

ATT-1 Enclosed Ground Flare system datasheet

Amendments in red colour

Item / Quantity		RV-101E/ 1	
PROCESS DESIGN CONDITIONS			
Note	50-PK-101		Rev.
	Governing case (hydraulic design)	Case No. 8A	2
	Flow Rate, kg/h	As per 070327C001-091-SP-0180-001_PB	2
	Molecular Weight		
	Specific Heats Ratio		
	Lower Heating Value, BTU/scf		
	Temperature (Min / Max), °C		- 26 / 88
	Allowable Pressure@ Flare inlet, bar(g)	0.3	
	Required Smokeless Flaring	100%	
	Smokeless System Type	Steam/Pressure assisted	2
Site Conditions			
	Ambient Temperature (Min / Max), °C,	-5 / 45	
	Relative Humidity, (Min. / Aver. / Max) %	20 / 75 / 90	
	Solar Radiation, Btu/hr*ft ²	None	
	Wind Velocity for Radiation, m/s	NA	
	Elevation, m	5.7 above Sea level	
	Wind load calculation Code	N.T.C. D.M. 14/01/08 più circolare esplicativa N°617 (02/02/09)	
	Wind Velocity for Structural Design (Max / Average), km/h	120 / 18	
	Seismic Zone	N.T.C. D.M. 14/01/08 più circolare esplicativa N°617 (02/02/09)	
	Max. Deflection @ Top	H/200	
	Hazardous Area Classification	Zone 2 IIC T3	
Available Utilities			
	Electrical Power, V / Ph / Hz	220 / 1 / 50	
	Fuel Gas Pressure (Min / Max), bar(g)	2.9 / 3.9	
	Fuel Gas Temperature, °C	Ambient	
	Instrument Air Pressure (Min / Max), bar(g)	2.9 / 4.4	
	Instrument Air Temperature, °C	Ambient	
	Purge gas (Nitrogen) Pressure (Min / Max), bar(g)	2.9 / 4.4	
	Purge gas (Nitrogen) Temperature, °C	Ambient	
	Assist Gas L.H.V., Btu/Scf	NA	
+ Predicted Performance			
	Total Capacity, kg/h	130.000	
	Smokeless Capacity, R≤1, kg/h	130.000 (100% of maximum flowrate)	
	Available Pressure, bar(g)	0.3	
	Heat release in the combustion chamber, kcal/h/m ³	Preliminary 196.000 (tbc)	2
	Peak Radiation @ Grade, Btu/h*ft ²	Negligible outside combustion chamber	
*	SPL outside wind fence, dB(A)	85 (15 m from the wind fence at about 4 m height)	
*	SPL @ general working areas, dB(A)	85	
*	SPL @ limited access working areas, dB(A)	91	
Predicted Utility Consumption			
**	Purge Gas, m ³ /h	Continuous purge required for stage 1 (nitrogen): preliminary min 90 Nm ³ /h Intermittent nitrogen purge for other stages (after valves closing): from 35 to 300 Nm ³ /h for other stages (for min 15 min)	
	Pilot Gas, Nm ³ /h (each pilot)	1.6 (preliminary pilot number 12÷14, tbc)	
	Ignition Gas, Nm ³ /h	4 for few seconds	
	Ignition Air, Nm ³ /h	40 for few seconds	
	Assist Gas for smokeless, kg/h	NA	
***	Steam, kg/h	Preliminary 30.000 ± 20%	
	Power Supply, kW	Preliminary 2 kW for ignition system	

Notes:

(+) JZHC can provide calculation of expected emission rates considering the following data:

- Flare gas conditions as specified in Flare Datasheet (composition, flow rates)
- Expected combustion efficiency 99% for the flaring conditions specified in the Flare Datasheet (composition, flow rates)
- Pollutants production rates as per AP42 for Nitrogen Oxides
- (0.07 lb/MMBTU) and for Carbon Monoxide (0.37 lb/MMBTU)

Flare is designed to minimize emissions, and expected combustion efficiency for properly operated flares should be in the range of 98%+ (ref. to AP42).

Note: AP42 is the primary compilation of emission factor information published by the US EPA (Environmental Protection Agency) containing a dedicated chapter about industrial flares (13.5).

MECHANICAL DESIGN CONDITIONS			
Note			Rev.
	Overall Height, m	Preliminary max 35 (combustion chamber only – piers excluded, expected 5 m height)	
	Design	Combustion chamber supported by CS piers (by others)	
Burners			
	Type	SKEC (steam assisted) for first stages	Fin Plates (no assisted) for other stages
	Number	Preliminary 25 +/- 10%	Preliminary 185 +/- 10%
	Material	Top part: SS310 Burner riser: SS316	
	Design Code	JZHC std	
	Construction Code	JZHC std	
	Inspection Code	JZHC std	
Ignition Pilots			
	Type	Automatic HE / manual FFG	
	Quantity	2 (retractable pilots) for stage 1 At least 1 (retractable pilot each row) for other stages	
	Air Inspirator Device / Material	Venturi / CS	
	Continuous Gas Tube, Diameter / Material / Sch.	1/2" / SS304 / sch. 40s	
	Ignition Tube, Diameter / Material / Sch.	1" / SS304 / sch. 40s	
	Pilot Tip Material	AISI 310	
	Thermocouples Type / Quantity	Single "K" / No. 1 each Pilot	
	Junction Box(es), Material / Execution / Mechanical Protection	Aluminum alloy / Eex-e / IP55	
Headers upstream staging system			
	Design Pressure, bar(g)	3.5	
	Design Temperature, °C	-140 ÷ 280	
	Material	SS316	
	Gas Inlet Flange, Diameter / Type / Rating / Code / Material	Site welded to staging system	
	Intermediate Connection Type	Site welding	
	Design Code	ASME B31.3	
	Construction Code	ASME B31.3	
	Inspection Code	ASME B31.3	
Staging system			
	Design Pressure, bar(g)	3.5	
	Design Temperature, °C	-140 ÷ 280	
	Material	SS316	
	Layout	Preliminary 7÷9 stages <ul style="list-style-type: none"> • Stage 1: no valve required • Other stages: one pneumatic on-off automatic valve 	2
	Nitrogen purge system	For 2 nd stage to last stage	
	Manifold Gas Inlet Flange, Type / Rating / Code / Material	24" (hold) / WN-RF / 150 / ANSI B16.47 B / SS316	
	Battery limit	As per P&ID	
	Manifold, diameter	24" (tbc)	
	Diameter	Later	
	Intermediate Connection Type	Site welding	
	Design Code	ASME B31.3	
	Construction Code	ASME B31.3	
	Inspection Code	ASME B31.3	

