

Company focus

Answering global de-watering needs

Pioneer Pump is a privately-owned company located in the UK, US and South Africa. It specialises in the design and manufacture of high-quality end suction centrifugal pumps, mainly for the mining, construction, municipal and industrial markets. World Pumps asked MD Simon Ruffles about the sectors addressed and their needs.

With a range of more than 400 pump models in a variety of materials and configurations, Pioneer Pump's most important market sectors are mining and quarrying, but others include construction, wastewater, environmental, industrial, power generation and defence and military. Specific applications include de-watering, flood control, sewage bypass, cooling water, environmental pollution control, pump outs, pipeline filling and standby duties.

In total, the company has 95 employees: six in South Africa, 12 in the UK, and the rest in the USA at Pioneer Pump Inc., which is the main manufacturing centre based in Canby, Oregon, and which manages the sales and marketing of pumps in North America, South America and Asia. In the UK, Pioneer Pump Ltd., manages the sales, manufacturing and after-sales service of all pumps in Europe, North and West Africa, and the Middle East, and has developed a wide distributor network in many of these countries and the rest of the world.

However, the UK, USA and South African companies do not exclusively address local markets. The UK business has, for example, focused on external markets since the start of the 2008 economic crisis. Examples include Ghana, Saudi Arabia and Qatar, which are all growth areas for the company. In Nigeria, there is a large and growing market for centrifugal pumps in the mining sector.

However, Pioneer is also trying to expand pump sales in the UK, mainly for de-watering in quarries and in wastewater systems, using the P Series (self-priming) and PP Series (vacuum-assisted self-priming) machines.

The South African firm, Pioneer Pump (Pty) Ltd., is a certified Level 2 BEE company located in Johannesburg, having a 125% BEE procurement recognition level supplying the nation's major mining and energy companies involved with coal, iron

ore and precious metals. It is more local with its dealings, having significant demand for mining related pumps from South Africa itself, Zambia, Zimbabwe and Namibia.

There are other differences between the three factories' output: the US company operates autonomously in North America, South America and Indonesia. It also has big business with pump rentals in North America, which is something that is currently under development in the UK.



Figure 1. A PP64S17 pump Perkins 1106-driven quarry trailer in Doveholes, Buxton, UK. This, delivered to Cemex, pumps 350 m³/hr at a 62 m head maximum. It operates as a feed pump to a washplant.



Figure 2. Mounted on a barge, two 18 in pumpsets fitted with 450SM pumps and powered by Caterpillar C15 engines are seen de-watering a Norwegian harbour at a pumping rate of 3000 m³/hr at 18 m total dynamic head (TDH).

Rental applications include de-watering, bypass, flushing, pressure testing, flood management, jetting, ballast, standby firepacks and tank cleaning.

Pioneer Pump's main competitors in the mining and quarrying sectors are Godwin Pumps (a Xylem brand) and Gorman-Rupp Pumps in the USA, plus Selwood and Andrew Sykes in the UK and abroad. The main differentiator is that these companies rent out pump-sets, something that is in the process of being launched in the UK by Pioneer Pump. Currently, the company direct-sells pumps and packaged pumps, but the rental market is growing and the aim is to do this in the UK, as it brings very significant advantages for pump end-users, particularly in terms of servicing and support. This will enable them to provide very real advantages for pump end-users, particularly in terms of servicing and support.

In order of importance, the factors currently driving the market are: commercial; technical; environmental and legislative, although the last two are inter-related to a large extent.

Construction

In the construction sector, the applications include de-watering, wellpoint, drilling mud and bulk water management. Pioneer's main competitors are the same (though not Andrew Sykes). This sector is considerably smaller now than it once

was in the EU and UK because of the ongoing recession, so is not, therefore, as important for to Pioneer as it once was.

Further construction sector applications include jetting (using high velocity water

pressure to blast away accumulated scale, silt, sand and grease build-up on walls and pipes) and well-pointing. Another typical construction application is handling Bentonite, which is an absorbent aluminium phyllosilicate. Because of its excellent colloidal properties, it is often used as drilling mud for oil and gas wells and for geotechnical and environmental investigations. The property of swelling also makes sodium bentonite useful as a self-sealant, much used in construction, landfills, slurry walls and as a drilling mud for bore holes. The company's PP self-priming pumps are typically used for this and similar duties.

Pioneer Pump's ATEX business is significant, but not huge, at typically around 10% of the business across all three companies. Most ATEX pump equipment sales are in the oil and gas industries worldwide, with the majority coming from the US company, but the aim, again, is to grow the ATEX business in the UK.

