**Invitation to tender**

**Autoclave Suitable for Composite Manufacture**

**Ref: Piran SPF1**

# 1. Background

Having worked on world leading projects in a variety of industries as a manufacturer and direct consultant to major projects Piran Advanced Composites (PAC) Limited have now established ourselves offering a complete service from design, engineering and manufacture of one off, R&D, low volume and high volume structures and components. We have developed novel technologies to be able to offer high quality services to a variety of industries such as Aerospace, Defence, Medical, Automotive and Marine. Our experience ranges from ultra-lightweight novel Aerospace R&D aerostructures through to low/high volume propulsion and flight critical Components

# 2. General Requirement

# To support our ongoing growth and capacity ambitions, PAC are seeking to purchase a new autoclave that is suitable for composite production.

# The purchase of this system is part of grant funded PAC has secured from the Shared Prosperity Fund. We will assess tenders received on a lowest compliant response.

# 3. Tender requirements

The supplier is invited to tender for the following:

**3.1 Minimum Specification**

|  |  |  |  |
| --- | --- | --- | --- |
| 3.1.1 | Heating system | Electric |  |
| 3.1.2 | Internal shell diameter | 2,300 | mm |
| 3.1.3 | Useful internal diameter | 2,100 | mm |
| 3.1.4 | Internal length of cylindrical body | 5,000 | mm |
| 3.1.5 | Useful internal length | 4,500 | mm |
| 3.1.6 | Inside volume | 26 | m³ |
| 3.1.7 | Insulating thickness – Rockwool Material | 100 | mm |
| 3.1.8 | Insulation coating | Alu-Zinc |  |
| 3.1.9 | Type of ducts for fluid recirculation | Lower mounted |  |
| 3.1.10 | Internal rails | 2 | N° |
| 3.1.11 | Design Pressure PS | 9 | Bar G |
| 3.1.12 | Working pressure | 7 | Bar G |
| 3.1.13 | Fluid | AIR |  |
| 3.1.14 | Operating temperature | 200 | °C |
| 3.1.15 | Control System | PC-PLC |  |
| 3.1.16 | Keeping time | Programmable | min. |
| 3.1.17 | Pressurizing rate | Programmable | bar/min. |
| 3.1.18 | De-pressurizing rate | Programmable | bar/min. |
| 3.1.19 | Vacuum + measure connections | 8 + 8 | N° |
| 3.1.20 | Thermocouples connections J type | 8 | N° |
| 3.1.21 | Max. Load configuration per cycle:* Composite (Specific heat c = 1,799 kJ/kg)
* Steel (Specific heat c = 0,502 kJ/kg)
 | 1002,000 | Kg |
| 3.1.22 | Heating gradient (full load) in atmosphere | 2 | °C/min |
| 3.1.23 | Cooling gradient (full load) in atmosphere | NATURAL | °C/min |
| 3.1.24 | Temperature uniformity checked after stabilization at 2 bar at a minimum distance of 200 mm far from the walls and the floor and 300mm from the protection grids of the batteriesand the door of the autoclave. | ±3 | °C |
| 3.1.25 | Heating battery power (electric) | 60 | Kw |
| 3.1.26 | Cooling system capacity | Predisposition |  |
| 3.1.27 | Sealed Flange for future cooling | 2 | N° |
| 3.1.28 | Fan motor with INVERTER (speed variable) | 15 | Kw |
| 3.1.29 | Fluid circulation turbine capacity | 7,000 | m³/h |
| 3.1.30 | Working voltage of the plant | 415/50/3 | V/Hz/ph |
| 3.1.31 | Max Noise level | 80 | dB |
| 3.1.32 | Project rules | EN13445/3 |  |
| 3.1.33 | Body material | P355NH as perEN10028-3 |  |
| 3.1.34 | Rings Material | SA350LF2 perEN10028-3 |  |
| 3.1.35 | Construction material | 2014/68/UE |  |
| 3.1.36 | Test certificates | 3.1 as per EN10204 |  |

3.2 POWER CONTROL CABINET

3.2.1 Compliance with (CEI EN 60204-1, CEI EN60439-1, 006/42/CE) and CE certified.

3.2.2 Working voltage: 415V 50Hz 3/PE

3.2.3 Control voltage: 230V 50Hz/24V DC

3.2.4 Thermocouple: PT100/ TC “J”

3.2.5 Control range temp.:0-200 °C

3.2.6 Control range pressure: 0-7 bar

3.2.7 The power section includes:

1. Voltage presence indicator
2. SCR thyristors
3. Main switch for power supply
4. Cooling fans
5. Motor Control
6. Emergency shutdown with safety relay;

3.3 Control Software

The control software is to provide the of management of all systems and controls. To be compatible with existing software, the management software is to be designed as S.C.A.D.A. compliant with special applicative to the polymerization of composite and thermoplastic materials. The scope of the present supply includes:

