

Stantec

Equipment Data Sheet
Enclosed Combustor

SI UNITS

DOC: KDU-NOFC-W137-MEC-DAS-FET-4450-00001

PAGE: 1 OF 3

STANTEC PROJECT NO.: 110616828

CLIENT: **Chevron Canada**

CLIENT PROJECT NO:

SERVICE: **Combustor**

MODEL: CURF 12000

RFQ/PO NO. KDU-000F445001-PUR-REQ-FET-4450-00001

LOCATION: 45-03-002-19 WSM 4-2-1-2-20 125

SERIAL: 301121-01

TAG: 1-44-F-4450 QTY: One (1)

SIZE: CYRIL 10000

REV*

A

MANUFACTURER

PROCESS DESIGN

TOTAL VAPOR (VENT GAS)

STD FLOW RATE, NORMAL	417	Sm ³ /hr
STD FLOW RATE, MAX	417	Sm ³ /hr
VOLUMETRIC FLOW RATE	See Page 2	Am ³ /s
DENSITY	See Page 2	kg/m ³
TEMPERATURE	See Page 2	°C
PRESSURE	172	kPag
EXIT VELOCITY	N/A	m/s
AVG MOLECULAR WEIGHT	19.9	MW
STEAM CONDITIONS	N/A	kPag @ °C

MOLECULAR	TEMP	PRESS	FLOW
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PURGE GAS	*	*	*	*
PILOT GAS	44.38	AMB	Note 22	0.33
IGNITER GAS	44.38	AMB	Note 22	*
LOWER HEATING VALUE	87,003		kJ/SCM	
TIP PRESS. DROP	ALLOW	N/A	CALC	N/A kPa
SEAL PRESS. DROP	ALLOW	N/A	CALC	N/A kPa
STACK PRESS. DROP	ALLOW	N/A	CALC	N/A kPa
SO2 GROUND LEVEL CONCENT	N/A			
FUEL GAS CONSUMPTION	288		scf/d	

SITE CONDITIONS AND UTILITIES

AMBIENT TEMP.	MAXIMUM	27	°C	WIND VELOCITY	DESIGN	Note 7	km/h	SITE ELEVATION	808	m
	MINIMUM	-40	°C		NORMAL		km/h	INSTRUMENT AIR	690	kPag
DESIGN METAL TEMP.	MINIMUM	-45	°C		DIRECTION	NW-SE		BAROMETRIC PRESS.	98.4	kPa
POWER	600V/3/60			V / PH / Hz	EARTHQUAKE ZONE	Sa(0.2)=0.10, Sa(0.5)=0.06, Sa(1.0)=0.03				
AREA CLASSIFICATION	Class I Zone 2					Sa(2.5)=0.02 PGA=0.04				

