



**pump and abrasion  
technologies®**

Easy Cost-Effective Reliable

.....  
PUMP AND ABRASION BUSINESS  
PRACTICES HOLD IN HIGHEST REGARD  
THE PRINCIPLES OF BEING EASY, COST  
EFFECTIVE AND RELIABLE.  
.....

EASY

COST-EFFECTIVE

RELIABLE



# Company Profile

From small beginnings in 2004, Pump and Abrasion Technologies has grown to become a formidable player in the African pump market. We are a respected manufacturer and supplier of heavy duty pump solutions to the mining, mineral processing, industrial and agricultural segments. Pump and Abrasion has developed a range of premium quality pumps and after-market pump spares, which is offered at competitive prices and with unparalleled service.

Based in Centurion, South Africa, Pump and Abrasion has continuously expanded its' African footprint, enjoying success in territories such as Botswana, Ghana, Mozambique, Namibia, Tanzania, Zambia and Zimbabwe. Our factories span 20 000m<sup>2</sup> and consists of house foundries, machine shops, repair and assembly workshops, and warehousing to support high-volume production and delivery requirements.

Our supply and support capability extends to entire pumping systems comprising pumps, electric motors and related accessories, from concept design and specification phase through to installation, commissioning and maintenance. Our Battlemax®, Battlestream® and Battlesub® brands are recognised throughout Africa for exacting quality standards, excellent performance and long working life.

To cater for unique and varied applications our range of pump materials has evolved to include 27% and 35% chrome, natural and synthetic rubbers, polyurethane, ceramics and stainless steel.

We pride ourselves on providing a seamless acquisition experience with a dedicated sales team on standby to ensure that every client receives the best possible service. This is backed up by a strong technical team and a comprehensive application engineering and design facility. Our TUV Rhineland ISO 9001:2008 certification ensures delivery to customer requirements without exception. Pump and Abrasion is committed to the highest standards of ethical conduct in our dealings and the provision of the highest possible levels of service.

Our mission is to be a preferred supplier of easy, cost-effective and reliable pumping solutions to African mining, industrial and agricultural clients.

We will achieve this by striving for premium quality products, engineering excellence, service excellence, continued product innovation and an unwavering commitment to the highest ethical standards.





To support clients in far-off locations we partner with carefully selected distributors. Tri-Pump exclusively represent Pump and Abrasion in certain African markets. These partners share our commitment to providing exceptional solutions and services aligned with our Easy, Cost-Effective, Reliable mantra.

### **Core Company Values**

Pump and Abrasion's value proposition is summarised by its motto: Easy, Cost-Effective and Reliable. Consistently living these values has ensured that the Battlemax, Battlestream and Battlesub brands have become well-entrenched in the African market. A strong, loyal customer-base attest to the success of this approach to business.

Easy refers to our simple, well designed products that are easy to maintain and developed on proven design principles. Easy maintenance is a result of our strong customer-focused service that includes ready technical support and quick quote and query response times.

Reliable refers to proven products, experienced personnel and an effective distribution network. We insist at all times on providing excellent service levels and product availability. Pump and Abrasion has all of the required industry standard certification and we also offer a One Year Warranty on all products.

Cost Effective refers to proven product reliability and wear life along with our competitive pricing structures. High product availability also means reduced inventory investment while our constant technological improvements mean that customers will have products on the cutting edge of innovation without breaking the bank.

### **Geographic Profile**

Pump and Abrasion Technologies is headquartered in Centurion, Gauteng South Africa, with branches in Rustenburg and Middelburg, as well as agents in Cape Town, Kimberley, Phalaborwa, Richard's Bay and Welkom. Clients in Botswana, Lesotho, Mozambique, Namibia, Swaziland and Zimbabwe are serviced from Centurion. An ever expanding African footprint now includes territories as far afield as The DRC, Ghana, Tanzania and Zambia.

# Product Profile



Pump and Abrasion's Battlemax®, Battlestream® and Battlesub® products were developed to meet specific needs in the mining, industrial and agricultural pump markets. The brands stand for premium quality pumps and after-market pump spares at competitive prices and best-in-class service excellence. This service includes application engineering and supply of complete pumping solutions (comprising pump, electric motor and accessories). Pump reconditioning to original specification and service exchange units round out the service offering.

