STUDIO TORCIA A TERRA PER IMPIANTO P1CR - VERSALIS (Eni)
REQUEST FOR QUOTATION

EQUIPMENT: **ENCLOSED GROUND FLARE**

TECHNICAL SUPPLY SPECIFICATION

FOR BUDGETARY QUOTATION

SCOPE OF SUPPLY

The supply is composed of the following parts:

Part I: Equipment / Material Supply

Part II: List of Attachment

Part III: Particular Technical Specification

Part IV: Inspection and test plan

REV.	DATE (DD/MM/YYYY)	STATUS	WRITTEN BY (name & visa)	CHECKED BY (name & visa)	APPROV./AUTHOR. BY (name & visa)
A	10/04/2017	REQUEST FOR QUOTATION	G.CORRADO	C.SAVONA	C.SAVONA / G.MONTI

DOCUMENT REVISIONS

STUDIO TORCIA A TERRA PER IMPIANTO P1CR - VERSALIS (Eni)
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PART I: EQUIPMENT/MATERIAL SUPPLY

BASE QUOTATION			
POSITION	ITEM/TAG	QUANTITY	DESCRIPTION
1	**RV-101E**	1	ENCLOSED GROUND FLARE PACKAGE INCLUDING ALL LOCAL INSTRUMENTATION AND PLC
2	-	1 SET	SPARES FOR ERECTION, COMMISIONING AND START-UP
OPTIONS			
POSITION	ITEM/TAG	QUANTITY	DESCRIPTION
1	-	1 SET	SPARES FOR TWO YEARS
2	-	1 SET	CAPITAL SPARES
3	-	-	SMOKELESS WITH AIR INSTEAD OF STEAM
4	-	-	BUCKLING PINS INSTEAD OF RUPTURE DISKS
5	V 9101	-	NEW LIQUID SEAL DRUM
6	V 9063	-	MODIFICATIONS OR REPLACEMENT OF EXISTING LIQUID SEAL DRUM
7	-	-	MODIFICATION ON DCS
8	-	-	DAILY RATES FOR ERECTION SUPERVISION
9	-	-	TRANSPORTATION AT SITE
10	-	-	ERECTION AT SITE

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PART II: LIST OF ATTACHMENTS

DESCRIPTION	REFERENCE	REV	ATTACHMENT	
			INCLUSION DATE	DELETION DATE
1. APPLICABLE DOCUMENTS				
DATA SHEET FOR GROUND FLARE	070327C001-091-SP-0180-001	A	10/04/2017	
BASIC DESIGN DATA	070327C001-000-JSD-0001-001	A	10/04/2017	
SITE AMBIENT DATA	BR392416-INMA_05_114	3	10/04/2017	
AUXILIARY SERVICE DATA	BR392417-INMA_05_115	1	10/04/2017	
PROCESS DESCRIPTION	070327C001-000-CN-0009-002	A	10/04/2017	
PFD ENCLOSED GROUND FLARE	070327C001-091-PFD-0010-001	A	10/04/2017	
DATA SHEET OF EXISTING LIQUID SEAL	2638-RM-PF-002	1	10/04/2017	
PLOT PLAN SCHEME (*for collectors and flares RV-101 a/b/c/d)*	BR366409	3	10/04/2017	
P&ID - SYMBOLS	1742-00-AS-0020-01 1of2	4	10/04/2017	
P&ID - SYMBOLS	1742-00-AS-0020-01 2of2	5	10/04/2017	
P&ID – FLARE GAS RECOVERY	1742-90-AS-0020-02 2of2	8	10/04/2017	

PART III: PARTICULAR TECHNICAL SPECIFICATION

1. INTRODUCTION

1.1 General

This document defines the minimum technical requirements for the design, performance, material supply, inspection, testing and preparation for shipment of the supply of enclosed ground flare and ancillaries.
The scope is to estimate the cost for the installation of a new enclosed ground flare RV-101E working in parallel with the existing elevated flare RV-101C; the purpose is to reduce the flaring gas sent to the existing elevated flare RV-101C, from the cracking unit P1CR, improving the smokeless capacity of the flare system.
The new enclosed ground flare will be installed at ENI-Versalis polymer plant, Brindisi (Italy).

The attachments to this RFQ shall be taken into consideration and in case of conflict the Vendor shall refer to Contractor for clarification.

The Vendor is the sole responsible for the correct application of the contractual documentation and the adherence of the supply to specifications.
In principle No deviations to the applicable job specifications, standards and documents attached to this RFQ are allowed unless due to a clear equipment design limit. No deviation that can be solved commercially shall be submitted.

1.2 Project References

- Project Name: STUDIO TORCIA A TERRA PER IMPIANTO P1CR
- Client name: VERSALIS (ENI)
- Plant: PETROLCHIMICO DI BRINDISI
- Location: BRINDISI (ITALY)
- Project Language: ITALIAN (*)

(*) All documentations at execution stage will be provided in Italian language.

1.3 Order of Priority

In case of conflict among this RFQ, Project Specifications, Standards and codes, the following order shall govern:

- Italian laws and regulations
- Directives of European Union
- This requisition and relevant attachments
- Project Specifications and Standards
- International Codes and Standards

Vendor shall submit any ambiguity in or contradiction among the documents of the same priority in writing, for Technip Italy resolution.

2. SCOPE OF SUPPLY

2.1 Inclusions

The supply shall include all the equipment and accessories required to meet the performances stated in the attached Data Sheet within specified battery limits.

