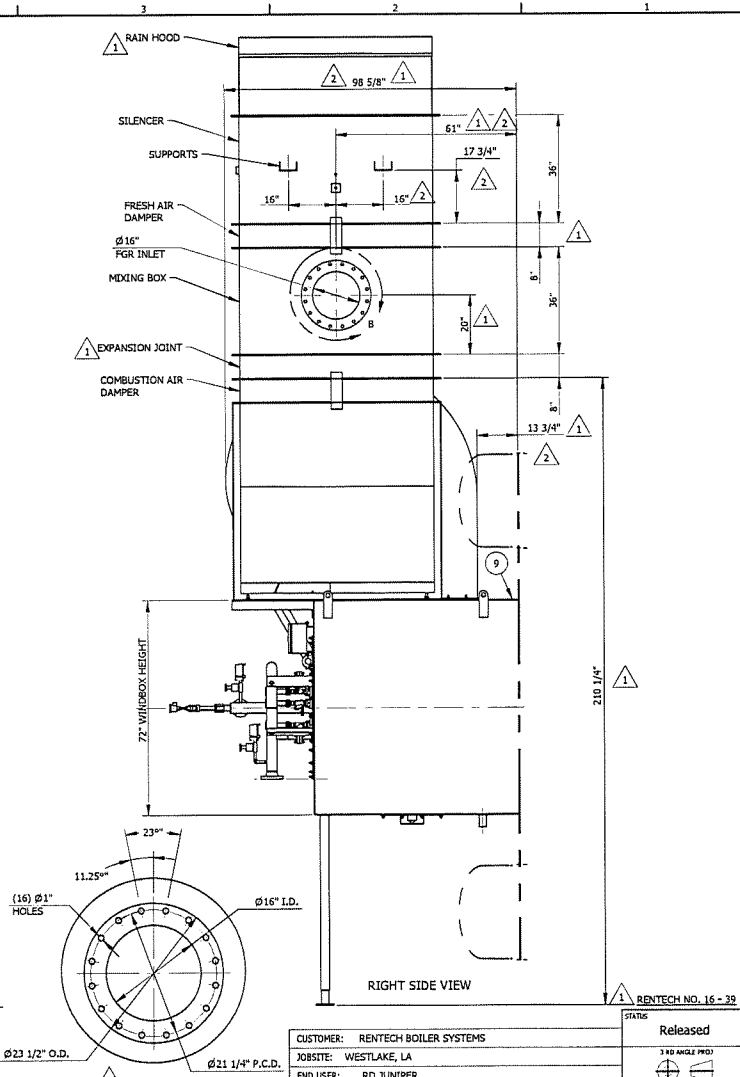
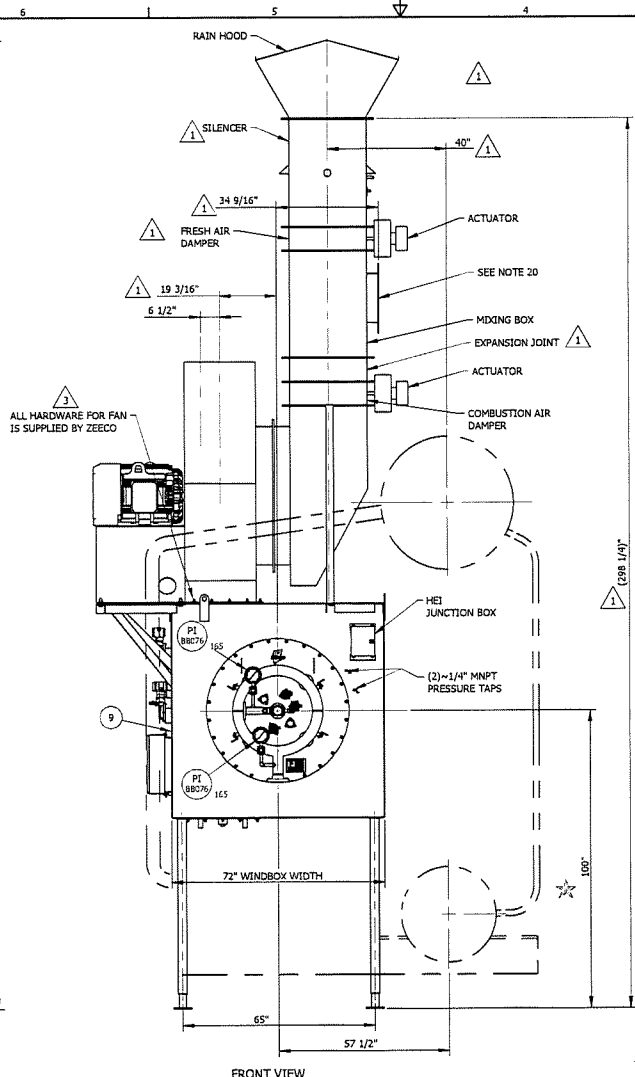
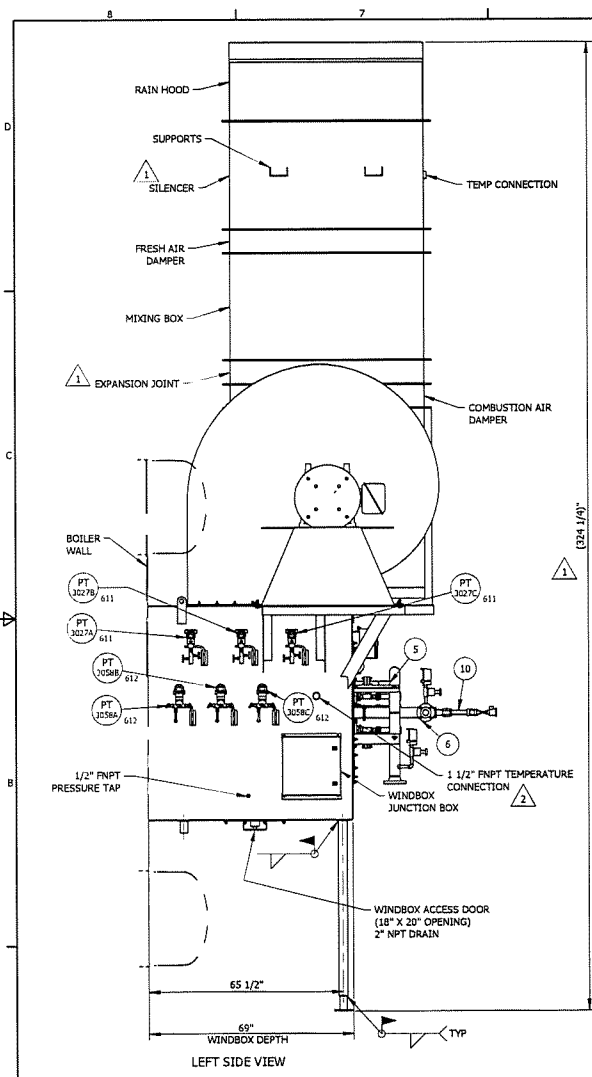
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SEE DRAWING 30625-G006A-100 FOR BURNER GENERAL ARRANGEMENT AND PARTS LIST
SEE DRAWING 30625-G006A-102 FOR WINDBOX ARRANGEMENT