DESIGN DATA

ENCLOSED COMBUSTOR						DESIGN DATA														
LENGTH X WIDTH HT. MIN. THICKNESS DESIGN TEMPERATURE STACK SKIN TEMPERATURE STACK TIP TEMPERATURE			4572 x 2133 mm 3048 mm 6.35 mm 204 (Max/Min) °F 29°C 122 (Max/Min) °F 34°C 726 °C			DESIGN PRESSURE ALLOW FLUX @ BASE CORROSION ALLOW ANCHOR BOLT QTY/DIA REFRACTORY LINED VISIBLE FLAME			.17 kPag 0 kW/m² 0 mm 0 YES NO			INCINERATOR MAT'L BASE PLATE MAT'L LINING SYSTEM ANCHOR BOLTS NDE RADIOGRAPHY			44 w 44 w SEE N/A NONE N/A			ASTM (VTC) ASTM (VTC) type/thk ASTM		
☒ FREE STANDING ☐ GUYED ☐ GUY WIRES _____						☐ SHACKLES _____ ☒ FLAME ARRESTOR REMOVAL EFFICIENCY <u>BGR Zircal/Hamco 99-919%</u>						☐ TURNBUCKLES _____ LIFT LUGS MAT' <u>44 w</u> ASTM CSA 640.2 (VTC) WIND SHROUD ☒ YES ☐ NO								
☒ BMS <u>ACL</u> STACK TEMP MONITOR ☒ YES ☐ NO CONNECTIONS (Separate Required for Different Inlet Pressures)						INLET NOZZLE ANGLE <u>See Page 2</u> deg INLET NOZZLE RATING <u>See Page 2</u> ANSI STEAM CONN. RATING <u>N/A</u> ANSI						PILOT GAS CONN. <u>6.35</u> mm/rating IGNITER GAS CONN. <u>N/A</u> mm BASE PLATE SIZE <u>N/A</u> mm								
☒ SEAL TYPE <u>N/A</u> BLOWER <u>N/A</u> TYPE <u>N/A</u> VOLUME <u>N/A</u> SCFM						SIZE <u>N/A</u> MOTOR <u>N/A</u> POWER <u>N/A</u> V/ph/Hz						ENCLOSURE <u>N/A</u> IGNITION MONIT. SYSTEM <u>Yes</u> THERMOCOUPLE QUANTITY <u>0</u> IGNITION POWER <u>24v</u> V/ph/Hz ☐ RETRACTABLE ☒ CONTINUOUS SPARKING <u>Pilot</u>								
☒ PILOTS AND IGNITION SYSTEM PILOT MANUFACTURER <u>ACL</u> PILOT QUANTITY <u>2</u> FLAME FAIL ALARM (TC) <u>Yes</u> IGNITER MANUFACTURER <u>ACL</u> ☒ AUTO RE-IGNITION						TYPE / MODEL NO. <u>ACL 1500</u> IGNITION TYPE <u>Pilot Ignition</u> TC TYPE <u>N/A</u> IGNITER TYPE <u>Auto Ignition</u> ☐ MANUAL RE-IGNITION						REGULATORS <u>Qty * ; per AML</u> VALVES <u>Per AML, CSA B149 Compliant</u> SHELL MATERIAL <u>By OTHERS</u> DRAIN SIZE <u>See Page 2</u> mm								
☒ FUEL GAS TRAIN MAX DESIGN TEMP. <u>52</u> °C MDMT <u>-45</u> °C LIQUID KNOCK-OUT POT <u>yes BY OTHERS</u> SIZE (OD x s/s) <u>*</u> mm HEAD THICKNESS <u>*</u> mm						DESIGN PRESSURE <u>1890 (VTC)</u> kPag PRESSURE GAUGES <u>Qty * ; per AML</u> HEAD MATERIAL <u>By OTHERS</u> SHELL THICKNESS <u>By OTHERS</u> mm						SHELL MATERIAL <u>By OTHERS</u> DRAIN SIZE <u>See Page 2</u> mm REGULATORS <u>1 FISCHER 67 CFR</u> VALVES <u>Qty * ; per AML Per AML and line class</u>								
☒ PROCESS PIPING MAX DESIGN TEMP. <u>60</u> °C MDMT <u>-45</u> °C MISCELLANEOUS ☐ AIRCRAFT WARNING BEACON ☐ M. O. T. PAINTING ☒ ONE (1) PIECE DESIGN ☐ FLANGED DESIGN INSULATION SPEC. <u>Note 8</u> ERECTION BY ☒ BUYER ☐ VENDOR						DESIGN PRESSURE <u>103</u> kPag PRESSURE GAUGES <u>4 Qty * ; per AML</u> <u>PRESSURE TRANSMISSION WIKIA</u> ☐ LADDER C/W GAGE <u>(1) ROSEMOUNT.</u> ☐ PLATFORM ☐ TWO (2) PIECE DESIGN ☐ WELDED SECTIONS PAINTING SPEC <u>Note 9</u> SHIPPING BY ☒ BUYER ☐ VENDOR						☐ FUEL GAS SKID ☒ FLAME ARRESTOR ☐ PAINTER'S TROLLEY ☒ LIFTING LUGS ☒ TAILING LUGS ☐ VENDOR FIELD ASSEMBLY ERECTION WT <u>4990</u> kg TOTAL WT <u>4990</u> kg								