The main equipment described into the pertinent data sheet is the basis of the supply, which in details shall include, but shall not be limited to, the following item and services:

- Flare firebox frame, combustion chamber and casing;
- All support steel structures;
- Refractory and insulation lining with relevant anchors;
- Antiacid coating for firebox panels lined with ceramic fiber and insulation blocks
- Refractory to protect foundation pillars;
- SS rain cap to protect refractory on flare top;
- All required Platforms, gratings, and ladders;
- All access/inspection doors;
- Flue gas instrument connections on firebox casing including sampling connection;
- Wind fence complete of internal lining;
- Staging system; consist of but not limited of:
  - complete burner groups systems for staging (burner SS310 as minimum);
  - complete staging piping system including manifolds, manual and on-off automatic valves, safety relief device (rupture disks);
  - continuous Pilots (SS310 min.) c/w ignition system and relevant detectors (2 Thermocouples, k type, retractable for each pilot);
  - service piping for pilots inside battery limits in SS (SS304 min.);
  - post purge system including Nitrogen post purge valves and manifolds;
  - flame arrestor/s;
  - limit switches on rupture disks /Nitrogen/Staging Valves;
- All smokeless steam piping and staging distribution to burners;
- All purge gas system and staging distribution to burners:
- All required control valve, flare alarms etc for safe operation;
- All control valves on waste and service lines;
- Pressure transmitters on Main Flare Headers;

- Ignition system composed by automatic high energy spark, ignited pilot type-FFG, as auxiliary ignition system;
- Local Ignition panels for automatic H.E. spark and FFG ignition complete of all instrumentation with alarm & status signals repeated to DCS;
- Ignition cables between the local Panel and pilots;
- FFG piping between each stage to the Ignition control panel;
- All required junction boxes;
- Combustion & Staging Control Management System (PLC to be separated quoted);
- All necessary steam control system, skid mounted with all required instrument, valves, piping, steam trap etc.;
- Any other required instruments for equipment operation and safe control;
- Suitable lifting lugs for any pieces to be handled/lifted;
- Foundation template (if necessary);
- Bolts, nuts and washers for field erection, including a minimum overage of 10%;
- Earthing clips;
- Complete insulation work including design, material and supports;
- Nameplates in Stainless Steel material;
- Painting up to final coat;
- All accessories and appurtenances necessary for a satisfactory and safe operation;
- All required cabling, guides, conduit and supports;
- Special Tools for Installation and Maintenance;
- Spare Parts for Erection, Pre-Commissioning, Commissioning & Start-Up;
- Packing suitable for storage and sea transportation;
- Spare parts for erection, commissioning and start-up; including 10% bolting for field erection;
- Any other appurtenance within the battery limits not specifically listed in the exclusions;
- Engineering;
- Flue gas dispersion calculation;
- Fabrication and manufacturing;
- Management of sub-vendors, inspections and test activities in workshop;
- Certificates;

- **EC declaration of conformity and CE marking;**
- Documentation and drawings;
- Documentation for transportation;
- Kick-off meeting (two days);
- Attendance at HAZOP and FAT; two days for each meeting of attendance of Vendor specialists to be included in the base scope of supply
- Site assistance for erection (on daily rate);

2.2 Exclusions

The following will be out of the Vendor scope of supply:

- Foundation and civil works (except loading data for foundation design);
- Foundation anchor bolts (if standard type);
- Piping outside the battery limits;
- Instrumentation / electrical part outside battery limits;
- Electric power, lighting and grounding systems;
- Transportation to Site;
- Field Erection;

2.3 Option

Vendor will include the following optional price for:

- Smokeless with air instead of steam inducing all system (air fans, ducting, control and distribution system, etc.);
- Liquid Seal Drums;
- Buckling pin valves instead of rupture disks;
- DCS implementation;
- Spare Parts for two year's operation;
- Capital Spares;
- Transportation at site;
- Erection at site;

2.4 The Package battery limits shall be shown into a General Assembly Drawing and P&ID's to be submitted by Vendor with the proposal.
The following battery limits will be considered for the enclosed ground flare package.

At Flare:

Flares waste gas inlet	One Flanged connection
Nitrogen	One flanged connection
Steam	One flanged connection
Support gas	One flanged connection
Pilot/Ignition lines	Flanged connections
Instrumentation/Electrical	Junction boxes
Instrument air	One flanged connection

Above battery limits will be considered located at boundary of flare area.
All distribution (piping, instrumentation and electrical) inside battery limits will be included in the scope of supply.

At control local panel (shop assembled on skid):

Instrument air	One flanged connection at panel
Fuel gas lines	One flanged connection at panel
Ignition/pilot lines	Flanged connections at panel
Instrumentation / Electrical	Junction boxes at panel

2.5 Shop Prefabrication/ Modularization

The shop prefabrication shall be extended at maximum possible extent; the shop prefabrication shall be as minimum:

2.5.1 Firebox

Casing shop prefabricated in panels with internal insulation anchors, supports, lugs and similar device already shop installed. Antacid coating will be shop installed.

Structural steel will be assembled by bolting at site. Connection between panels, supports and other structures will be flanged.

2.5.2 Windfence

Shop prefabricated in panels with internal insulation anchors, supports, lugs and similar device already shop installed. Ready to be assembled by bolting.

2.5.3 Refractory

Supplied loose for site installation.

2.5.4 Manifolds and burners and pilots

- Each stage manifold will be shop prefabricated
- Each burner will be provided in preassembled unit ready to be installed on relevant manifold
- Each pilot will be provided already shop prefabricated ready to be installed on relevant stage

2.5.5 Stagging piping and valves

Shop prefabricated on skids. Actuated valves will be flanged.

2.5.6 Local Ignition & control panel

Completely shop prefabricated, tested and wired on common on rack ready to be installed on relevant foundation.

2.5.7 Piping

Piping shall be shop prefabricated and tested in spools for OD 2" and higher and in commercial lengths for OD 1½" and lower. Flanges where foreseen will be provided shop installed.

2.5.8 Miscellanea

All loose parts such as burner assemblies, pipe supports, instrumentation, shall be supplied loose, duly packed.

2.5.9 Platforms, stairs and ladders

- Platforms partly assembled in panels including beams, bracing, grating supports, hand-railing connections, etc.
- The shapes not assembled in panels will be supplied ready to be bolted to the supports.
- The grating shall be in panels ready to be bolted to the supports.
- The handrails assembled in panels including posts, plate, intermediate strips, etc.
- The ladders assembled in sections including stringers, rungs, connections, etc.
- The relevant cages assembled in sections to be bolted to the ladders in field.
- Ladders and platforms will be hot dip galvanized.