MANUFACTURED TO FRANCE AND
INSTALLATION LEADING GEN.
FABRICATION DIM: $\pm 1/8"$ (3mm)
PIPING CONN. DIM: $\pm 1/2"$ (13mm)
BOLTING DIM: $\pm 1/8"$ (3mm)
TILE DIM: $\pm 1/8"$ (3mm)
FUEL PORT ANGLE: $\pm 2^\circ$
PIPING AND AIR CONNECTIONS
DESIGNED FOR ZERO LOADING

NO.	DATE	REVISION DESCRIPTION	BY	CHKD.	APP.
2	08MAY17	AS BUILT	CEJ	DSM	JG
1	27JAN17	UPDATED NOTES	JLB	DSM	JG
0	04JAN17	RELEASED FOR CUSTOMER APPROVAL	CEJ	CTD	JG

RENTTECH NO. 16-39		STATUS	Released
CUSTOMER: RENTTECH BOILER SYSTEMS		3RD ANGLE PROJ	<input checked="" type="checkbox"/>
JOB SITE: WESTLAKE, LA		DIM IN INCHES UNLESS OTHERWISE STATED.	
END USER: RD JUNIPER		DRAWN	CEJ
P.O. NO.: 70045241		DATE	07-Jan-16
<small>RENTTECH INC. 2200 LAKEVIEW BLVD SUITE 1000 WESTLAKE, LA 70709-5017 PHONE: (504) 885-1111 FAX: (504) 885-1118 www.renttech.com</small>		CHKD	CTD
FREEJET P16 GENERAL ARRANGEMENT TILE VIEW (1- Required)		SCALE	NONE
SER. NO. 30625 SPEC. CAT. G SUB CAT. 006 SYSTEM NO. A SHOCK NO. 101 REV. NO. 2		SHEET NO.	1 OF 1



MANUFACTURING TOLERANCE AND
 FIT SPECIFICATIONS (UNLESS NOTED)
 FABRICATION DIM. ±1/32" (1.5mm)
 PIPING DIM. DIM. ±1/32" (1.5mm)
 BOLTING DIM. ±1/64" (0.39mm)
 TRF. DIM. ±1/16" (0.625mm)
 FUEL PIPING ANGLE: 45°
 PIPING AND AIR CONNECTIONS
 DESIGNED FOR ZERO LOADING

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 AND CONFIRMED BY THE CLIENT TO ENSURE
 PROPER INTERFACING OF THE ZEECO EQUIPMENT
 TO THE EXISTING EQUIPMENT.

SEE DRAWING 30625-G006A-100 FOR BURNER GENERAL ARRANGEMENT AND PARTS LIST
 SEE DRAWING 30625-G006A-101 FOR TILE VIEW, BOILER WALL OPENING AND GENERAL NOTES

NO.	DATE	REVISION DESCRIPTION	BY	CHKD.	APP.
4	08MAY17	AS BUILT	CED	DSM	JG
3	20MAR17	ADDED NOTE	CED	DSM	JG
2	17FEB17	UPDATED PER CUSTOMER COMMENTS & WHERE NOTED	CED	DSM	JG
1	27JAN17	DIMENSIONS & CALLOUTS FOR MIXING BOX & COMBUSTION AIR DUCTING	JLB	DSM	JG
0	04JAN17	RELEASED FOR CUSTOMER APPROVAL	CED	CTD	JG

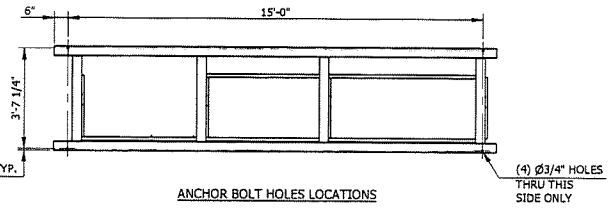
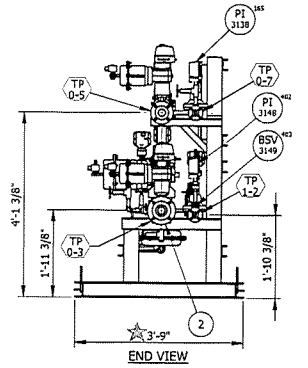
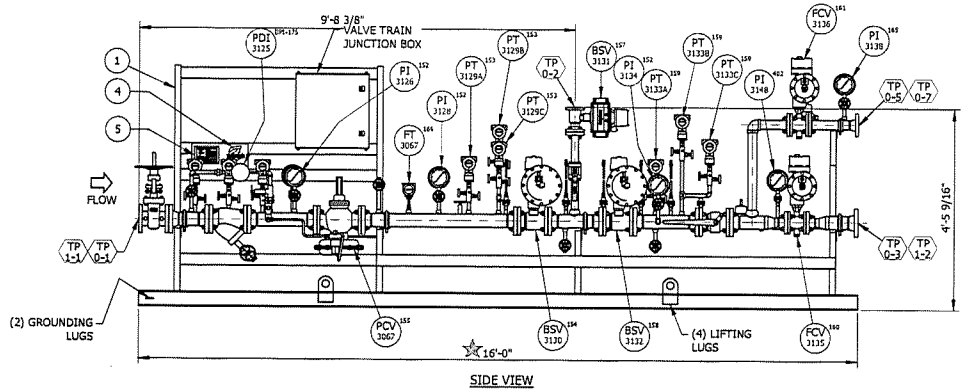
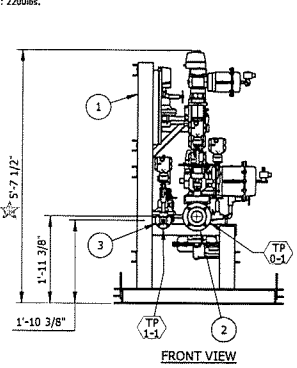
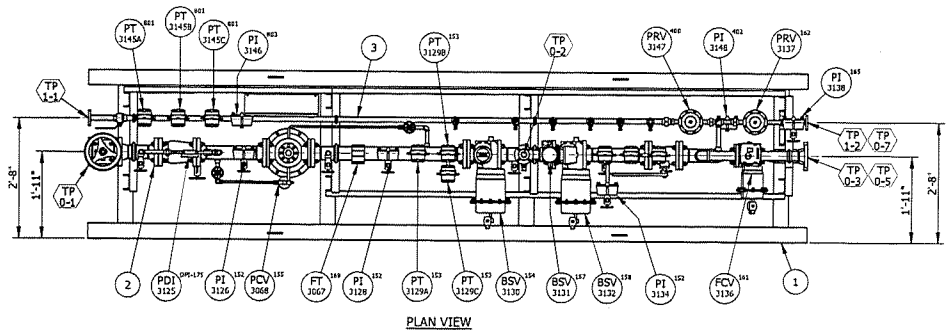
CUSTOMER: RENTECH BOILER SYSTEMS		Released	
JOB SITE: WESTLAKE, LA		3 RD ANGLE PROJ.	
END USER: RD JUNIPER		DIMS IN INCHES UNLESS OTHERWISE STATED.	
P.O. NO.: 70045241		DRAWN: CED DATE: 07-Jan-16	
RENTECH, INC. 2301 WEST BAYSHORE SUITE 100-1001 WESTLAKE, LA 70706		FREEJET P16 WINDBOX ARRANGEMENT (1- Required)	
S.D. NO. 30625 DWG. CAT. G SUB CAT. 006 SYSTEM NO. A ENGR. NO. 102 REV. NO. 4		SCALE: NONE SHEET NO. 1 OF 1	