1. No. 1 PLC
2. No. 1 PC with the S.C.A.D.A. (Supervisory Control and Data Acquisition) Supervisor licence, including:Polymerization cycle running and supervision of process data; complete of data-recording with database MySQL for traceability of cycle for over 20 Years with Reports and Trend Graphic;
3. DIAGNOSTIC package dedicated to process anomalies analysis
4. Software Viewer to display cycle data by a PC on the internal network
5. UPS for automation feeding for 30 minutes. No. 1 UPS group to keep the cabled PC for Industrial use and the PLC fed in case of lack of electricity from the net and save data and registration. The cycle, in case of lack of electricity is to go on hold up to the restoration of electricity when automatically will restart up to the completion.
6. No. 1 PC for Industrial use:
	1. 1 serial interface
	2. Keyboard
	3. mouse
	4. 2 Ethernet interfaces
	5. 4 USB interfaces
	6. hard disk at least 500 GB
	7. operating system: Windows 10
	8. 22" LED display, resolution 1920 x 1080 Pixels

3.3.7 Main synoptic to allow the visualization and the supervision in real time of:

1. Cooling system and valve state
2. Cooling tower
3. Heating circuit
4. Pressurization circuit
5. Air temperature and temperature cycle, and valve state
6. Motor temperature cycle, running,
7. Steam inlet pressure and temperature and valve state
8. Oxygen percentage in autoclave
9. Purging air: time of working and fun running
10. De-pressurization circuit
11. User-friendly high resolution, for easy visualization and comprehension of the machine status and alarms;
12. No limit to programme saving and storing, naming and recalling by alphanumeric ways
13. Recording on database SQL of configuration and recipe data, alarms, configuration and cycle data, events;
14. SQL encrypted database
15. 20 year data recording availability
16. Management executed by different levels appointed by passwords. It is possible to generate new users without limit directly from the interface.
17. PID control on pressure
18. PID control on temperature.
19. Dynamic control on temperature with possibility to adjust every single cycle to the loading part
20. Manual and Automatic control availability for each connected system
21. Automatic vacuum tests and automatic exclusion of damages line. Limit threshold is appointed by the operator
22. Advanced management for ordinary maintenance
23. Remote assistance through TeamViewer
24. Loading Cycle configuration including appointment of vacuum lines and TC
25. Bar-code for loaded part
26. Seeking function based on cycle, recipe, batch, data or comment;
27. Automatic creation of reports in PDF format for alarm, events and trends.
28. Data export in Excel format
29. Possibility of cycle holding
30. Possibility of controlled cycle abort
31. Possibility of Recipe parameters modification during running cycle
32. Possibility to enable or disable each part TC, even during running cycle
33. Advanced diagnostic of sensors and wiring
34. Recipe implementation with parameters of Tech/Spec
35. Advanced management of registered data and comparison with parameters of Tech/Spec
36. Individual management of single part based on parameters of Tech/Spec
37. Advanced detailed reports with identification of each parameter out of Spec
38. Generation of detailed report for each single part treated.
39. Possibility to choose what TC has to be used for regulation (air / colder tool / hotter tool / average tool)
40. Alarms transmittal:
	* by flash lamp;
	* by loud horn;
	* by MAIL cellular phone
	1. **Pressurization/depressurization**
		1. Real Value from pressure switch and transmitter
		2. Pneumatic valve to manage the compressed air inlet

3.4.3 Pneumatic valve to manage the compressed air outlet

**3.5** **Excess of temperature**

3.5.1 Independent analogic thermostat able to stop the heating power in case of overtemperature.

3.5.2 PT100 sensor as Temperature threshold set on control system

**3.6 Excess of pressure**

3.6.1 Independent analogic pressure switch able to stop the feeding pressure in case of overpressure.

3.6.2 Transmitter sensor as Pressure threshold set on control system

**3.7** **Sound absorber (silencer)**

Designed to absorb the noise in the autoclave depressurization phase. The silencer assures that the noise level doesn’t go over 85 dB at n° 3 metre distance

**3.8** **Vacuum station (vacuum + measure) automatic**

The unit is intended complete with vacuum pump, tank, pipes, valves and instrumentation. The group is directly connected to wall pass groups arranged on one side of the autoclave:

1. n° 1 pump of 50 m3/h, motor of 1,25 kW, 50 Hz 3ph
2. n° 1 vertical tank of 100 Lt
3. n° 1 pressure transducer on the tank
4. n° 1 vacuum gauge hand on the tank
5. n° 1 ON-OFF pneumatic valve for tank vacuum
6. n° 1 ON-OFF pneumatic valve for tank venting
7. n° 1 manual vacuum line shut-off valve on the tank
8. n° 1 manual tank venting valve
9. n° 8 + 8 automatic vacuum lines + measure controlled by the control system, composed of:
	1. n° 8 pneumatic valves for vacuum
	2. n° 8 pneumatic valves for venting
	3. n° 8 transducers for measuring the vacuum on the measure line with display directly on the PC
	4. n° 8 vacuum filter (cartridge)
	5. n° 8 connecting pipes between valves and autoclave

All mounted on skids

**3.9 Loading and unloading trolley complete with under trolley**

**3.10 Commissioning (erection & test/training) and FAT at our premises**

**3.11** **Delivery**

Delivery to our premises Southern Hangar 1, Space port Cornwall, Newquay, Cornwall TR84HP

4**. Budget**

The total maximum budget available for this commission is £210,000 (exc VAT) but inclusive of all expenses.