* INDICATES INFORMATION TO BE COMPLETED BY VENDOR

0: INDICATES AN ORDER REVISION

1, 2, 3, ... : INDICATES A POST-ORDER REVISION

[illegible]



Equipment Data Sheet
Enclosed Combustor

SI UNITS

DOC: KDU-NOFC-W137-MEC-DAS-FET-4450-00001

STANTEC PROJECT NO.: 110616828

CLIENT: Chevron Canada

CLIENT PROJECT NO:

SERVICE: Combustor

MODEL: CUBE 10000

PAGE: 2 OF 3

RFQ/PO NO. KDU-000F445001-PUR-REQ-FET-4450-00001

LOCATION: 15-03-062-19 W5M 4-7

SERIAL: 308121201

TAG: 1-44-F-4450 QTY: One (1)

SIZE: 10000

MANUFACTURER

CONNECTION SCHEDULE - INCINERATOR

MARK	SIZE	QTY	SERVICE	Material	RATING	Type	SCH	Angle (deg)	Bolting	Gasket	Notes
N1	3/8	1	Pilot Gas to BMS	316/316L	150	Tubing	40	90	N/A	N/A	VTC
N2	2"	1	Process Gas	CS	150	RF WN	80	90	N/A	N/A	VTC
N3	2"	1	Process Gas	CS	150	RF WN	NPT 80	90	N/A	N/A	VTC
N4	3/8	1	Fuel Gas - Propane	316/316L	150	RF WN	40	90	N/A	N/A	VTC
N5	1/2	1	Drain	CS	150	RF WN	40	180	N/A	N/A	VTC
N6	1/2	1	Drain	CS	150	RF WN	40	180	N/A	N/A	VTC

CONNECTION SCHEDULE - SCRUBBER

N1	*	1	Inlet	*	*	RF WN	*	*	*	*	Note 10
N2	*	1	Outlet	*	*	RF WN	*	*	*	*	
N3	*	1	Drain	*	*	RF WN	*	*	*	*	

WASTE GAS COMPOSITION

Case 1 - Cold Stream with Methanol

Component	Mole Fraction
H2	0.00012
He	0.00032
N2	0.01026
CO2	0.00464
H2S	0.00105
C1	0.80962
C2	0.11833
C3	0.03664
iC4	0.00420
nC4	0.00781
iC5	0.00163
nC5	0.00166
C6	0.00097
C7	0.00048
C8	0.00025
C9	0.00009
C10	0.00004
C11	0.00002
C12	0.00001
Benzene	0.00003
Toluene	0.00006
E-Benzene	0.00005
o-Xylene	0.00001
124-Mbenzene	0.00001
Cyclopentane	0.00007
MCyclopentane	0.00019
Cyclohexane	0.00015
MCyclohexane	0.00027
H2O	0.00040
Methanol	0.00064
Total	1.0000

Case 2 - Pre-Heated Stream

Component	Mole Fraction
H2	0.00012
He	0.00032
N2	0.01027
CO2	0.00464
H2S	0.00105
C1	0.81014
C2	0.11841
C3	0.03666
iC4	0.00420
nC4	0.00781
iC5	0.00163
nC5	0.00166
C6	0.00097
C7	0.00048
C8	0.00025
C9	0.00009
C10	0.00004
C11	0.00002
C12	0.00001
Benzene	0.00003
Toluene	0.00006
E-Benzene	0.00005
o-Xylene	0.00001
124-Mbenzene	0.00001
Cyclopentane	0.00007
MCyclopentane	0.00019
Cyclohexane	0.00015
MCyclohexane	0.00027
H2O	0.00040
Methanol	0.00000
Total	1.0000