Pump designs

All of the company's pumps are centrifugal designs, but some are self-primers (dry-primers), whilst others are

Specific pumps and applications

Vacuum assisted self priming: Of the vacuum assisted self priming designs, the PP Prime clear liquids pumps offer the highest performing self priming pressures of any single stage pump in the world, the company says. With impeller diameters of up to 530mm, these units can deliver pressures in excess of 20 bar. The PP Series is also available as a solids handling pump, used by large international mining, rental and process companies. These machines deliver high pressures for high flow rate applications, including de-watering, at more than 4000 m³/hr.

Self priming pumps: The P Series solids handling pump is a heavy duty self-priming type having up to 76 mm solids handling capability. High reliability derives from the use of good quality ductile iron castings in combination with 17-4PH stainless steel shafts. There is also a high-pressure variant, the PE Series, which has the same features as the P series, but with higher pressure and smaller solids handling capabilities. The PT Series solids handling unit is the company's smallest self-priming.

Standard centrifugal pumps: These include the high pressure clear liquid pumpsets having working pressures to 20 bar and important Net Positive Suction Head Required (NPSHR) characteristics. The end suction clear liquid range is the highest performing range of pumps offered. With sizes from 37 mm to 300 mm, these units have been designed for extreme pressure applications on a 24/7 basis. For example, the SC Series solids handling type provides flows to 4000 m³/hr and pressures to 12 bar. All units provide a minimum of 76 mm solids handling and optional run-dry capability for arduous conditions, such as drilling and mud pumping in oil and gas applications.

To handle the most delicate products with minimum damage, there is the SC Series Hydrotransport pump supplied in both 150 mm and 200 mm sizes. These units feature ductile iron volutes and run-dry mechanical seals, so they can operate in very abrasive applications, such as primary loading pumps where many more traditional pumps can suffer high wear rates.



Figure 3. A PP64S17 pump electric (WEG) motor-driven is pumping 300 m³/hr to an 80 m head.

vacuum-assisted self-priming types. The latter are wet self-priming and end suction centrifugal machines. These pumps are sold individually, but also form the basis of package pump sets in both engine-driven and electric motor packages.

The pumps designed for the construction industry incorporate heavy duty shafts, bearings and advanced fluid end designs. One design that is different from most

competitive products is the dry priming pump. This integrates Pioneer's pumps with a patented self-priming system, such

that the machines are capable of a suction lift above 7 m with very high efficiencies. Therefore, users can pump higher flows at higher pressures, using less energy and fuel than typical conventional pumps.

The reasons for this high efficiency are that most competitors' pumps feature 'semi-open' impeller design, which can waste energy. The semi-open impeller incorporates a single shroud at the back. This is the most common design used in the US and the one found with most ANSI standard pumps. Pioneer's pumps, however, are fully-enclosed in that the closed impeller features a shroud on either side of the vanes. This is the most common design found with ISO standard pumps. With this design, the pumped fluid flows through the internal impeller passages without hydraulic interaction with the stationary casing walls. The relative velocity between the impeller and the fluid at any given radius is quite small. This results in higher efficiency, as well as less wear than other impeller formats.

"The pump packaging to the business is highly important to the company, as it provides at least 50% of the total output."

Case study 1 – High pressure solids handling pumpset for Cemex Shap Quarry, UK

Pioneer provided a 100SH pumpset and associated pipework to Cemex Shap in Cumbria, allowing the company to maintain its quarrying activities, even in the most difficult conditions, and in typically difficult winter weather. Based on the PP64S17 high flow pump, the pumpset incorporated a Tier III emission compliant ACT C9ACERT engine, all mounted directly on a heavy duty skid.

The pumpset was designed to allow the quarry to use the pump over the next 10 years by being packaged with a sufficiently large engine that will enable operation out to 300 m³/hr and pressures of up to 10 bar (350 ft).



Figure 4. At Halkyn quarry in Wales, a PP108C18 pump is driven by a Caterpillar C15 engine. Sold two years ago, this is still operating today with no need to change the pump. Starting pumping at level 4 of the quarry, it is now on level 7, but will soon have to be upgraded to a pump having a 21 in impeller to accommodate new a duty point.

Case study 2 – Emergency sewage bypass pumping in Oman

Pioneer Pump, through its distributor GSIS in Oman, has supplied four 250SM (10X8) portable pumpsets to the municipality of Salalah in Oman for emergency standby pumpsets. Powered by both electric motors and CAT 150 kW (200 HP) engines, each is capable of pumping more than 5000 m³/hr (176, 570 ft³/hr).

Mounted on fast tow trailers, these pumpsets can be moved around the district in the event of flooding or changing bypass pumping requirements.