## EASY

- Simple, well designed products based on proven principles
- Easy to maintain for maximum uptime
- Functionally interchangeable with other brands
- Customer-focused inventory and service
- Full application engineering, design and technical support capability
- Fast quote and query response times

## COST-EFFECTIVE

- Long wear life reduces spare part spend and improves uptime
- Highly competitive pricing structures
- Product availability and interchangeability reduces customer inventory investment
- Effective distribution network throughout Southern Africa
- BBBEE Contributor

## RELIABLE

- High specification manufacturing and stringent quality control
- Continuous product development to maximise MTBF
- Extensive field trials to prove excellent wear life
- TÜV Rheinland ISO9001:2008 accredited Quality Management System
- All products fully guaranteed
- Excellent service levels and product availability

Battlemax® Heavy Duty



Battlestream® Water Pumps



Battlemax® Gravel Pump



Battlemax® Dewatering



Battlemax® Quick Release



Battlesub® Submersible



Battlemax® Vertical Spindle



# Case Study

## Successful Acid Resistant Poly-Urethane Trial at Canyon Coal, Hakhano Colliery.

### 1. Introduction

#### 1.1 Client Back Ground

Canyon Coal is a coal exploration and mining company with operations and projects in Mpumalanga and Gauteng provinces of South Africa. The Hakhano project became an operational mine in December 2009. It is an opencast mine. DMS plant was commissioned in September 2010 and is currently operated by Minopex.

Minopex is a specialist in the field of outsourced operation and maintenance (O&M) of mineral-processing facilities in the coal, platinum, chromite and diamond industries. It is internationally acknowledged for its quality service and high standards. This specific site operated by Minopex is for Canyon Coal in the Middelburg area. ROM coal is washed and four products are produced with the following indicative quality.

**CV:** 6000 kcal/kg (net as received basis)  
**Ash:** 11-12% (air dry basis)  
**Volatiles:** 24-25% (air dry basis)  
**Inherent Moisture:** 3-4% (air dry basis)  
**Total moisture:** 6-7% (as received basis)  
**Sulphur:** 0.25-0.35% (air dry basis)  
**Monthly saleable coal production is** 120 000 ton

#### 1.2.1 Problem Statement

The processing plant at Hakhano started experiencing very low PH levels affecting especially the Spiral Discard Feed pump. These low PH levels caused severe premature failure on standard chrome parts. Minopex had replaced these

parts and pump every 3 weeks due to the PH levels. Minopex asked Pump and Abrasion to do an analysis on the situation with the aim of reducing cost, decreasing downtime and extending the pump life.

#### 1.2.2 PAT Evaluation & Recommendations with regards to the problem statement

Pump and Abrasion Technologies (PAT) is a South African based manufacturer of heavy duty Battlemax slurry pumps and approached Minopex to present their range of products. PAT evaluated the modular arrangement of the Spiral discard pump system and it was found that the reason for high pump failures is the low PH available in the application. This resulted in the high wear on the pump parts and the pump needed to be replaced every 3 weeks on the complete wet end which consists of the impeller, volute, throat bush and insert. The original material used was the standard 27% chrome casting (19-27% chrome) in a standard 6/4E Type P Pump. This problem kept on reoccurring and no solution could be found with any other slurry manufacturer thus it made sense for PAT to have the opportunity in providing a solution. The intention was for PAT to install a selected pump, evaluate this pump over a period of time and ultimately reduce the cost of ownership to Minopex. PAT researched a couple of materials after their site visit. The material selected by PAT was the Acid resistant

Poly-Urethane which had good abrasion resistant qualities but could also handle extremely low PH situations. The sizing of the material (top size 3mm) was in specification to move over to the Poly- Urethane solution

### 2. Test Trial

#### 2.1 Trial Pump Specifications

The pump Installed by PAT was the 6/4E-INAP with a 45 Kw motor. The liners for the pumps selected were the Acid resistant Poly-Urethane liners which consisted of the Throat-bush, cover plate liner and the Impeller.

#### 2.2 Trial Pump Expectations

The previous pump only lasted 3 weeks in the application before it had to be replaced. The cost for these 27% chrome pumps were very expensive and Minopex needed to reduce the cost of ownership. The 6/4EINAP is a lot more cost effective than the previous pump installed thus the first goal was to get to the 3 weeks life expectancy which Minopex currently achieved. Any increase on the application's life expectancy was a bonus.

#### 2.3 Inspection Frequency

The first inspection to be done after 3 weeks of running or when the pump fails. All other lubrication inspections were done by Minopex on a daily basis.

### 3. Inspection 18/06/2014

#### 3.1 Photos of Inspection 18/06/2014 (after 3 weeks)



Figure 1: Pump opened up. Impeller still in pristine condition. The low Ph has had no impact on the liners or the impellers, surpassing the previous material life time



Figure 2: Throat Bush showing no signs of wear after 3 weeks. The throat bush used to be replaced after every 3 weeks



Figure 3: Cover plate liner still showing no signs of wear after 3 weeks

#### 3.2 Cost comparison of life cycle (before and after trial)

The pump has now ran for a period of 6 weeks and still in good condition. It is safe to say that the pump will last for a minimum of 12 weeks.