NOTES:

- MATERIALS, CONSTRUCTION AND PRESSURE TESTING OF PIPING TO BE PER ANSI B 31.1 REQUIREMENTS (LATEST EDITION).
- PIPING 2" DIA. AND SMALLER TO BE SCH. 80 STEEL PIPE WITH 3000 LBS. FORGED STEEL SOCKET WELD END FITTINGS AND 150 LBS. RAISED FACE FLANGES.
- PIPING 2 1/2" DIA. AND LARGER TO BE SCH. 40 STEEL PIPE WITH STANDARD BUTT WELD FITTINGS AND 150 LBS. RAISED FACE FLANGES.
- THREADED FITTINGS WILL BE LIMITED.
- GASKETS FOR GAS PIPING TO BE 1/16" THICK KINGSBIL C-4401. RAISED FACE FLANGE WILL USE RING GASKET INSIDE BOLTS OF FLANGE. FLAT FACE FLANGE WILL USE FULL FACE GASKET TO MATCH O.D. OF FLANGE.
- BOLTS AND NUTS FOR ALL PIPING FLANGES TO BE HIGH STRENGTH AS FOLLOWS:
BOLTS WILL BE ASTM A-193 GRADE B7 - ZINC PLATED.
NUTS WILL BE ASTM A-194 GRADE 2H - ZINC PLATED.
FLAT WASHERS SHALL BE TYPE F136 - ZINC PLATED.
- ALL MATING FLANGES TO MATCH EQUIPMENT SIZE, MATERIAL, TYPE AND CLASS UNLESS OTHERWISE NOTED.
- ALL INSTRUMENT AIR PIPING TO BE 3/8" 316 SS SEAMLESS TUBING. SENSING LINES TO BE 1/2" 316 SS SEAMLESS TUBING.
- FABRICATOR TO CHECK AND VERIFY ALL ELEVATIONS AND DIMENSIONS DURING CONSTRUCTION OF PIPE TRAINS.
- ALL EXTERNAL CARBON STEEL SURFACES TO BE SURFACE PREPPED PER SSPC-SP-6 AND PAINTED WITH BASE COAT Sherwin Williams MACROPOXY 646 FAST DRY EPOXY 646 (5.0-10.0 Mils DFT (125-250 Microns)), TOP COAT (LIGHT BUFF) with Sherwin Williams ACGLON 218HS ACRYLIC POLYURETHANE (3.0-6.0 Mils DFT (75-150 Microns)) OR EQUAL. INSTRUMENT AIR TRAIN COLOR: BLUE RAL 5015; OIL AND STEAM TRAIN COLOR: BLACK RAL 9011; NATURAL AND PILOT GAS TRAIN COLOR: YELLOW RAL 1021.
- FUEL SKID FRAME TO BE HOT DIP GALVANIZED PER ASTM A-123 OR PAINTED IN ACCORDANCE WITH PAINT SPECIFICATION AND PAINTED COLOR: GRAY RAL 7030.
- ALL VALVES AND FUEL SKID COMPONENTS ARE SUPPLIED WITH COMPONENT MANUFACTURER STANDARD FINISH.
- APPROX. WEIGHT: 2200lbs.

TERM POINT	LINE SIZE	CONN. TYPE	SERVICE
0-1	3"	CL150 RF FLANGE	MAIN GAS INLET CONN.
0-2	1 1/2"	CL150 RF FLANGE	MAIN GAS VENT CONN.
0-3	3"	CL 150 RF FLANGE	MAIN GAS RING OUTLET CONN.
0-4	3"	CL150 RF FLANGE	MAIN GAS BURNER CENTER OUTLET CONN.
0-7	3/4"	CL150 RF FLANGE	MAIN GAS IGNITER FUEL OUTLET CONN.
1-1	1"	CL150 RF FLANGE	INSTRUMENT AIR INLET CONN.
1-2	3/4"	CL150 RF FLANGE	IGNITER AIR OUTLET CONN.

PARTS LIST				
ITE	QTY	DESCRIPTION	PART NUMBER	MATERIAL
1	1	VALVE RACK STEEL ASSEMBLY	30625-P013A-501	
2	1	MAIN GAS VALVE TRAIN ASSEMBLY	30625-P013A-502	
3	1	INSTRUMENT AIR VALVE TRAIN ASSEMBLY	30625-P013A-504	
4	1	STANDARD ZECCO LOGO	AA-839	304 SS
5	1	NAMEPLATE (LARGE)	AA-885	304 SS



MANUFACTURING TOLERANCE AND INSTALLATION LEGEND GEN
 FABRICATION DIM: ±1/8" (3mm)
 PIPING DIM: DIM ±1/2" (13mm)
 BOLTING DIM: ±1/8" (3mm)
 TLE DIM: ±1/8" (3mm)
 FUEL PORT ANGLE: 45°
 PIPING AND AIR CONNECTIONS DESIGNED FOR ZERO LOADING

NO.	DATE	REVISION DESCRIPTION	BY	CKD.	APP.
3	22MAY17	AS BUILT	CEC	DSM	GS
2	12APR17	REVISED CUSTOMER TAGS	DSM	DSM	GS
1	29JAN17	UPDATED ITEM TAGS	JLB	DSM	DP
0	03JAN17	RELEASED FOR APPROVAL	CTD	CTD	DP
		REVISION DESCRIPTION			

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RENTECH NO. 16 - 39

CUSTOMER: RENTECH BOILER SYSTEMS
 JOBSITE: WESTLAKE, LA
 END USER: RD JUNIPER
 P.O. NO.: 70045241

STATUS: Released

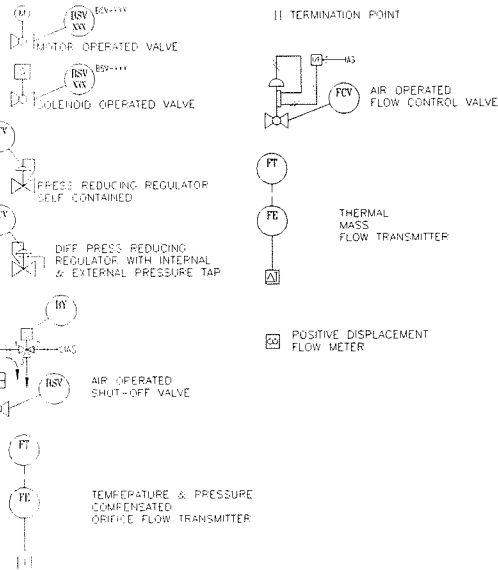
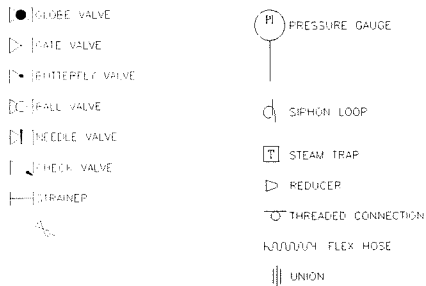
3 RD ANGLE PROJ

UNLESS OTHERWISE STATED.