2.5.10 Packing

All goods shall be properly packed suitably for sea transportation.
All surface of equipment both inferior and exterior, subject to corrosion during transportation and storage period at site shall be protected by a rust preventive or suitable means.

3. DESIGN REQUIREMENTS

3.1 General

Unit shall be designed, fabricated and tested strictly in accordance with the notes of this document and all the specifications herein mentioned.
Unless otherwise specified, all publications, codes, etc. referred in the present document and its attachments shall be last edition at the date of Proposal submission.
It will be Vendor's responsibility to comply with any other effective local law, regulation and code.

Vendor shall include in the proposal the Deviation Clarification List duly filled in and signed, even in case of full compliance with the requirements of this document.
Unless otherwise specified in the deviation list, the proposal will be deemed fully in compliance with the requirements.

3.2 Applicable Standard and Codes

Supplier shall design and fabricate the flares in accordance with all the Project specifications and Contractor specifications mentioned on this specification and/or its attached documents, and in particular with the following design documents:

- Basic Design Data 070327C001-000-JSD-0001-001
- Data sheet 070327C001-091-SP-0180-001

Unless otherwise noted, latest issues of the following industry codes and standards shall be applicable:

- API Std. 521 Pressure relieving and Depressuring System
- API Std. 537 Flare Details for General Refinery and Petrochemical Service
- ANSI / ASME B.31.3 / 16.5 /16.47;
- ASTM for material test selection;
- ASME SEC V Non-Destructive Examination
- ASME SEC IX Welding Qualifications
- EN 288-1 Requirements regarding welding technology for steel structure

3.3 Basic Design Data Requirements

Ambient conditions are:

- Minimum/Maximum ambient air temperature: -5 / + 45°C
- Minimum design metal temperature: -5 °C
- Relative Humidity (min. / aver. / max): 20% / 75 % /90%
- Pressure 1013 ± 7 mbar abs.
- Area elevation: 5.7 m above sea
- Max wind velocity: 120 km/h

For complete data see the Basic Design Data 070327C001-000-JSD-0001-001.

3.4 Civil & Structural Requirements

- Refer to the project specification for applicable codes.
- 3 mm of corrosion allowance will be considered for firebox steel casing.
- The design shall guarantee free accessibility for maintenance and proper access for operation of all equipment; adequate handling devices, when necessary, shall also be provided

3.5 Piping

The number of interfaces or battery limit piping connections including steam, waste gas, drains and utilities shall be minimized by collecting to a single point located at flare boundary area, unless otherwise stated.

Battery limit connections shall be ASME/ANSI flanged.

When interconnecting piping is provided loose by Vendor, Vendor shall provide all necessary supports, gaskets, bolts and nuts: the limit of supply is the piping support connection to the foundation or main structure.

All Battery Limits will be considered fixed points.

3.6 Painting & Coating – Insulation

Vendor shall paint the flare system and all ancillary up to the final coat suitable for heavy corrosive (marine) environmental.

On structural steel at least 300 µm of total dry film thickness of external coating will be considered.

Inside antacid coating on firebox panels will be shop applied, only where panel are lined with ceramic fiber or block.

Bolting, grating will be provided hot dip galvanized.

3.7 Refractory

Vendor will define in its proposal the applied refractory system giving evidence the **Refractory system in the firebox will be design to withstand the thermal shock during flaring**.

Where firebox sections in contact with flame it is recommended to provide brick wall with insulation panels as backup, section not in contact with the flame may be lined with CF blocks.

Refractory thickness will be not lower than 150 mm.

Anchor material in fireboxes will be SS310 as minimum. SS304 is acceptable only for short anchoring (pins, block supports, etc.) in contact with CS panel.

Refractory temperature class will be as minimum 200 °C higher than the maximum flue gas temperature.

Refractory in contact with the flame will have a temperature class not lower than 1430 °C.

Refractory not in contact with the flame will have a temperature class not lower than 1260 °C.

All Ceramic Fibers will be asbestos free type (exonerated from any carcinogenic classification as per European Directives).

3.8 Area Classification

Field electrical and instrumentation components shall be supplied in EEx-d execution, according to area classification as required for fuel and flared gases (Zone 2 IIC T3 as minimum).

3.9 Instrumentation

Vendor shall consider the following criteria:

- 6 years of continuous operation of the flare system is required. Additional redundant instrumentation/devices will be provided as necessary to guarantee the continuity of the operating service.
- Buckling pins in lieu of rupture disks, to improve the continuous operation, will be separately quoted as option.
- the possibility to anticipate the opening of staging valve by a signal from a flow transmitter on discharge line, before the flare gas pressure rise up to opening set point, will be considered.
- PLC for BMS/SIS will be Stand-alone type Emerson DeltaV SIS, in accordance with IEC61508 e IEC61511, certified SIL3. PLC will be included in scope of supply and separately quoted. PLC cabinet will be installed in FAR and not in filed. Vendor to provide preliminary information of PLC cabinet.
- Interface with existing DCS will be wired. Expansion on DCS will be ABB Symphony plus type and separately quoted (as option):

  ABB DCS: MODEL: SYNPHONY PLUS HARMONY
  ABB CONSOLLE: MODEL for graphic pages: SYNPHONY PLUS OPERATION VERSIONE: 2.0.3

3.10 EC Declaration of Conformity and CE marking

Vendor shall be the Manufacturer according to applicable CE Marking Directives of each of the below mentioned Items to be considered as Products to be placed on the European Economic Area (EEA). Where for some of these Items the Manufacturer will be a Sub-Supplier, Vendor must inform TPIT in the Technical and Commercial bid giving reference to the Items that will be CE marked by Sub-Supplier and listing the potential Sub-Suppliers with full name and address.

The main CE Marking Directives for the above Items, as applicable, are:

- 2014/68/EU (ex 97/23/EC) Pressure Equipment Directive (PED);
- 2014/34/EU (ex 94/9/EC) ATEX Directive (ATEX);
- 305/2011 Construction Product Regulation (CPR);

- MD, applicable module for assessing the conformity of the machinery and issue a Declaration of Conformity as per Annex II.1.A;
- CPR for structural steel as applicable with reference to EN 1090, considering the Flare as minimum as per execution class EXC3

According to CE Marking Directive definition, if Vendor or one of the eventual Sub-Suppliers as Manufacturer of some of the above mentioned Items, is located outside the EEA, the Manufacturer has to declare in writing who is the selected "European Authorized Representative" (EAR). In that case, Vendor has to provide, the Manufacturer official "Delegation to the European Authorized Representative" undertaken by the nominated European Authorized Representative in writing by acceptance signature.