Pressure Vessel		
Type	FGRU by others New Liquid seal currently excluded	
Design Pressure, psi(g)		
Design Temperature, °F		
Material		
Gas Inlet / Outlet Flange, Diameter / Type / Rating / Code / Material		
Skirt Material		
Man Way Q.ty / Diameter		
Service Piping along (From pilots to ignition system)		
Pilot Gas Lines, Quantity / Diameter / Material / Sch.	1 each stage / 1/2" / SS304 / sch. 40	
Ignition Gas Lines, Quantity / Material / Diameter / Sch.	1 each pilot / 1" / SS304 / sch. 40	
Intermediate Connection Type	Site welding	
Gas Lines, Material / Sch.	NA	
Design Code	ANSI B31.3	
Construction Code		
Inspection Code		
Electrical & Instrumentation along flare (From pilots to ignition system)		
TE/HE Cables, Type / Routing	JZHC standard conduits or cable trays	
Stairs, Ladders and Platforms		
Working Platforms	On combustion chamber base to retractable pilots and where required for accessibility on the flare (Customer to inform)	
Combustion Chamber		
Type	JZHC std - panels painted	
Material	Painted CS (A36 or equivalent)	
Diameter, m	Preliminary 15 m ± 20%	
Height, m	Preliminary max 35	
Lining inside combustion chamber	Compacted ceramic fibre	
Wind fence (by JZ)		
Type	JZHC std	
Material	CS H.D.G.	
Diameter	Preliminary 25÷30 m	
Height	Preliminary 6÷7 m	
Smokeless System		
Flare Gas Flow Detector	By others	
Ignition & Control Panel		
Location	Outside fence (location by JHJC)	
Ignition Control System	Automatic HE and manual FFG	
Logic	In JZHC LCP (relay logic)	
Control Box, Material / Execution / Mechanical Protection	Aluminum alloy / Eex-e / IP55	
Lamps on Panel for Pilot ON/OFF	As required	
Lamp Test		
Remote Alarm Contacts		
Remote Ignition Contacts		
Ignition Transformer(s) Box, Material / Execution / Mechanical Protection	Aluminum alloy / Eex-d / IP65	
Ignition system layout	Refer to P&ID	
Panel Supporting Frame Material	Carbon steel	
Power Supply, V / Ph. / Hz	220 / 1 / 50	
Surface Preparation	JZHC std	
Primer Type / Thickness, µm		
Intermediate Coat Type / Thickness, µm		
Finish Coat Type / Thickness, µm		

Loads on Nozzles		
Fx, Fy, Fz, kN		As per API 537
Mx, My, Mz, kN*m		
Painting		
External Surface Preparation		JZHC std
External Primer Type / Thickness, μm		JZHC std
External Intermediate Coat Type / Thickness, μm		JZHC std/300
External Finish Coat Type / Thickness, μm		JZHC std
Internal Painting		Antiacid coating
Tropicalization		No
Applicable Tests, Services, and Codes		
Radiographic Test		Spot on Burners Butt Welds + Full on Burners Cross Welds Spot on Flare headers Butt Welds + Full on Flare headers Cross Welds
Liquid Penetrant		Flare Tip: Full Flare Riser: Full
Magnetic Test		No
Ultrasonic Test		No
Hydraulic Test		No
Pneumatic Test		For FFG skid only
Control Panel Electrical Simulation		Yes
HIC Test		No
SSCC Test		No
Impact Test		No
PMI		For SS parts only
PWHT		No
Trial Assembly @ Workshop		NA
Wet Sour Service		No
Lethal Service		No
NACE Std. MR0103		No
Material Certificates		EN 10204 3.1. for process parts and main structural parts EN 10204 2.2 for structural parts (minor components)
Materials Code		ASTM or equivalent
Electrical Code		IEC - CENELEC
Conformity of Pressure Equipment to PED Directive		Yes for header only
Conformity of Electrical Equipment to ATEX Directive		Yes

NOTES		
*	Estimated SPL is 8hr Weighted and has an allowance of $\pm 3 \text{ dB(A)} \pm 3\%$ without background noise and reverberation.	
**	Purge gas flowrate is valid in still wind condition. Purge gas shall be above dew point and shall not contain oxygen.	
***	<ul style="list-style-type: none"> ✓ Steam flowrate is calculated under the assumption of steady condition flaring. ✓ Regulation of steam flowrate and pressure shall be by Client. 	
	Included in our offer are also the following items: <ul style="list-style-type: none"> ◆ Earth Lugs ◆ Lifting Lugs ◆ Bolts, Nuts and Gaskets for Flanges Different from Battery Limits Flanges ◆ Nameplates ◆ Rust Prevention Work for Transportation and Site Storage 	