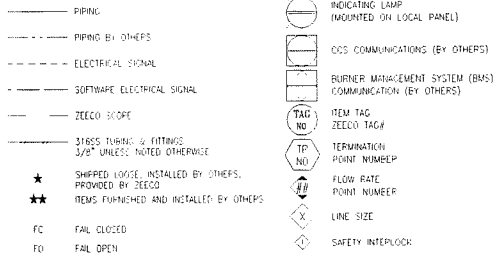
DATE	DATE
30-Aug-16	
CTD	DP
DSM	DP
SCALE	SHEET NO.
NONE	1 OF 1

MAIN GAS FUEL SKID FOR FREE-JET TYPE BURNER GENERAL ARRANGEMENT (1- Required)

S.D. NO.	DWG. CAT.	SUB CAT.	SYSTEM NO.	DWG. NO.	REV. NO.
30625	G	013	A	500	3



LEGEND:



ASME B31.1 CONSTRUCTION NOTES:

1. PIPING 2" AND UNDER SHALL BE A-106 SEAMLESS PIPE, SCHEDULE 80, SOCKET WELDED END CONNECTIONS, 3000# FITTINGS.
2. PIPING 2" AND LARGER WILL BE A-106 SEAMLESS PIPE, SCHEDULE 40, CL150 FLANGED OR BUTT WELDED CONNECTIONS.
3. BOLTS SHALL BE ASTM A-193 GRADE B7-ZINC PLATED.
4. NUTS SHALL BE ASTM A-194 GRADE 2H-ZINC PLATED.
5. FLAT-WASHER (2) PER STUD, (1) PER BOLT, TYPE F436-ZINC PLATED.
6. GASKETS SHALL BE GARLOCK BLUE-GUARD 3000, 1/16" THICK, OR EQUAL.

STANDARD P&ID NOTES:

1. ALL VENT LINES MUST BE BROUGHT TO A SAFE ATMOSPHERIC LOCATION IN ACCORDANCE TO LOCAL CODES (BY END USER).
2. REFER TO THE MECHANICAL EQUIPMENT LIST FOR VALVE AND EQUIPMENT INFORMATION.
3. VALVE TRAIN IS DESIGNED IN ACCORDANCE WITH NFPA 85 2015 EDITION.
4. INSTRUMENT AIR SHALL BE CLEAN, DRY & AT 80 PSIG MINIMUM.
5. SAFETY SHUT OFF VALVES MUST BE PLACED AS CLOSE AS POSSIBLE TO THE BURNER FRONT.

TERMINATION POINTS

Termination point list

Termination Point	Connection Size	Connection Type	Description	Flow Diamond
TP 0-1	3"	Class 150 RF Flange	Main Gas Fuel Skid Inlet Connection	Yes
TP 0-2	1 1/2"	Class 150 RF Flange	Main Gas Vent Connection	No
TP 0-3	3"	Class 150 RF Flange	Main Gas Ring Fuel Skid Outlet Connection	Yes
TP 0-4	3"	Class 150 RF Flange	Main Gas Ring Burner Connection	Yes
TP 0-5	2"	Class 150 RF Flange	Main Gas Burner Center Fuel Skid Outlet Connection	Yes
TP 0-6	2"	Class 150 RF Flange	Main Gas Burner Center Connection	Yes
TP 0-7	3/4"	Class 150 RF Flange	Main Gas Burner Gas Lance Fuel Skid Outlet Connection	Yes
TP 0-8	1/2"	Class 150 RF Flange	Main Gas Burner Gas Lance Connection	Yes
TP 1-1	3/4"	Class 150 RF Flange	Instrument Air Fuel Skid Inlet Connection	Yes
TP 1-2	3/4"	Class 150 RF Flange	Main Gas Burner Gas Lance Air Fuel Skid Outlet Connection	Yes
TP 1-3	3/4"	Class 150 RF Flange	Main Gas Burner Gas Lance Air Connection	Yes
TP 2-1	1"	FNPT	Scanner Purge Air Connection	No

FLOW POINTS

	0-1	0-3	0-4	0-5	0-6	0-7	0-8	1-1	1-2	1-3	2-1	3-1
LOCATION	NATURAL GAS SUPPLY	NATURAL GAS HEADER	BURNER	NATURAL GAS HEADER	BURNER	NATURAL GAS HEADER	BURNER	INSTRUMENT AIR SUPPLY	INSTRUMENT AIR HEADER	BURNER	BURNER	WINDBOX
FLUID	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS	INSTRUMENT AIR	INSTRUMENT AIR	INSTRUMENT AIR	INSTRUMENT AIR	COMBUSTION AIR
PRESSURE (MAX)	30 PSIG	16 PSIG	15 PSIG	7 PSIG	5.6 PSIG	11 PSIG	10 PSIG	80 PSIG	11 PSIG	10 PSIG	17.2 in W.C.	12.2 in W.C.
PRESSURE (MIN)	30 PSIG	0.2 PSIG	0.2 PSIG	0.2 PSIG	0.2 PSIG	11 PSIG	10 PSIG	80 PSIG	11 PSIG	10 PSIG	17.2 in W.C.	0.8 in W.C.
FLOW (MAX) SCFH	70,254	59,716	59,716	21,076	21,076	150	150	2000	1609	1609	300	62396
FLOW (MIN) SCFH	7,025	5,972	5,972	3,513	3,513	150	150	2000	1609	1609	300	15600