4. PERFORMANCE GUARANTEES

Vendor shall guarantee the performances as specified in process data sheet.

- 99% min of thermal destruction
- Smokeless within all operating range
- Maximum pressure drops at design
- Reliable and proper operation of the flare
- Noise level

List of guarantees will be included in the proposal.

In case process performances are not achieved, Vendor will be requested to make the necessary corrective work to match the guaranteed performances. All necessary modifications shall be made at Vendor care and expenses.

5. SPARE PARTS

Vendor will provide the list of spare parts for erection and start up (already included in the scope of supply) and the lists of two years spare parts.

Two years spare parts will be separately quoted as option.

6. QA/QC, INSPECTIONS AND TESTS REQUIREMENTS

VENDOR shall establish, document and maintain a quality system as a mean of assuring that his supply conforms to the contract requirements. This quality system shall be addressed to elements of ISO 9001 or 9002, as appropriate.
The type and extent of tests shall be in strict compliance with the contractual codes, standards, data sheet(s) and/or specifications attached to this requisition.
Cost of NoBo for CE marking of the package is considered included in the scope of supply included cost for site NoBo's activities for completion of CE marking. Vendor shall establish and implement QA/QC management in Sub-supplier's premises wherever outsourcing is done.
The minimum extent of inspection activities by (review of documents, random or complete inspection of material, spot or complete witnessing of tests) is specified on the attached Inspection Test Plan (ITP) Appendix.

7. PROPOSAL INFORMATION

Vendor shall include in its proposal, at least the following information:

- Technical description of the proposed flare system
- Commercial description with inclusions, options and delivery terms
- Flare data sheets
- Preliminary pollutant dispersion study
- Performance Guarantees list
- Utilities consumption list
- Outline preliminary drawings showing flare system arrangement
- Preliminary burner and pilot assembly drawings
- Preliminary Piping and Instrumentation Diagrams with evidence of Battery Limits, local instrumentation and signals
- Description of the refractory system
- Preliminary information for PLC
- List of deviations
- Degree of prefabrication
- Preliminary Shipping dimensions and weights
- List of proposed sub-Vendors
- Reference list
- List of special tools (if any)
- List of spare parts (commissioning and pre commissioning and start up)
- Two years spare part list

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APPENDIX - A

Part IV: Inspection and test plan		
EQUIPMENT DESCRIPTION: ENCLOSED GROUND FLARE		
CRITICALITY RATING:	INSPECTION LEVEL: 3 (1)	MR CODE: 0186-01
VENDOR:	INSPECTION AUTHORITY:	
REMARKS: (1) This inspection level is referred to the complete unit.		

SCOPE

This Inspection and test plan is an engineering document which defines for each type of equipment:

- The type and extent of Contractor and Owner/Owner Representative involvement in each phase of fabrication, control and testing requiring an inspection
- The resulting Suppliers contractual obligations, in accordance with applicable Project General Purchase Conditions.

Note: The inspection and test plan of TECHNIP ITALY may under no circumstances be used as a substitute for the Suppliers Quality Control Plan

DEFINITION OF UT INVOLVEMENT

The nature of TECHNIP ITALY involvement is indicated against each activity of fabrication and testing by means of the letters, H, W and R the meaning of which is the following:

H : (Hold) Point

The Supplier cannot carry out the specified controls and tests without Inspector attendance.
Consequently, the attendance to witnessing is mandatory. The Supplier must notify to TECHNIP ITALY by fax of the dedicated inspection activity at least fifteen (15) days in advance.
The Supplier cannot deviate from this rule unless written approval has been given by involved operating center.

W: (Witness)

The Supplier must notify to TECHNIP ITALY of the dedicated inspection activity at least fifteen (15) days in advance. Technip Italy representative witnessing is not mandatory, but optional. When a percentage value is indicated (i.e. W 10%) the inspection activities will be witnessed on spot basis as per percentage indicated.
If TECHNIP ITALY representative do not elect to be present, the Supplier may proceed with his own inspection, provided controls and tests records are made available to Inspector for review.

R: (Review) - Review of Documents

The Supplier has either to submit to Inspector for comments the documents required prior to the performance of the dedicated activity or to transmit or make available for the review of Inspector the results of the controls and tests conducted, as the case may be.

SUPPLIER'S FABRICATION AND QUALITY CONTROL PLAN

- The Supplier must issue a Fabrication and Quality Control Plan for each equipment.
- The Supplier's Fabrication and Quality Control Plan is a document which defines in a chronological manner the list of the operations of fabrication, controls and tests in accordance with his own "know-how" and with the requirements specified in Material Requisition.
- Following information shall be clearly specified against each operation :

- Reference documents (drawings, procedures, etc.)
- Acceptance criteria (code, etc.)
- Recording documents for controls and tests
- Involvement of the Quality Control department of the Supplier and/or his sub-supplier

This Supplier's Fabrication and Quality Control Plan will have to include all inspection activities defined in Inspection and Test Plan as well as all inspection activities scheduled by the Independent Inspection Authority and/or the Client.

- For equipment of inspection levels 1, 2 and 3, the Supplier's Fabrication and Quality Control Plan will have to be submitted compulsory to TECHNIP ITALY for comments before the pre-inspection meeting is held.

INSPECTION RELEASE CERTIFICATE

This document issued by TECHNIP ITALY inspector, permits the Vendor to proceed with the packing and to notify the shipment.