Pump packaging

Complete pump packages can be provided for mining and quarrying applications, either AC electric motor or diesel engine driven. The engines offered are typically Caterpillar, Perkins or John Deer, but this depends to some extent on customer choice. Pioneer usually specifies the engines that drive skid- and barge-mounted pumpsets, but sometimes customers want to make their own choice. Many companies in Ghana insist on Caterpillar engines. In terms of specifying the pump (type, rating, etc), there is a standard procedure. The company's engineers e-mail customers with a form to complete, listing required flow rate, head, suction lift and whether to be skid-mounted or not. They then suggest a suitable pump for the purpose.

Efficiencies are high because the pumps have been designed for maximum fuel efficiency when paired with diesel engines in pump packages running at 1800 rev/min, compared with the more conventional 1000 rev/min. This helps optimize the engine/pump configuration for maximum efficiency, resulting in reduced pumping energy and a lower engine fuel consumption.

Packaged pumpsets include high pressure clear liquid types, which are open skid-mounted engine driven packaged pumpsets capable of flows in excess of 2000 m³/hr and pressures of 20 bar. These are suitable for certain industrial applications, such as firefighting, plus quarry and mine de-watering, as well as mass



Figure 5. A skid-mounted pumpset with a 'Rock and Rain' roof, protecting the Caterpillar engine from adverse weather conditions and falling rocks. Sound attenuated canopies can also be supplied.

construction projects. High pressure solids handling pumpsets are engine driven open and sound attenuated high flow solids handling machines, capable of pressures above 12 bar and pass solids in excess of 150 mm.

Another type of pumpset offered is the low-medium pressure solids handling design, possibly the highest performance

to 16 bar. These pumps are similarly packaged in fully-bundled sound attenuated canopies, or on trailers or skids. The pump packaging side to the business is highly important to the company, as it provides at least 50% of the total output.

The in-house design team offers complete turnkey solutions, including the integration of specialist equipment, such as

“Mining, quarrying and construction applications pose various environmental difficulties for pump design and operation.”

range of pumps currently available on the European market, with maximum flows of more than 4000 m³/hr and heads of up to 12 bar. These units are available as packaged, fully-bundled sound attenuated canopies with sound levels down to 60 db(A), or on open skids and trailers. Another design is the low-medium pressure clear liquid pumpsets, which use high performance sound attenuated self-priming pumps. The maximum flows are more than 2000 m³/hr with heads of up

flame proofing engines, monitoring rotating parts for both temperature and vibration, the testing of equipment - including seismic testing for nuclear and other specialist applications - right through to the provision of butt-welded pipework and fittings.

There is another aspect to pump packaging, however, as some customers simply want to have a bare shaft pump delivered so that they can make their

own pump packages. This can sometimes save them money, they say.

Skid-mounted pumps also provide significant business, providing around 50% of the company's total in the UK (and the UK company also exports a significant number). In the USA, around 25% are skid-mounted pump sets and mounted on barges, but none are provided by the South African company. Note that these figures also include truck-mounted pump sets.

All three factories package equipment for both domestic and international markets to all current legislative requirements, such as CE, ATEX and ASTM, as well as some more specialized, such as nuclear industry specifications.

GSM telemetry equipment can be supplied for pump remote monitoring and control applications. GSM is used because, after looking at this technology and a number of alternatives, it was concluded that it is a cost-effective global standard, and is also often tougher (greater hardening) than other wireless or web technologies against RFI. Also, GSM can be tied into the company's existing pump control panels with ease.

Mining, quarrying and construction applications pose various environmental



Figure 6. A sound-attenuated canopy set for lower noise emissions and also protection from theft.

difficulties for pump design and operation, because of noise, vibration, dirt, dusts, rough handling, difficult pumped media and extremes of temperature. This is the reason why Pioneer uses canopy pump-sets for many such applications. Originally design for sound attenuation, canopy sets, by their nature, help to insu-

late the pump-set from moisture and dirt etc. However, it also protects the pumpset from theft (e.g. the batteries and alternators).

There are some pump-sets working in Oman, for example, where it is extremely hot, that are also climate-controlled.

Future plans

Pioneer Pump's plans for the near future include growing the UK business, so six more people have just been recruited to help with this. They will deal with sales, brand recognition and rentals. As stated, another aim to go into the rentals market in the UK.

In addition, while the company has distributors in Spain, France, Italy, Qatar and Saudi Arabia amongst others, the plan is to further improve the distribution network. It is also planned to grow the business by £1m/year in the UK, and 10m Rand /year in South Africa. ■



Figure 7. John Deere engine powered Pioneer pumps mounted on trailers.

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