FIRST LETTER	VARIABLE	INSTRUMENTATION IDENTIFICATION															
		INSTRUMENT FUNCTION	PROCESS ELEMENT	REGULATOR	VALVE / OWNER	CONTROL VALVE	SPEEDY VALVE	PLURV	LURV	SWITCH	TRIPSHOOTER	ORIFICE	WELL / PROBE				
A	ANALYSIS	AE	AI														AA
B	BURNER	BE	BI	BEV		BSV	BA	BL	BS	BT							BB
C	USER'S CHOICE																
D	USER'S CHOICE																
E	VOLTAGE	EE	EI				EA										
F	FLOW RATE	FE	FI	FV	FCV	FQV				FS	FT	FO					
G	USER'S CHOICE																
H	HAND				HV												
I	CURRENT		II				IA			IS	IT						
J	POWER		JI				JA			JS	JT						
K	TIME		KI				KA										
L	LEVEL		LI		LCV		LA	LL	LS	LT		LW					
M	USER'S CHOICE																
N	USER'S CHOICE																
O	USER'S CHOICE																
P	PRESSURE	PE	PI	PV	PCV	PSV	PA	PL	PS	PT		PW					
PD	PRESSURE DIFFERENTIAL	PEI	PIV	PDCV	PDSV	PDA	PDL	PDS	PDT								
Q	QUANTITY																
R	RADIATION																
S	SPEED / FREQUENCY																
T	TEMPERATURE	TE	TI	TV	TCV		TA		TS	TT		TW					
TD	TEMPERATURE DIFFERENTIAL	TEI	TIV	TDCV		TDA		TDS	TDT								
U	MULTIVARIABLE																
V	VIBRATION / MECH. ANALYSIS																
W	WEIGHT / FORCE																
X	UNCLASSIFIED																
Z	POSITION	ZE	ZI	ZCV		ZA		ZS	ZT								
Y	EVENT		YI			YA	YL	YS	YT								

USERS CHOICE:	UNCLASSIFIED:	MODIFIERS:
FLAME SCANNER: BE	FAN: HF	(LOC AT END OF TAGS)
STRAINER: STP	MOTOR: XM	HIGH: H
CHECK VALVE: CK	EXPANSION JOINT: XJ	LOW: L
FLEX HOSE: CH	DAMPER: XD	MIDDLE: M
DAMPER VOLUME CONTROL: FCZ	SILENCER: XFO	OPEN: O
STEAM TRAP: CTP	PNEUMATIC CYLINDER: XZ	CLOSED: C
CONTROL AIR SOLENOID: BY	SIGHT GLASS: VS	
	MIXING BOX: XB	

ASME B31.1 NO. 16 - 39

CUSTOMER: PENTECH BOILER SYSTEMS STATUS: RELEASED

JOB SITE: WESTLAKE, LA

END USER: PD JUNIPER

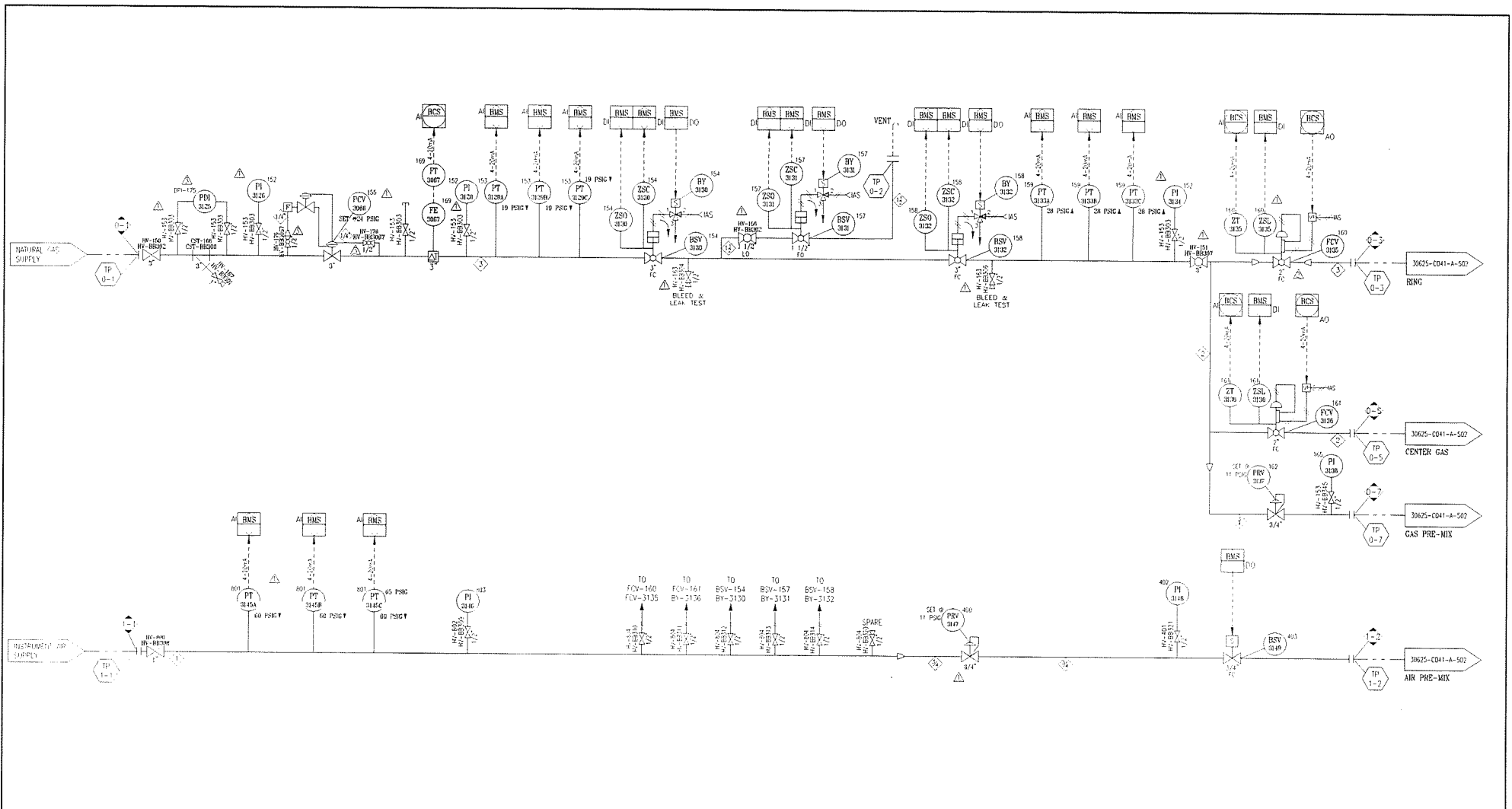
P.O. NO.: 79045241

DATE: 2/21/2017

ISSUED FOR CUSTOMER APPROVAL

30625 C 041 A 500 2

NO.	DATE	DESCRIPTION	BY	CHK	APP
2	21FEB17	UPDATED FLOW POINTS TABLE	TAQ	DSM	DP
1	27JAN17	UPDATED TABLE	RLB	DSM	DP
0	21DEC16	ISSUED FOR CUSTOMER APPROVAL	DSM	JM	DP