**Tenders that exceed the total budget will not be considered.**

The budget will be reviewed as part of the tender evaluation detailed in Section 10 and will reflect the degree to which there is a saving on the maximum budget

# 5. Tender and commission timetable

The timescale of the programme is from the date of signing the contract until acceptance by PAC. The timetable for submission of the Tender, completion of the programme are set out below:

|  |  |
| --- | --- |
| **Milestone** | **Date** |
| Date ITT available on Contracts Finder | 22 January 2025 |
| Last date for raising queries | 1700: 29 January 2025 |
| Last date for clarifications to queries | 1700: 30 January 2025 |
| Deadline to return ITT | **1700: 9 February 2025** |
| Evaluation of ITT | 10 February 2025 |
| Award of Contract  | 11 February 2025 |
| Contract completion | 31 March 2025 |

# 6. Tender submission requirements

Please include the following information in your Tender submission.

6.1 Please provide your proposal and any necessary technical or specification sheets. This should demonstrate how you meet or exceed the requirement in section 3

6.2 Conflict of Interest statement as per section 8

6.3 Copy of your company’s Terms and Conditions and Payment Plan

**7. Sub-contracting**

Tenderers should note that a consortia can submit a tender but the sub-contracting of aspects of this commission after appointment will only be allowed by prior agreement with PAC Limited

**8. Conflicts of Interest**

Tenderers must provide a clear statement with regard to potential conflicts of interests. Therefore, **please confirm within your tender submission** whether, to the best of your knowledge, there is any conflict of interest between your organisation and PAC Limited or its programme team that is likely to influence the outcome of this procurement either directly or indirectly through financial, economic or other personal interest which might be perceived to compromise the impartiality and independence of any party in the context of this procurement procedure.

Receipt of this statement will permit PAC Limited to ensure that, in the event of a conflict of interest being notified or noticed, appropriate steps are taken to ensure that the evaluation of any submission will be undertaken by an independent and impartial panel.

# 9. Tender clarifications

Any clarification queries arising from this Invitation to Tender which may have a bearing on the offer should be raised by email to:

procurement@pirancomposites.co.uk

in accordance with the Tender and Commission Timetable in section 5.

Responses to clarifications will be anonymised and uploaded by PAC Limited to Contracts Finder and will be viewable to all tenderers.

No representation by way of explanation or otherwise to persons or corporations tendering or desirous of tendering as to the meaning of the tender, contract or other tender documents or as to any other matter or thing to be done under the proposed contract shall bind PAC Limited unless such representation is in writing and duly signed by a Director/Partner of the tenderer. All such correspondence shall be returned with the Tender Documents and shall form part of the contract.

# 10. Tender evaluation methodology

The tender will be assessed on its compliance to the requirement detailed in section 3.

11**. Tender Award**

The contract will be awarded to the lowest compliant bid.

Any contract awarded as a result of this tender process will be in accordance with terms and conditions agreed between the two contracting enterprises.

# 12. Tender returns

Tenders are to be returned by email.

Tenders are to be returned in accordance with Section 5

Latest date to be returned: As per Section 5

Latest time to be returned: 17:00

Emailed tenders should be sent electronically to

procurement@pirancomposites.co.uk

with the following message clearly noted in the Subject box;

**‘PAC Autoclave ITT Response’**

**Tenderers are advised to request an acknowledgement of receipt of their email.**

# 13. Disclaimer

The issue of this documentation does not commit PAC Limited to award any contract pursuant to the tender process or enter into a contractual relationship with any provider of the service. Nothing in the documentation or in any other communications made between PAC Limited or its agents and any other party, or any part thereof, shall be taken as constituting a contract, agreement or representation between PAC Limited and any other party (save for a formal award of contract made in writing by PAC Limited or on behalf of PAC Limited).

Tenderers must obtain for themselves, at their own responsibility and expense, all information necessary for the preparation of their tender responses. Information supplied to the tenderers by PAC Limited or any information contained in PAC Limited’s publications is supplied only for general guidance in the preparation of the tender response. Tenderers must satisfy themselves by their own investigations as to the accuracy of any such information and no responsibility is accepted by PAC Limited for any loss or damage of whatever kind and howsoever caused arising from the use by tenderers of such information.

PAC Limited reserves the right to vary or change all or any part of the basis of the procedures for the procurement process at any time or not to proceed with the proposed procurement at all.

Cancellation of the procurement process (at any time) under any circumstances will not render PAC Limited liable for any costs or expenses incurred by tenderers during the procurement process.