FUEL GAS - PROPANE COMPOSITION

Component	Mole Fraction
H2	0.0000
He	0.0000
N2	0.0000
CO2	0.0000
H2S	0.0000
C1	0.0000
C2	0.0000
C3	0.9800
iC4	0.0100
nC4	0.0100
iC5	0.0000
nC5	0.0000
C6	0.0000
C7	0.0000
C8	0.0000
C9	0.0000
C10	0.0000
C11	0.0000
C12	0.0000
Benzene	0.0000
Toluene	0.0000
E-Benzene	0.0000
o-Xylene	0.0000
124-Mbenzene	0.0000
Cyclopentane	0.0000
MCyclopentane	0.0000
Cyclohexane	0.0000
MCyclohexane	0.0000
H2O	0.0000
Methanol	0.0000
Total	1.0000

Pressure: 172 kPag
Temperature: -38.1°C
Max. Flow Rate: 10 e3sm3/d
Lower Heating Value: 40,131 kJ/scm
Ratio Specific Heat: 1.30
Viscosity: 0.0089 cP
Molecular Weight: 19.90
Density: 2.738 kg/m3
Expected Liquid Dropout Rate @ Supply Pressure: 0.0072 m3/h
Anticipated Cumulative Liquid Dropout: 0.0215 m3
Volumetric Flow Rate: 128.2 Am3/h
Duration: 3 hours

Pressure: 172 kPag
Temperature: -10°C
Max. Flow Rate: 10 e3sm3/d
Lower Heating Value: 40,139 kJ/scm
Ratio Specific Heat: 1.29
Viscosity: 0.0099 cP
Molecular Weight: 19.90
Density: 2.424 kg/m3
Expected Liquid Dropout Rate @ Supply Pressure: 0.0009 m3/h
Anticipated Cumulative Liquid Dropout: 0.0027 m3
Volumetric Flow Rate: 144.7 Am3/h
Duration: 3 hours

Pressure: 700 (TBC, Note 22)
Temperature: Ambient
Max. Flow Rate: *
Lower Heating Value: 87,003 kJ/scm
Ratio Specific Heat: 1.12
Viscosity: 0.0082 cP
Molecular Weight: 44.38

* INDICATES INFORMATION TO BE COMPLETED BY VENDOR

* A, B, C, ... : INDICATES A PRE-ORDER REVISION

D: INDICATES AN ORDER REVISION

1, 2, 3, ... : INDICATES A POST-ORDER REVISION

REV	DATE	BY	CHECKED	PROCESS	ELECT.	INSTR.	APPROVED	CIVIL	DESCRIPTION
A	05-May-21	RR	LR	ADD	CM	SM	ST		ISSUED FOR QUOTATION