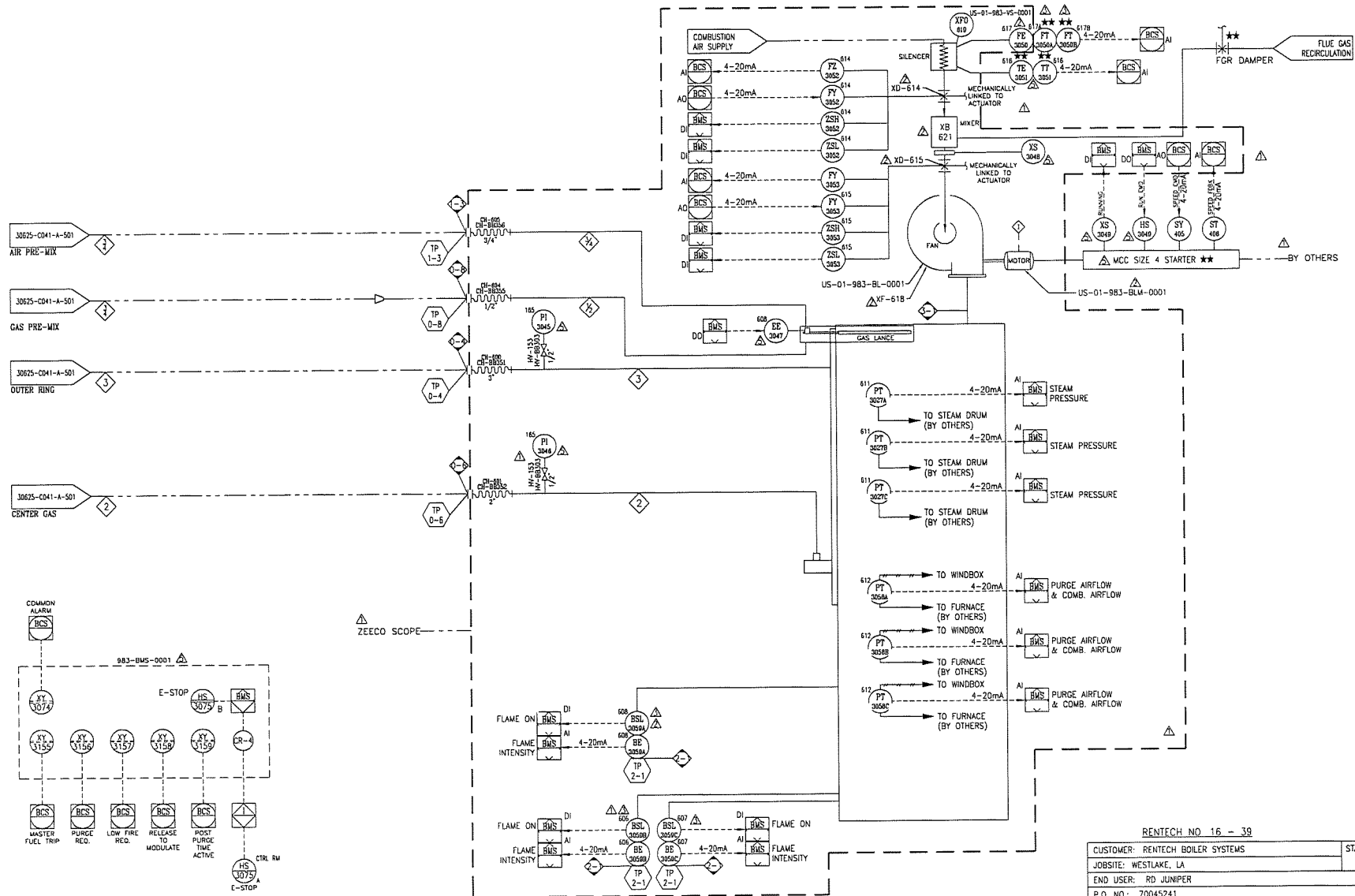


NOTE
 1 REFER DRAWING (SAMA)
 30625-CD04-A-502 FOR MORE DETAILS
 ON FCV PROCESS VARIABLES.

REVISION NO. 16 - 39

CUSTOMER: PENTECH BOILER SYSTEMS		STATUS: Released	
JOB SITE: WESTLAKE, LA			
END USER: PH NUMBER			
P.O. NO.: 70045241			
ZEPEDA 2001 DALLAS STREET HOUSTON, TEXAS 77058 PHONE: 281.281.2000 FAX: 281.281.2001 WWW.ZEPEDA.COM		P&ID FREEJET - MAIN GAS FUEL SKID	
DRAWN: DSM CHECK: JIM SCALE: NONE	DATE: 20DEC16 APP: DP MT	SYS. NO.: 30625 DWG. CAT: C SHIP CAT: 041	SYSTEM NO.: A DWG. NO.: 501 REV. NO.: 4

NO.	DATE	REVISION DESCRIPTION	BY	CHKD	APP
4	11APR17	REVISED ALL INSTUMENT CUSTOMER TAGS	DSM	CS	CS
3	20MAR17	UPDATED TAGS WHERE NOTED	CED	DSM	DP
2	28FEB17	CHANGED SIZE OF FCV-160; WAS 3"	DSM	DP	DP
1	27JAN17	UPDATED ITEM TAGS	JLB	DSM	DP
0	20DEC16	FOR CUSTOMER APPROVAL	DSM	JM	DP



NOTE 1:
 SCANNER COOLING AIR TO KEEP SCANNER
 DETECTOR CLEAN, 5 SCFM/SCANNER 5"
 W.C. TO OVERCOME FURNACE PRESSURE
 (BY OTHERS)

NO.	DATE	REVISION DESCRIPTION	BY	CHK	APP.
5	11APR17	REVISED WHERE NOTED	DSM	GS	GS
4	20MAR17	UPDATED TAGS WHERE NOTED	CED	DSM	GS
3	01MAR17	REVISED WHERE NOTED	DSM	GS	GS
2	21FEB17	UPDATED ITEM TAGS	TAQ	DSM	DP
1	27JAN17	UPDATED ITEM TAGS	JLB	DSM	DP
0	20DEC16	ISSUED FOR CUSTOMER APPROVAL	DSM	JM	DP