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CLASS: ENCLOSED GROUND FLARE	TYPE: COMPLETE UNIT	MR: 0186-01

STAGE	ACTIVITIES DESCRIPTION	INSPECTION LEVEL 1		2		**3**		4		5		REQ. OF CERTIF.	APPLICABLE DOCUMENTS AND REMARKS	
BEFORE FABRICATION	Pre-Inspection Meeting	H		H		H		H				-		
	Suborders check	R		R		R		R		R		-	For main materials and/or activities complete with all the technical attachments	
	Material Test Certificates	R		R		R		R		R		YES	Type EN 10204-3.1	
	Inspection of Sub-order components	W		W		W		W		R		-	See pertinent Sheet	
	N.D.E. on row materials	W		W		R		R		R		YES		
	Explosion Proof/Intrinsically Safe Certificates/ ATEX certificates	R		R		R		R		R		YES	Where applicable	
DURING FABRICATION														Inspection level of components
	Flare manifolds												See sheet	3
	Flare burners and pilots												See sheet	3
	Structural steel												See sheet	3
	Piping												See sheet	3
	Instruments												See sheet	3
	Control & Ignition Local Panel												See sheet	3
	Refractory												See sheet	
FINAL TEST	Visual check of mechanical protection degree – Packing and Marking Check	W		W		W		W		R		YES		
	Final visual and dimensional check	W		W		W		W				-		
	Painting check	W		W		R		R		R		YES		
	Nameplate Check	W		W		W		W				-		
DOCUMENTATION	Quality Control Manufacturing Dossier	H		H		H		H		H				
	EC Declaration of Conformity	R		R		R		R		R				

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CLASS: ENCLOSED GROUND FLARE	TYPE: FLARE MANIFOLDS	MR: 0186-01

STAGE	ACTIVITIES DESCRIPTION	INSPECTION LEVEL 1		2		**3**		4		5		REQ. OF CERTIF.	APPLICABLE DOCUMENTS AND REMARKS
BEFORE FABRICATION	Welders and N.D.E. operators qualifications	R		R		R		R		R		YES	
	Material test certificates	R		R		R		R		R		YES	Type EN 10204-3.1
DURING FABRICATION	Non Destructive Examination	R		R		R		R		R		YES	
	X-Rays Inspection	R		R		R		R		R		YES	Film review - Location map is requested
FINAL TEST	Hydraulic/Pneumatic test	H		W		W		W					As required for PED and CE marking
	Visual and Dimensional check	H		W		W		W					
	Painting check	W		W		R		R		R		YES	
DOCUMENTATION	Quality Control Manufacturing Dossier	H		H		H		H					

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CLASS: ENCLOSED GROUND FLARE	TYPE: FLARE BURNERS AND PILTOS	MR: 0186-01

STAGE	ACTIVITIES DESCRIPTION	INSPECTION LEVEL 1		2		3		4		5		REQ. OF CERTIF.	APPLICABLE DOCUMENTS AND REMARKS
BEFORE FABRICATION	Welders and N.D.E. operators qualifications	R		R		R		R		R		YES	
	Material test certificates	R		R		R		R		R		YES	Type EN 10204-3.1
DURING FABRICATION	Dry Penetrant Examination	W		R		R		R		R		YES	
	Fit-up	W 5%										-	To verify correct application of welding and fabrication procedure and bevel preparation
	X-Rays Inspection	R		R		R		R		R		YES	Film review - Location map is requested
	Final N.D.E.	W		W		R		R		R		YES	
	PMI	W 10 %		W 10%		W 5%		R		R		YES	On SS parts
FINAL TEST	Dimensional Check	H		W		W		W					
	Visual check	H		W		W		W					
DOCUMENTATION	Quality Control Manufacturing Dossier	H		H		H		H					

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REQUEST FOR QUOTATION

CLASS: ENCLOSED GROUND FLARE	TYPE: STRUCTURES	MR: 0186-01

STAGE	ACTIVITIES DESCRIPTION	INSPECTION LEVEL 1		2		**3**		4		5		REQ. OF CERTIF.	APPLICABLE DOCUMENTS AND REMARKS
BEFORE FABRICATION	Material test certificates	R		R		R		R		R		YES	Type EN 10204-3.1 for main structural components
DURING FABRICATION	Final NDE	R		R		R		R		R		YES	
	Trial Assembly Check					W 10 %							
FINAL TEST	Visual check	W		W		W						-	
	Dimensional Check	W		W 10 %		W 10 %							
	Painting check	W		W		R		R		R		YES	
DOCUMENTATION	Quality Control Manufacturing Dossier	H		H		H		H					

STUDIO TORCIA A TERRA PER IMPIANTO P1CR - VERSALIS (Eni)
REQUEST FOR QUOTATION

CLASS: ENCLOSED GROUND FLARE	TYPE: SERVICE PIPING	MR: 0186-01

STAGE	ACTIVITIES DESCRIPTION	INSPECTION LEVEL 1		2		**3**		4		5		REQ. OF CERTIF.	APPLICABLE DOCUMENTS AND REMARKS
BEFORE FABRICATION	Welders and N.D.E. operators qualifications	R		R		R		R		R		YES	
	Material test certificates	R		R		R		R		R		YES	Type EN 10204-3.1
DURING FABRICATION	N.D.E.	W		W		R		R		R		YES	
	PMI	W		W		W 10 %		R		R		YES	On SS parts
FINAL TEST	Dimensional Check	W		W		W							
	Visual Check	W		W		W							
	Hydraulic test	W		R		R		R		R		YES	As required for PED and CE marking
DOCUMENTATION	Quality Control Manufacturing Dossier	H		H		H		H					

STUDIO TORCIA A TERRA PER IMPIANTO P1CR - VERSALIS (Eni)
REQUEST FOR QUOTATION

CLASS: ENCLOSED GROUND FLARE	TYPE: INSTRUMENTS	MR: 0186-01

STAGE	ACTIVITIES DESCRIPTION	INSPECTION LEVEL 1		2		**3**		4		5		REQ. OF CERTIF.	APPLICABLE DOCUMENTS AND REMARKS
BEFORE FABRICATION	Material test certificates	R		R		R		R		R		YES	At least Conformity Certificate
	Mechanical Protection degree Certificate	R		R		R		R		R		YES	At least Conformity Certificate
	Explosion Proof/Intrinsically safe Certificate	R		R		R		R		R		YES	Issued by Recognized Authority ATEX certificate
DURING FABRICATION													
FINAL TEST	Calibration test	R		R		R		R		R		YES	As per applicable code
	Functional Test	R		R		R		R		R		YES	As per applicable code
	Pressure Test	R		R		R		R		R		YES	As per applicable code
	Tagging Check	W		W		W							
	Visual and Dimensional check	W		W		W							
DOCUMENTATION	Quality Control Manufacturing Dossier	H		H		H		H					

