



## Generator Supplier - Case Study



### Case Study Information

Customer	Critical Power, Supply, Hire & Rental Service OEM & Provider
Location	United Kingdom
Enquiry Received	April
Order Placed	July
Order Dispatched	October

### Equipment Supplied:

#### INV MINOR 40

Reversible Flexible Impeller Pump w/ Frequency Converter, Remote Control (15m)  
Fitted to Customised Stainless Steel Trolley w/ Flow Meter, Hosing & Ancillary Fittings

Supplementary 24v NC connector, dry running protection & thermal overload protection included.

### Enquiry:

- ✓ The customer wanted to be able to extract diesel stored in underground tanks (5 m deep) through a 2"  $\varnothing$  pipe and deliver it into a secondary tank to enable decommissioning to take place. They wanted the ability to vary the flow of the pump and also monitor the amount of diesel being extracted. The plan for the system was to be used and stored outdoors, powered by a single phase power supply, and needed to also house up to 20 m of hose within it to enable the operator to connect different lengths of pipe together to achieve different discharge and suction heads. The extraction process from their tanks was currently taking upwards of 8 hours and they wanted to reduce this to "as quickly as possible".
- ✓ The challenge was to try and come up with a bespoke solution which was easy to operate and maintain, fitted into a small footprint whilst also providing good suction lift capabilities and an adequate varying flow range through the 2" pipe they had on site, which couldn't be made any bigger.

### Solution:

- ✓ We were able to design, build and supply a ready to use solution which fitted all the customer's criteria and managed to cut their extracting time to less than 2 hours.
- ✓ We were able to mount a remote controlled inverter driven flexible impeller pump onto a bespoke trolley which housed the pump and flow meter on one level, and the 4 x 5 m coils of hose on a secondary level. Both sides of the trolley were fitted with double doors, with piano hinges and locks to enable the operator to position the system, open the doors, connect the required hose lengths together and control and monitor the volume displaced over a 15 m range. The supplied remote comes complete with on / off / reversing & speed control and pump fitted with dry run protection thus providing the operator with complete peace of mind over the safety of the system and full control of the pump at the point of use.
- ✓ The flexible impeller pump in question was supplied in Stainless Steel AISI 304 with NBR Impeller and Seal, ideally suited to the fluid and environment it was intended for. Furthermore, due to the pumps innate ability to prime from 6 m without the use of a non-return valve and handle solids up to 10 mm in diameter, it enabled the customer to prime from great depths and not worry about any sedimentation being drawn up from the bottom of the tanks.
- ✓ The connections used throughout the system were of a CAM Lock design enabling quick assembly of the suction and discharge hose lengths, connection to the pump and disassembly of the system for any maintenance purposes. Dust Caps and Plugs were also supplied to provide protection from dirt ingress into the hose and pump whilst the system was not in use.
- ✓ The trolley system was supplied with a powder coated finish with a high phosphate powder base coat ideally suited for use and storage outdoors, and fitted with 4 x swivel wheels, two of which had brakes, in order to provide as much manoeuvrability as possible.



## Aviation Company - Case Study



### Case Study Information

Customer	Aerospace Company
Location	UK
Enquiry Received	19th November
Order Placed	29th July
Order Dispatched	23rd September

### Equipment Supplied:

#### **2 x Horizontal Long Coupled Side Channel Pump w/ Explosion Proof Motor, Baseplate & custom port arrangement (2")**

##### **Liverani Range**

Service	Aviation Fuel Transfer Pump
Fluids	Aviation Fuel JET A1 (Unleaded Kerosne 804 kg/m <sup>3</sup> @ 15°C) & TS1 (Similar to A1 but with a flash point of 28°C, 787 kg/m <sup>3</sup> @ 15°C)
Auto-Ignition Temperature	200°C
Operating Fuel Temperature	-50°C to +60°C
Capacity	175 l/min @ 15 PSI D
Power	1.5 kW
Voltage	230-400-III
Frequency	50 Hz
RPM	1400 rpm
Protection	II 2G EExd IIC T4
Execution	Horizontal
Pump Casing	Stainless Steel AISI 316
Impeller	Brass
Shaft	Stainless Steel AISI 316