REV*	A	 	Equipment Data Sheet Enclosed Combustor SI UNITS	DOC: KDU-NOFC-W137-MEC-DAS-FET-4450-00001 STANTEC PROJECT NO: 110616828 CLIENT: Chevron Canada CLIENT PROJECT NO: SERVICE: Combustor MODEL: CUBE 10000	PAGE: 3 OF 3 RFQ/PO NO: KDU-000F445001-PUR-REQ-FET-4450-00001 LOCATION: 15-03-082-19 WSM 4-7 SERIAL: 301121-01 TAG: 1-44-F-4450 QTY: One (1) SIZE: 10,000				
		1 MANUFACTURER *							
		NOTES: 1. Option for Vendor to purchase piping materials through MRC under pre-approved pricing if Chevron's Centralized procurement is in place, if required. 2. Combustor to be in compliance with AER Directive 60. 3. Process gas piping to be as per C6CA2Q Specification (Vendor to confirm allowable max inlet pressure to scrubber). Tubing as per C9SDTS. 4. Fuel gas will be propane. Piping to be as per C1CA1F Specification. Tubing as per C9SDTB. 5. Structural calculations and wind load study shall be provided with an Alberta P.Eng. Stamp. 6. Structural analysis shall include: Wind loads, earthquake loads, wind induced vibration loads, internal pressure, nozzle loads, thermal loads, erection or maintenance loads Design to be in compliance with the National Building Code - 2019 Alberta Edition & Chevron general spec KDA-0800-FAC-SPC-FET-0000-00001, Section 5.1 7. Vendor to advise if any potential for solids formation, hydrates or freezing under cold climate conditions. 8. Wind design: Hourly 1/10 0.46 kPa; Hourly 1/10 0.35 kPa. Wind gust velocity for design purposes shall be at least 142.2 km/h. 9. Chevron's specifications require insulation for personnel protection for temperatures over 60 C. Vendor to advise if possible to provide mineral wool (hard block) insulation of thickness sufficient to reduce the surface temperature to a maximum of 60 C. Insulation to meet the requirements of KDA-0800-FAC-SPC-FET-0000-00001 Section 8. 10. External coating to be in accordance with KDA-0800-FAC-SPC-FET-0000-00001 Section 6.1.2.2 for insulated surfaces of piping and equipment, operating at up to a maximum of 200 C. 11. Vendor to specify maximum allowable nozzle load on scrubber. Vendor to ensure they do not exceed nozzle loads to the combustor with their piping. 12. Combustor to be equipped with nameplate containing manufacturer name, model, serial number, PO number, tag number and weight. 13. All electrical components shall be CSA approved, installed per CSA 22.1-2018 and per Chevron's electrical specifications. Controller shall be suitable for Class I, Zone 2 Area Classification and enclosure shall be NEMA 4X. 14. All structural butt welds shall be full penetration welds. 15. Minimum NDE requirements for the body of combustor: 1- Visual inspections shall be made for all welds during the welding operation and again after the work is completed 2- 100% RT BW acceptance criteria B31.3 severe cyclic, 3- 100% MPI to load bearing base plate, base plate gussets, lifting trunnions, lifting lugs, and inlet fillet welds acceptance criteria B31.3 severe cyclic 16. Lifting lugs shall below temperature impact tested materials suitable for an MDMT of -45C. 17. All piping materials shall be from manufacturers listed in the Approved Manufacturer's List. All instruments shall be from manufacturers listed in KDU-ZAAA-0800-ICS-SPC-CBU-0000-00053, or the Approved Manufacturer's List for any not listed in KDU-ZAAA-0800-ICS-SPC-CBU-0000-00053. 18. All sour service pressure piping components shall be in accordance with the Chevron Purchasing Requirements specifications. 19. Piping hydrotesting shall be in accordance with Chevron's Hydrotesting of Onshore Piping Specification KDA-0800-PIP-SPC-CBU-0000-00060. 20. Scrubber design and testing shall be in accordance with Chevron's Carbon Steel Pressure Vessels specification KDA-0800-MEC-SPC-CBU-0000-00004. 21. Units used in drawings shall be done in accordance with Chevron's Units of Measure specification KDA-0800-FAC-SPC-CBU-0000-00001. 22. NDE shall be in accordance with the appropriate line classes and Chevron's Radiographic Examination specification KDA-0800-PPL-SPC-CBU-0000-00001. 23. Pilot and ignitor gas provided from propane tank. Supply pressure to be confirmed. 24. Vendor responsible for all process piping between the scrubber and the combustor. Client connection will be at the scrubber inlet.							
		NOTES * LINING IS MORGAN ADVANCED MATERIALS CERAMIC FIBRE 300x48x1 #8 * DESIGN TEMP MDMT IS LIMITED TO -29°C AS COMBUSTION PLATE MATERIAL HAS NOT BEEN IMPACT TESTED TO -45°C HOWEVER IF COMBUSTION IS COLDER THAN -29°C THEN IT IS SITTING IDLE STATE. DURING OPERATION THE COMBUSTION WILL BE WARMER THAN -29°C ALL PIPING COMPONENTS ARE SUITABLE FOR AN MDMT OF -45°C. * PAINT RECOMMENDED TO BE HIGH HEAT BLACK. * UNSURE WHY (2) DRAWS ON PAGE 2 OF 3							
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