STUDIO TORCIA A TERRA PER IMPIANTO P1CR - VERSALIS (Eni)
REQUEST FOR QUOTATION

CLASS: ENCLOSED GROUND FLARE	TYPE: CONTROL & IGNITION LOCAL PANEL	MR: 0186-01

STAGE	ACTIVITIES DESCRIPTION	INSPECTION LEVEL 1		2		**3**		4		5		REQ. OF CERTIF.	APPLICABLE DOCUMENTS AND REMARKS
BEFORE FABRICATION	Manufacturing certificates	R		R		R		R		R		YES	Issued by Manufacturer (Conformity, Quality, Internal Test)
DURING FABRICATION													
FINAL TEST	Wiring check	W		W		W		W					
	Simulated Functional Test	W		W		W		W		R		YES	
	Insulation check	W		W		W		W				YES	
	Visual and dimensional check	W		W		W		W				- -	
	Painting check	W		W		W		R		R		YES	
	Pressure test	W		W		W		R		R		YES	
DOCUMENTATION	Quality Control Manufacturing Dossier	H		H		H		H					

STUDIO TORCIA A TERRA PER IMPIANTO P1CR - VERSALIS (Eni)
REQUEST FOR QUOTATION

CLASS: ENCLOSED GROUND FLARE	TYPE: REFRACTORY	MR: 0186-01

STAGE	ACTIVITIES DESCRIPTION	INSPECTION LEVEL 1		2		**3**		4		5		REQ. OF CERTIF.	APPLICABLE DOCUMENTS AND REMARKS
BEFORE FABRICATION	Manufacturing certificates	R		R		R		R		R		YES	
DURING FABRICATION	Bulk Density Check	R		R		R		R		R		YES	
	Permanent Linear Change Test	R		R		R		R		R		YES	
	Compressive Strength Test	R		R		R		R		R		YES	
	Chemical composition	R		R		R		R		R		YES	
FINAL TEST	Anchor visual check	H		W		W (5 %)		R		R		YES	
	Marking and Packing check	H		W		W		R		R			
DOCUMENTATION	Quality Control Manufacturing Dossier	H		H		H		H					

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STUDIO TORCIA A TERRA PER IMPIANTO P1CR
VERSALIS (Eni)

DATA SHEET FOR GROUND FLARE

Project N°	Unit	Document Code	Serial N°	Rev.	Page
070327C001	091	SP 0180	001	A	1/5

Service	GROUND FLARE		Item	RV-101E
Number Required	1 (note 3)		MR	
Type	ENCLOSED GROUND FLARE	Location	BRINDISI – ITALY	

PERFORMANCE DATA

Capacity	kg/h	130000					
Emergency Stage/Case (Note 5)		1	2	3	4	5	6
Flow Rate	kg/h	1500	5000	12500	20000	30000	55000
Temperature	°C	-130/201	-140/152	-37/83	-110/276	31/75	-22/223
Allowable Pressure Drop	mbar	By Vendor (note 1)					
Molecular Weight	kg/kmol	3,8/35,4	9,7/56	15/45	15,6/79,8	41/55,1	19,4/84,3
Ratio of Specific Heats							
Low Heating Value	kcal/kg						
Composition	% mol.	page 3 (1A,1B,1C,1D)	page 3 (2A,2B)	page 3 (3A,3B)	page 3/4 (4A,4B)	page 4 (5A/5B)	page 4 (6A/6B)
Design Condition							
Temperature	°C	-140/280 (note 6)					
Pressure	bar(g)	3,5					
Material		Stainless Steel					

A	SMOKELESS:	Required	yes (note 4, 8)	- Percentage	Whole Range %	
	- Medium	LP STEAM or MP STEAM / AIR (optional)		- Pressure	3,1-4,3 (LP STEAM) or 14,7-18,1 (MP STEAM) / Ambient (AIR)	barg
	- Flow Rate	kg/h		- Temperature	150-180 (LP STEAM) or 220-270 (MP STEAM) / Ambient (AIR)	°C

Utility Gas	Type	M.W.	L.H.V.	Flow Rate	Pressure	Temperature
		kg/kmol	kcal/kg	kg/h	bar(g)	°C
- Purge Gas	Nitrogen	28		*By Vendor*	2,9-4,4	ambient
- Pilot Gas	Fuel Gas (note 2)		9000-11500	*By Vendor*	2,9-3,9	ambient
-Support gas	Fuel Gas (note 2)		9000-11500	*By Vendor*	2,9-3,9	ambient
-Instrument air	Air		-	*By Vendor*	2,9-4,4	ambient

		Design	Min.	Max.			
Temperature	°C		-5	45	Altitude	5,7 ± 0,1	m a.s.l.
Rel. Humid.	%		20	90	Wind Velocity	33 max, 5 average	m/s
					Solar Radiation	-	W/m²

DESIGN DATA

Design Code	API 521 , API 537 (ISO 25457)		
Exit Gas Velocity	m/s	Mach Number	

FLARE PROCESS DESIGN

A	Combustion Chamber Diameter	~15m(9)
A	Windfence Diameter	~30m(9)
A	Total Flare Height	~35m(9)
A	Windfence height	~7m (9)

NOTES:

(1)Max. Allowable Pressure Drop at Full Capacity: 0,3 bar (To be Confirmed by Vendor)

(2)Composed by recovery gas with variable composition; if available, methane is fed. Density=0,7÷1,3 kg/m^3

(3)Vendor shall provide the ground flare and (as option)the new liquid seal drum V-9101 and the modified liquid seal V-9063. B.L. will be interconnecting at Supplier equipment.