RENTech NO. 16 - 39			STATUS: Released																																														
CUSTOMER: RENTECH BOILER SYSTEMS			JOB SITE: WESTLAKE, LA																																														
END USER: RD JUNIPER			P.O. NO.: 70045241																																														
<table border="1"> <tr> <td>DSM</td> <td>GS</td> <td>GS</td> </tr> <tr> <td>DSM</td> <td>GS</td> <td>GS</td> </tr> <tr> <td>DSM</td> <td>GS</td> <td>GS</td> </tr> <tr> <td>DSM</td> <td>GS</td> <td>GS</td> </tr> <tr> <td>JLB</td> <td>DSM</td> <td>DP</td> </tr> <tr> <td>DSM</td> <td>JM</td> <td>DP</td> </tr> <tr> <td>BY</td> <td>CHK</td> <td>APP.</td> </tr> </table>			DSM	GS	GS	DSM	GS	GS	DSM	GS	GS	DSM	GS	GS	JLB	DSM	DP	DSM	JM	DP	BY	CHK	APP.	<table border="1"> <tr> <td colspan="2">P&ID WINDBOX INSTRUMENT AND PIPING</td> <td>DRAWN: DSM</td> <td>BASIC: Z0DEC16</td> </tr> <tr> <td colspan="2"></td> <td>ENR: JM</td> <td>APP: DP</td> </tr> <tr> <td colspan="2"></td> <td>SCALE: NONE</td> <td>APP: MT</td> </tr> <tr> <td>S.O. NO.: 30625</td> <td>ENR. CAL: C</td> <td>SUB. CAL: 041</td> <td>STR. NO.: A</td> </tr> <tr> <td></td> <td></td> <td></td> <td>DWG. NO.: 502</td> </tr> <tr> <td></td> <td></td> <td></td> <td>REV. NO.: 5</td> </tr> </table>		P&ID WINDBOX INSTRUMENT AND PIPING		DRAWN: DSM	BASIC: Z0DEC16			ENR: JM	APP: DP			SCALE: NONE	APP: MT	S.O. NO.: 30625	ENR. CAL: C	SUB. CAL: 041	STR. NO.: A				DWG. NO.: 502				REV. NO.: 5
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Appendix A

Power Burner Data Sheets





89 Spring Ln
Plainville, CT
06066 United States of America
+1 (860) 479-0999

POWER BURNER DESIGN DATA SHEET

By	Rev	Date	Document Number
DNP	0	12/15/2016	30625-2036
CUSTOMER REFERENCE			SHEET
SALES ORDER			1 of 3

GENERAL INFORMATION				REV
1				
2	CUSTOMER NAME	Rentech		0
3	ADDRESS	ABILENE, TX		0
4				0
5	CUSTOMER ORDER NUMBER	SO30625		0
6				0
7	END USER NAME	RD Juniper		0
8	JOBSITE LOCATION	Westlake, LA		0
9	<i>Confidential Property of Zeeco. To be returned upon request and used only in reference to contracts or proposal of this company. Reproduction of this print or unauthorized use of this document is prohibited</i>			
10				
BOILER/SITE DATA				REV
11				
12	BOILER OEM	Rentech		0
13	BOILER TYPE	D-Type		0
14	YEAR OF MANUFACTURE	2017		0
15	NUMBER OF BOILERS	1		0
16	BOILER MAIN STEAM FLOW - MCR	50		KPPH 0
17	FEEDWATER TEMPERATURE	PLEASE CONFIRM		DEGREES F 0
18	STEAM OUTLET TEMPERATURE	750		DEGREES F 0
19	STEAM OUTLET PRESSURE	470		PSIG 0
20				
21	QUANTITY OF BURNERS PER BOILER	1		0
22	BURNER FIRING CONFIGURATION:	PACKAGE UNIT		0
23	BURNER ROWS / COLUMNS(CORNERS)	1 1		0
24	FURNACE WIDTH / LENGTH	6.8	19.0	FT 0
25	DIVISION WALL LENGTH	16.0		FT 0
26	TOP BURNER CENTERLINE TO NOSE	5.0		FT 0
27	BOTTOM BURNER CENTERLINE TO FLOOR	5.0		FT 0
28	BURNER VERTICAL / HORIZONTAL PITCH	0	0	FT 0
29	WINDBOX OR GUN-STYLE PLENUM	Windbox		0
30	WINDBOX HEIGHT / WIDTH / DEPTH	0	0	IN 0
31	FRONT WALL THICKNESS	10.0		IN 0
32	FRONT WALL + SEAL BOX THICKNESS	0.0		IN 0
33	FRONT WALL REFRACTORY	25%		% 0
34	FLOOR REFRACTORY	0%		% 0
35	SIDE WALL REFRACTORY	0%		% 0
36	ROOF REFRACTORY	0%		% 0
37	REAR REFRACTORY	0%		% 0
38	PLANT ELEVATION	25		FASL 0
39	NOISE SPECIFICATION (SOUND PRESSURE LEVEL, dBA)	85		
40	INSTALLATION	Outdoors		
41				
42	FURNACE DRAFT/PRESSURE	7.8		IN W.C. 0
43	DUCTING SUPPLY LOSSES	0.5		IN W.C. 0
44	MIN / MAX AMBIENT AIR TEMPERATURE	PLEASE CONFIRM	100	DEGREES F 0
45	FORCED FAN MANUFACTURER	AIRPRO		0
46	TEST BLOCK FORCED DRAFT FLOW (110%)	79,453		lb/hr 0
47	TEST BLOCK FORCED DRAFT PRESSURE (121%)	20		IN W.C. 0
48	ID FAN	N/A		0
49	AIR INLET TEMPERATURE AMBIENT	100		DEGREES F 0
50	FGR TEMPERATURE (IF APPLICABLE)	300		DEGREES F 0
51	INSTRUMENT AIR PRESSURE	80		PSIG 0
52	COOLING AIR PRESSURE	N/A		PSIG 0
53	COOLING AIR CONSUMPTION	N/A		lb/hr 0
54				
IGNITER OPERATING DATA				0
55				
56	IGNITER MODEL	HEI Direct Spark		0
57	IGNITER CLASS	Class III Special		0
58	IGNITER IGNITION METHOD	HEI		0
59	IGNITER FUEL	N/A		0
60				
ELECTRICAL CLASSIFICATION				0
61	BURNER ASSEMBLY	CLASS 1-DIV 2		0
62	FUEL VALVE SKID ASSEMBLY	CLASS 1-DIV 2		0
63	BURNER MANAGEMENT SYSTEM	NEMA 4X		0
64	COOLING AIR BLOWER ASSEMBLY	BY OTHERS		0
65	COMBUSTION CONTROL SYSTEM	NEMA 4X		0
66	ELECTRICAL POWER (PANELS)	120VAC/1Ph./60Hz		0
67	ELECTRICAL POWER (MAJOR)	480VAC/3Ph./60Hz		0
68	VOLTAGE IGNITER			0
69	AREA CLASSIFICATION	Non-Hazardous		
70				




80 Spring Lane
Plainville
Connecticut 06062 USA
Phone: (860) 479-0999

POWER BURNER DESIGN DATA SHEET

By	Rev	Date	Document Number
DNP	0	12/15/2016	30625-2036
CUSTOMER REFERENCE			SHEET
SALES ORDER			2 of 3