#### Cost Comparison Between Previous Material vs Battlemax Material

Previous Pump Model	Installation Cost	3 Weekly Cost	Total Cost per Annum
6/4E Type P 27% Chrome	R 78,000.00	R 62,400.00	R 1,081,392.00
Current Pump Model	Installation Cost	12 Weekly Cost	Total Cost per Annum
6/4INPA Poly	R 67,434.00	R 32,512.00	R 140,776.96

Table 1: Cost Comparison per Annum. Note the big saving on only one application in the plant

**Total Saving/annually**  
**R 940,615.04**

**Percentage Saving**  
**86.98%**

# Pump and Abrasion in the news

## Engineering News - Pump and Abrasion Inks Investment Deal August 4th, 2014

Pump and Abrasion Technologies has announced a Black Economic Empowerment (BEE) investment deal that introduces 30% direct BEE ownership.

Pump and Abrasion Technologies, renowned slurry pump manufacturer, made an empowering move in the company's long-term growth strategy by securing a BEE investment deal with Innovative Strategic Investments (ISI) in June this year. Since its founding in 2004, Pump and Abrasion has grown organically into a profitable business with customers in South Africa's mining sector and across its borders. This deal is in line with Pump and Abrasion's ethos of a socially responsible company that believes in transformation and the influencing of progress in South Africa.

This investment means that the company will be able to further fulfil its goal of expansion into Africa while continuing to offer their clients the superior service and performance that has become associated with Pump and Abrasion and its Battlemax, Battlestream and Battlesub range of pumps.

ISI's investment allows for Pump and Abrasion to further invest in company resources, infrastructure, technology and people. Pump and Abrasion Sales and Marketing Director, James Pienaar says: "Our client care focus of 'Delivering Where it Counts' reduces downtime and provides seamless on-site assistance to our clients. They also benefit from the cost-effectiveness and excellent wear life associated with the Battlemax brand. Now, this deal brings further benefit to our clients to meet their own BEE and Mining Charter transformation objectives."

"Pump and Abrasion is currently experiencing continued growth. We selected ISI as a strategic partner because their ethics, business culture and objectives align with our own. ISI's strong track record in

the mining industry underpinned our decision," says Pienaar.

National financial institution, Grindrod Bank facilitated the deal. Grindrod Bank Executive Director Andrew Blades says that the deal, months in the making, has been structured to meet several criteria: "First of all, it was decided at the outset that the deal had to be fully funded. Secondly, it was crucial that there would be mutual benefits to the partners. Finally, ISI had to become actively involved in Pump and Abrasion."

"This investment was a smart move for Pump and Abrasion as they are now able to expand their footprint. The value-add of their new partner strengthens Pump and Abrasion's growth potential and signifies their commitment to the South African mining industry," says Blades.

Co-founder and Director of ISI, Muvhango Netshitangani, says ISI is in complete agreement that these criteria were met. "The culture within our two companies is a perfect fit and met our expectations on all counts. With this partnership we see great potential for expansion and continued success within the mining industry."

According to Pienaar this partnership would also support the enhancement of Pump and Abrasion employees in terms of skills development and education. This will further enhance their positive working environment.

### About Pump and Abrasion

Pump and Abrasion has developed a range of quality products (Battlemax® and Battlestream®) for the mining and industrial pump markets, offering real quality pump spares at competitive prices and at a high level of service excellence.

This service includes the supply of complete pump sets comprising pump, electric motor, accessories and technical support.  
[www.pumpandabrasion.co.za](http://www.pumpandabrasion.co.za)

## Design

### The Design Office

Pump and Abrasion Technologies utilises a combination of experience, engineering tools and software to offer clients complete and innovative product solutions.

### Capabilities include, but are not limited to:

1. Full application engineering, from entire pump systems to optimising application driven details like materials and sealing arrangements.
2. Experienced application engineers (combined experience more than 50 years).

3. Proprietary pump selection software.
4. Market leading 3D CAD Software.
5. Continued research and development to introduce new part materials, including:
  - 35% Chrome
  - Range of Poly Urethane
  - Full Stainless Steel BattleSub Submersible Pumps
6. Continued research and development to expand range offering, including:
  - 8/6 FFPP High Pressure Slurry Pump
  - 6/4 EEPP High Pressure Slurry Pump
  - 250 F Rubber Lined Pumps
  - Full Stainless Steel BattleSub Submersible Pumps

### 3D CAD Software

Pump and Abrasion Technologies utilise market leading 3D CAD software for the development of our innovative product solutions.

### Featured Capabilities include, but is not limited to:

1. 3D Solid modelling: Accelerates design, increase productivity reduce development cost with 3D solid modelling with lifelike visualisation and virtual testing before manufacturing.