Liquid seal drum design shall be adequate, to face the lower temperature of the above relief scenarios.

Vendor design for ground flare and Liquid seal drums V-9063 and V-9101, shall also consider the contemporaneous operation of the existing elevated flare when the total relief flow will exceed the ground flare capacity.

(4) Vendor to provide the minimum steam (MP or LP)consumption for smokeless operation and as an option

Vendor will quote the smokeless operation with air.

(5) Represented Cases are extreme conditions. Such cases will be finalized following the routing definition of the flare header and relevant heat exchange with ambient.

Rev.	Status	Date	Wrt	Verif	App	Rev.	Status	Date	Wrt	Verif	App
A	ISSUE FOR RFQ	10-apr-17	G.C.	C.S.	C.S.						
PA	PROCESS ISSUE	7-apr-17	SC	DS	DS						

SP 018X.XLT 09/2003

STUDIO TORCIA A TERRA PER IMPIANTO P1CR
VERSALIS (Eni)

DATA SHEET FOR GROUND FLARE

Project N°	Unit	Document Code	Serial N°	Rev.	Page
070327C001	091	SP 0180	001	A	2/5

Service	GROUND FLARE	Item	RV-101E	
Number Required	1 (note 3)	MR		
Type	ENCLOSED GROUND FLARE	Location	BRINDISI – ITALY	

PERFORMANCE DATA

Capacity	kg/h	130000		
Emergency Stage/Case (Note 5)		7	8	
Flow Rate	kg/h	100000	130000	
Temperature	°C	-73/206	-26/88	
Allowable Pressure Drop	mbar	By Vendor (note 1)		
Molecular Weight	kg/kmol	18,7/48,9	23,3/38,2	
Ratio of Specific Heats				
Low Heating Value	kcal/kg			
Composition	% mol.	page 4 (7A/7B)	page 4 (8A/8B)	
Temperature	°C			
Pressure	bar(g)			
Material				

A	SMOKELESS:	Required	yes(see page1)	- Percentage	Whole range(see page 1)	%
	- Medium			- Pressure	bar(g)	
	- Flow Rate	kg/h		- Temperature	°C	

Utility Gas	Type	M.W.	L.H.V.	Flow Rate	Pressure	Temperature
		kg/kmol	kcal/kg	kg/h	bar(g)	°C

AMBIENT DATA

		Design	Min.	Max.		
Temperature	°C				Altitude	m a.s.l.
Rel. Humid.	%				Wind Velocity	m/s
					Solar Radiation	W/m²

DESIGN DATA

Design Code			
Exit Gas Velocity	m/s	Mach Number	

FLARE PROCESS DESIGN

Combustion Chamber Diameter	m
Windfence Diameter	m
Total Flare Height	m
Windfence height	m

NOTES:

(6) Design temperature associated to the discharge scenario with limited time duration.
Normal condition are ambient. Minimum design temperature for selection of materials will be -140 °C.
(7) Vendor to specify noise level at ground.
A (8)Thermal destruction will be 99% min.
A (9)Expected to be confirmed by Vendor.

Rev.	Status	Date	Wrt	Verif	App	Rev.	Status	Date	Wrt	Verif	App
A	ISSUE FOR RFQ	10-apr-17	G.C.	C.S.	C.S.						
PA	PROCESS ISSUE	7-apr-17	SC	DS	DS						

DATA SHEET FOR
GROUND FLARE

Project N°	Unit	Document Code	Serial N°	Rev.	Page
070327C001	091	SP 0180	001	A	3/5

Service	GROUND FLARE	Item	RV-101E
Number Required	1 (note 3)	MR	
Type	ENCLOSED GROUND FLARE	Location	BRINDISI – ITALY

DISCHARGED FLARE GAS AND FUEL GAS COMPOSITION

DISCHARGED FLARE GAS (molar composition %)

Stage/Emergency Case	Formula	1A	1B	1C	1D	2A	2B	3A	3B	4A
Total Molecular Weight		**27,3**	**3,8**	**35,4**	**28,0**	**9,7**	**56,0**	**15**	**45**	**15,6**
WATER	H20			38,0						
HYDROGEN	H2	20,7	87,0	6,5		45,0		7,0		5,5
NITROGEN	N2	0,6			100,0					
METHANE	C2H4	25,8	13,0	12,0		55,0		93,0		91,3
ACETYLENE	C2H2									
ETHYLENE	C2H4	15,4		15,0						3,2
ETHANE	C2H6	2,2		3,0						
PROPYNE	C3H4								4,7	
PROPADIENE	C3H4								4,0	
PROPENE	C3H6	17,2		5,0					66,5	
PROPANE	C3H8	3,1							2,8	
VAC (VINYLACETYLENE)	C4H4						1,0			
1,3 BUTADIENE	C4H6			1,5			46,5		11,0	
1-BUTENE	C4H8						13,5		3,5	
Cis 2-BUTENE	C4H8						4,5			
Trans 2-BUTENE	C4H8						4,0			
I-BUTENE	C4H8						23,0		6,0	
IBUTANE	C4H10						2,0			
BUTANE	C4H10						5,0		0,5	
CYCLOPENTADIENE	C5H6								1,0	
Trans 1,3 PENTADIENE	C5H8									
PENTANE	C5H12									
HEXANE	C6H14									
BENZENE	C6H6			2,5						
HEPTANE	C7H16									
TOLUENE	C7H8			3,0						
STYRENE	C8H8			4,0						
EBENZENE	C8H10									
MXYLENE	C8H10			5,0						
C4 TOTALI	-	13,9								
IDROCARBURI > C4	-	1,1								
C4-C5	-			2,0						
IDROCARBURI CON NBP≥155°C	-			2,5						
VAPORI "VIRGIN NAFTA"	-									
VAPORI OLIO (NBP=200°C)	-									
VAPORI BENZINE	-									
ALTRI IDROCARBURI PESANTI	-						0,5			

NOTES:

Rev.	Status	Date	Wrt	Verif	App	Rev.	Status	Date	Wrt	Verif	App
PA	PROCESS ISSUE	7-apr-17	SC	DS	DS						