71	BURNER DESIGN DATA				
72	BURNER MANUFACTURER	Zeeco			0
73	BURNER MODEL	FreeJet			0
74	QUANTITY OF FLAME SCANNERS, PER BURNER	3			0
75	QUANTITY OF SIGHT PORTS, PER BURNER	2			0
76	BURNER THROAT TILE / REFRACTORY MATERIAL	Minimum 70% Alumina Precast Refractory			0
77	THROAT DIAMETER	19		IN	0
78	TUBE NEST DIAMETER, MINIMUM/ACTUAL	31	0.00	IN	0
79					
80	OIL UNIT SIZE	N/A			0
81	ATOMIZATION TECHNIQUE	N/A			0
82					
83	FUEL PRESSURE AT IGNITER	N/A		Psig	0
84	PRE-MIX AIR PRESSURE	10		Psig	0
85	PRE-MIX AIR FLOW	1609		SCFH	0
86	IGNITER FUEL FLOW	N/A		SCFH	0
87	IGNITER HEAT RELEASE	N/A		MMBtu/hr	0
88					
89	BURNER OPERATING DATA				REV
90	BURNER FUEL TYPE	GAS FIRED			0
91	BURNER HEAT RELEASE - MCR	74.3		MM Btu/hr	0
92	BOILER HEAT RELEASE - MCR	74.3		MM Btu/hr	0
93	BURNER TURNDOWN REQUIRED	10:1			0
94	EXPECTED FLAME LENGTH	11.78		FT	0
95	EXPECTED FLAME WIDTH	3.37		FT	0
96	% EXCESS AIR AT DESIGN HEAT RELEASE - MCR	15		%	0
97	COMBUSTION AIR TEMPERATURE AT BURNER	127		DEGREES F	0
98	COMBUSTION AIR RELATIVE HUMIDITY	N/A	N/A	%	0
99	COMBUSTION AIR FLOW MCR	62396		lb/hr	0
100	FGR PERCENTAGE	15%		%	0
101	OFA PERCENTAGE	0%		%	0
102	BURNER DRAFT LOSS MCR	5.9		IN W.C.	0
103	EXIT O2 AT 100% LOAD	3.0		%	0
104		AIR, STEAM, GAS, OR MECHANICAL	NOT APPLICABLE		0
105	ATOMIZING MEDIUM	TEMPERATURE AT BURNER	NOT APPLICABLE	DEGREES F	0
106		PRESSURE at BURNER	NOT APPLICABLE	PSIG	0
107		PRESSURE AT VALVE TRAIN INLET	NOT APPLICABLE	PSIG	0
108		ATOMIZING MEDIA FLOW	NOT APPLICABLE	lb/hr	0
109	GAS FUEL CHARACTERISTICS				REV
110	FUEL GAS DESIGNATION	STD NAT GAS			0
111	HEATING VALUE	(HHV) Btu/scf	1057		0
112	HEATING VALUE	(LHV) Btu/scf	954		0
113	FUEL HEAT RELEASE	MM Btu/hr	74		0
114	SPECIFIC GRAVITY [AIR = 1.0]		0.59		0
115	MAXIMUM FUEL FLOW	lb/hr	3163		0
116	MAXIMUM FUEL FLOW	SCFH	70254		0
117	FUEL TEMPERATURE AT BURNER	DEGREES F	70		0
118	FUEL PRESSURE AT VALVE TRAIN INLET	PSIG	30.0		0
119	FUEL REGULATED BEFORE VALVE TRAIN INLET		NO		0
120	FUEL PRESSURE AVAILABLE AT BURNER	PSIG	15.0		0
121	FUEL GAS COMPOSITION				0
122	CH4 (methane)	Volume%	95.00		0
123	C2H6 (ethane)	Volume%	2.00		0
124	C3H8 (propane)	Volume%	2.50		0
125	C4H10 (butane)	Volume%			0
126	C5H12 (pentane)	Volume%			0
127	C6H14 (hexane)	Volume%			0
128	C5H10 (cyclopentane)	Volume%			0
129	C6H12 (cyclohexane)	Volume%			0
130	C2H4 (ethene)	Volume%			0
131	C3H6 (propene)	Volume%			0
132	C4H8 (butene)	Volume%			0
133	C5H10 (pentene)	Volume%			0
134	C5H8 (isoprene)	Volume%			0
135	CO2	Volume%			0
136	H2O	Volume%			0
137	O2	Volume%			0
138	N2	Volume%	0.50		0
139	SO2	Volume%			0
140	H2S	Volume%			0
141	CO	Volume%			0
142	NH3	Volume%			0
143	H2	Volume%			0
144	Other	Volume%			0
145	TOTAL		100.00		0

 80 Spring Lane Plainville Connecticut 06062 USA Phone: (860) 479-0999	POWER BURNER DATA SHEET		By	Rev	Date	Document Number
	CUSTOMER REFERENCE		DNP	0	12/15/2016	30625-2036
	SALES ORDER		30625			
146	LIQUID FUEL CHARACTERISTICS					REV
147	FUEL OIL DESIGNATION					0
148	FUEL PRESSURE AT VALVE TRAIN INLET		PSIG		PSIG	0
149	FUEL PRESSURE AVAILABLE AT BURNER		PSIG		PSIG	0
150	FUEL FLOW AT 100% MCR		lb/hr		lb/hr	0
151	FUEL OIL COMPOSITION					0
152	C %	Weight%				0
153	H %	Weight%				0
154	S, %	Weight%				0
155	N, %	Weight%				0
156	ASPHALTENES, %	Weight%				0
157	ASH, %	Weight%				0
158	H ₂ O %	Weight%				0
159	FUEL OIL METALS: Vanadium, Potassium, Sodium		wppm			0
160	HEATING VALUE (HHV)		Btu/lb		Btu/lb	0
161	SPECIFIC GRAVITY					0
162	KINEMATIC VISCOSITY					0
163	FUEL TEMPERATURE REQUIRED AT BURNER		DEGREES F		DEGREES F	0
164	FUEL TEMPERATURE AT VALVE TRAIN INLET		DEGREES F		DEGREES F	0
165	EMMISSION REQUIREMENTS					REV
166			GAS FIRED	LIQUID FUEL FIRED	PREDICTION / GUARANTEE	0
167	NOx	ppmv	See Notes		Guarantee	0
168	CO	ppmv	See Notes		Guarantee	0
169	UHC	lb / MMBtu				0
170	VOC	lb / MMBtu				0
171	OPACITY	lb / MMBtu				0
172	PARTICULATE	lb / MMBtu				0
173						0
174	EMISSIONS ARE GUARANTEED BETWEEN 25-100% MCR					0
175	*CORRECTED TO 3% O ₂ (DRY BASIS)					0
176	NOTES & CLARIFICATIONS					REV
177	Performance Guarantees:					0
178	NOx, 9 ppm from 20% to 100% MCR, 42ppm from 10% to 20% MCR					0
179	NOx, 0.011 lb/MMBtu from 20% to 100% MCR, 0.05 lb/MMBtu from 10% to 20% MCR					0
180	CO, 50 ppm from 20% to 100% MCR, 200 ppm from 10% to 20% MCR					0
181	CO, 0.037 lb/MMBtu from 20% to 100% MCR, 0.148 lb/MMBtu from 10% to 20% MCR					0
182						0
183						0
184						0
185						0
186						0
187						0
188						0
189						0
190						0
191						0
192						0
193						0
194						0