# Design

2. Weldments: Quickly creates designs that have extrusions and easily generate cut lists and bills of materials to streamline design and manufacturing of welded structures, frames, and bases.
3. Sheet Metal Design: Quickly and cost-effectively creates a wide range of sheet metal part designs using a wide range of flexible tools.
4. Large Assembly Design: Simplified design of large assemblies with easy-to-use tools to create, manage, and visualise large and complex designs that can contain thousands of parts.
5. CAD Import/Export: Easily convert CAD data into a format that meets design requirements.



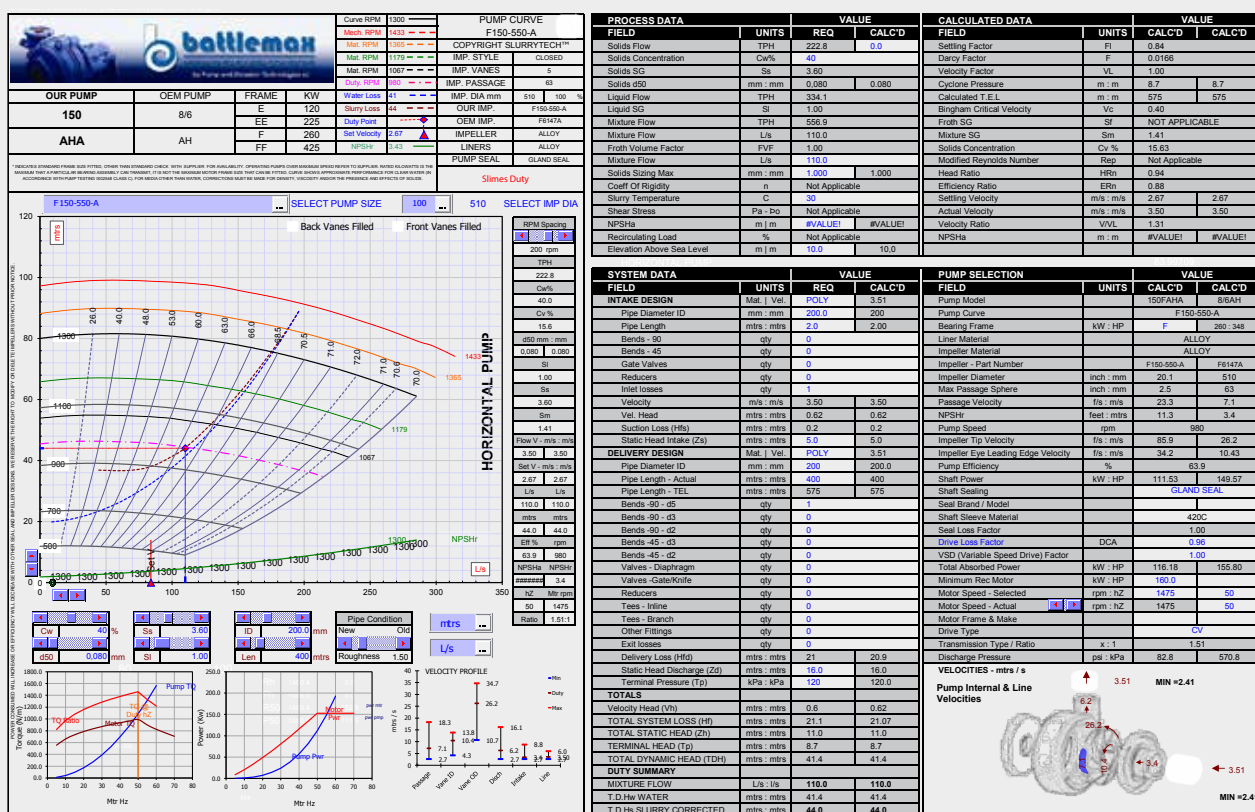
# Curve Engine

## BATTLEMAX SLURRY PUMP SELECTION APPLICATION

Battlemax Curve Engine performs Newtonian slurry calculations and superimposes the results as a system resistance curve on a pump performance curve. Curve Engine models the system resistance for clear water and slurry based on design parameters specific to each application. The pump which best matches the system requirements is easily selected by overlaying the calculation results on the performance curves of several different pumps. To further improve the resolution of the pump selection specific details on construction materials, sealing arrangement, drive configuration and more can be entered to configure the pump to suit the process conditions.

Curve Engine results are based on “real world” application knowledge. Most system and performance calculators present results for “As New” systems and equipment, this includes pump components and pipe lines. Our system curves can be generated based on semi worn pipe roughness and not just on smooth new pipe wall roughness. Subsequently redundancy is built into the design from the onset which will allow for piping system deterioration over time with minimal performance offset.

All results are verified by our experienced application engineers to ensure optimised performance and lowest total cost of ownership.





@PumpandAbrasion



PumpandAbrasion

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