Service	GROUND FLARE	Item	RV-101E
Number Required	1 (note 3)	MR	
Type	ENCLOSED GROUND FLARE	Location	BRINDISI – ITALY

DISCHARGED FLARE GAS AND FUEL GAS COMPOSITION

DISCHARGED FLARE GAS (molar composition %)

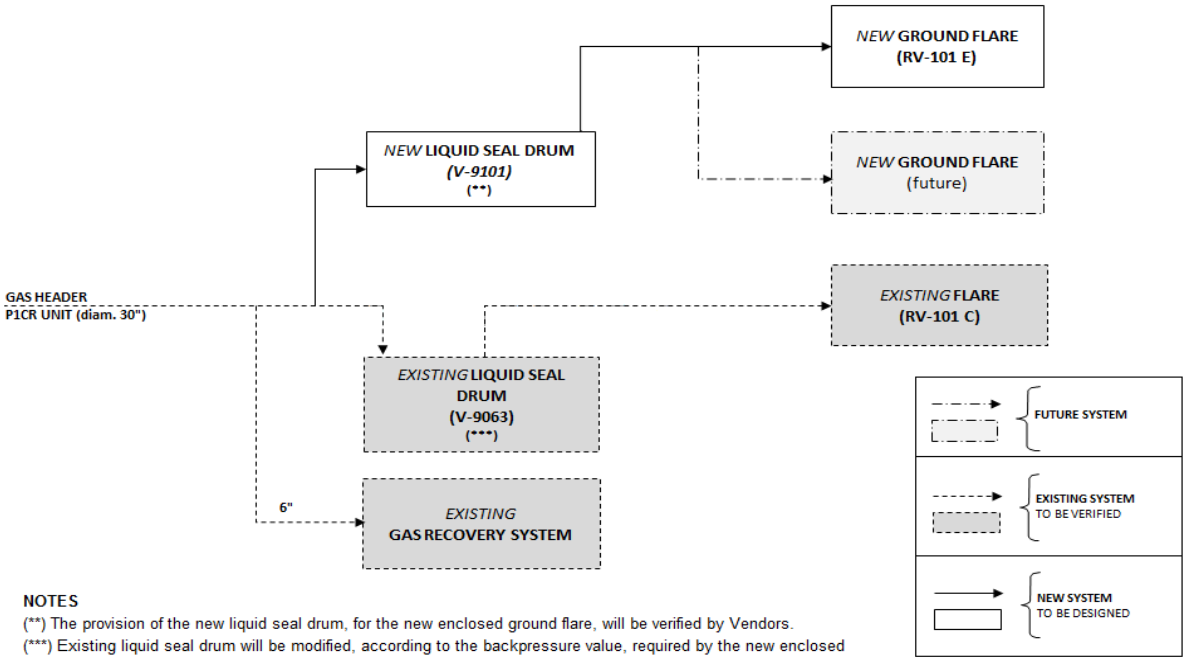
Stage/Emergency Case	Formula	4B	5A	5B	6A	6B	7A	7B	8A	8B
Total Molecular Weight		**79,8**	**41,0**	**55,1**	**19,4**	**84,3**	**18,7**	**48,9**	**23,3**	**38,2**
WATER	H20	11,5				25,0	8,0			
HYDROGEN	H2	6,5	1,0		30,0		25,0			
NITROGEN	N2									
METHANE	C2H4	26,0			28,0		35,0		72,0	
ACETYLENE	C2H2									
ETHYLENE	C2H4				24,0		20,0			28,0
ETHANE	C2H6		9,0				3,0			
PROPYNE	C3H4							3,5		
PROPADIENE	C3H4							2,5		
PROPENE	C3H6		87,0		18,0		5,0	37,0	28,0	72,0
PROPANE	C3H8		3,0					3,0		
VAC (VINYLACETYLENE)	C4H4			1,7						
1,3 BUTADIENE	C4H6			46,8			1,0	36,0		
1-BUTENE	C4H8			13,5						
Cis 2-BUTENE	C4H8			4,0						
Trans 2-BUTENE	C4H8			4,5						
I-BUTENE	C4H8			23,0			0,5	18,0		
IBUTANE	C4H10			2,0						
BUTANE	C4H10			4,5		9,0				
CYCLOPENTADIENE	C5H6					2,0	0,5			
Trans 1,3 PENTADIENE	C5H8					0,5				
PENTANE	C5H12					0,5				
HEXANE	C6H14					2,0				
BENZENE	C6H6					11,0	1,5			
HEPTANE	C7H16					4,0				
TOLUENE	C7H8					4,0	0,5			
STYRENE	C8H8									
EBENZENE	C8H10									
MXYLENE	C8H10									
C4 TOTALI	-									
IDROCARBURI > C4	-									
C4-C5	-									
IDROCARBURI CON NBP≥155°C	-									
VAPORI "VIRGIN NAFTA"	-	11,0								
VAPORI OLIO (NBP=200°C)	-	45,0				31,0				
VAPORI BENZINE	-					11,0				
ALTRI IDROCARBURI PESANTI	-									

NOTES:

Rev.	Status	Date	Wrt	Verif	App	Rev.	Status	Date	Wrt	Verif	App
PA	PROCESS ISSUE	7-apr-17	SC	DS	DS						

Service	GROUND FLARE	Item	RV-101E
Number Required	1 (note 3)	MR	
Type	ENCLOSED GROUND FLARE	Location	BRINDISI – ITALY

SEMPLIFIED DIAGRAM



NOTES
(**) The provision of the new liquid seal drum, for the new enclosed ground flare, will be verified by Vendors.
(***) Existing liquid seal drum will be modified, according to the backpressure value, required by the new enclosed ground flare. Vendor to provide also the liquid seal modification for the new enclosed ground flare and the future new enclosed ground flare.

Flare	Capacity (kg/h)	Cap. Smokeless (kg/h)	Hydraulic Seal Level (mm)
RV-101C	650000	200000	600

NOTES:

Rev.	Status	Date	Wrt	Verif	App	Rev.	Status	Date	Wrt	Verif	App
PA	PROCESS ISSUE	7-apr-17	SC	DS	DS						