#### **1 x Horizontal Long Coupled Side Channel Pump w/ Explosion Proof Motor & Baseplate**

Service	Aviation Fuel Transfer Pump
Fluids	Aviation Fuel JET A1 (unleaded Kerosine 804 kg/m <sup>3</sup> @ 15°C) & TS1 (Similar to A1 but with a flash point of 28°C, 787 kg/m <sup>3</sup> @ 15°C)
Auto-Ignition Temperature	200°C
Operating Fuel Temperature	-50°C to +60°C
Capacity	175 l/min @ 15 PSI D
Power	0.25 kW
Voltage	230-400-III
Frequency	50 Hz
RPM	1400 rpm
Protection	II 2G EExd IIC T4
Execution	Horizontal
Pump Casing	Stainless Steel AISI 316
Impeller	Brass
Shaft	Stainless Steel AISI 316
Sealing	Bi-Directional Mechanical Seal - Ceramic / Graphite / Viton
Connections	3/4" BSPM G



## Enquiry:

- ✓ The client wanted to develop some aviation fuel test rigs which would incorporate pumps that could handle aviation fuel at varying temperatures (-50°C to +60°C), varying flow rates (30 – 100% of rated duty) within an ATEX Zone 2 environment. Further to this the client wanted pumps which would minimise the heat input into the fuel during operation, have air cooled motors which could operate with ambient air temperatures of -10°C – 35°C and also allow fuel to flow through them whilst the pumps were idle.
- 

## Solution:

- ✓ Castle Pumps were able to select and customise suitable pumps from their extensive ATEX side channel pump range that fitted the exacting specification of the client and supply under their approved budget for the rigs. CAD drawings for the custom port configuration were made and supplied to the client during the quoting process and photos of the finished pumps sent to the client for their final approval ahead of delivery.

Within a matter of 3.5 working weeks, the pumps were fabricated, tested and delivered to the customers facility for integration into their testing rigs and put into successful operation (10 hrs on / 2 hrs off).



## Aerospace (ATEX) - Case Study



### Case Study Information

Customer	Aerospace Company - ATEX
Location	UK
Enquiry Received	4th May
Order Placed	30th August
Order Dispatched	22nd November

### Equipment Supplied:

#### 1 x Self Priming, ATEX Zone 1 Side Channel Pump - Sero SOHB Range

Application	Test Rig Pump
Fluid	Aviation Fuel T4
Temperature	10 - 59°C
Specific Gravity	0.804
Viscosity	1 mm <sup>2</sup> /s
Vapour Content Ratio	1.5:1
Suction	Self Priming to 4.2m - Max Requirement
Flow Rate	3.4 m <sup>3</sup> /hr (+/- 10%)
Discharge Pressures	1.5 - 4 Bar
Motor	0.75 kW / 230 - 400 v / 3 Phase / 1450 rpm / IP55 / EExdeIICT4
Casing, Stages & Base	Ductile Iron GGG 40
Shaft	1.4021
Impellers	1.4059

### Enquiry:

- ✓ An Aerospace company approached us with the idea that they wanted to simulate and test the effects that a helicopter's pitch and roll in flight would have on the aviation line, specifically the fuel delivery system. Due to where the client wanted to fix the pump as well as the varying position and fluid levels in the tank (supply reservoir pressure was to be progressively reduced down to a minimum of 6.5 PSIA), there was expected to be a high amount of vapour pressure as well as suction lift for the pump to perform. This, coupled with the fact that the equipment needed to be located in an ATEX Zone 1 environment, meant that this selection was particularly problematic and required a very specific type of pump.

### Solution:

- ✓ We selected a self priming side channel pump for this arduous application based on the knowledge that these pumps can handle up to 50% entrained gases and were capable of performing within the differential pressure range required. We were also able to supply this unit in a close coupled arrangement which meant that the unit would quite easily sit within the frame of the test rig. After careful friction loss and weight calculations, we recommended to ultimately move the pump closer to the feed tanks which facilitated an easier suction lift and lightened the load on the tail of the rig assembly.

Furthermore, by supplying the motor with PTC thermistors the client was able to accurately control the flow rate and pressure of the side channel pump, consequently enabling them to test the pump under a wide range of flow rates and pressures.

The client was so impressed with our in house knowledge, fast response and ability to understand their bespoke request that they subsequently referred us to other partners and also registered us on their preferred supplier data base.