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## **BENMARC ENVIRONMENTAL (PTY) LTD**

### **PAC System Information**

#### **PAC's**

***It's the trouble-free central, radial compressed-air cleaning system that keeps materials flowing. And eliminates wasted man-hours***



It

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## 1. Approach - General

### **CHUTE BLOCKAGE PREVENTION**

If you have a problem with sticky material causing chute blockages, Benmarc has the solution. Benmarc's PACS® is a cost effective method of keeping your material flowing.

Benmarc SA has installed PACS® in several large plants in South Africa handling a variety of different materials including coal, iron ore and Kimberlite. After installing PACS® in one chute, our customers typically come back for more. The results speak for themselves.

### **Theory of Operation**

Benmarc's patented Pneumatic Accumulation Control System (PACS®) works on the principle that compressed air can be utilized to remove build-ups of wet, sticky material from the walls of material handling system chutes, bins, and hoppers. Normal plant compressed air (6 to 8 Bar) has been proven to exert enough energy to remove large accumulations of material when directed along equipment surfaces underneath the accumulations. PACS® does this automatically, without operator interface, 24 hours per day, without interfering with normal material handling operations. Loss of material flow due to blockage is virtually eliminated in areas where PACS® nozzles are correctly positioned.

### **Safety**

PACS® systems contribute directly to an increase in the safety performance of plant personnel. Personnel exposure to the hazards of clearing hoppers and pipes is greatly reduced with the proposed system. Since the clearing of plugged hoppers is a physically exhausting task, eliminating its occurrence will leave operators better prepared to accomplish other tasks.

## 2. How They Work

A standard PACS® system consists of a number of properly positioned PACS® nozzles and pulse valves, a compressed air receiver and / or compressor, and the necessary electronic controls. A blast of compressed air is delivered sequentially to each nozzle through a quick opening / quick closing pulse valve. Each nozzle directs the air in a 360° pattern along the inside surface of the chute work for a radial distance of approximately 500 mm. The air dislodges and breaks up the layer of material, which is then carried away by gravity or other material flowing through the chute.

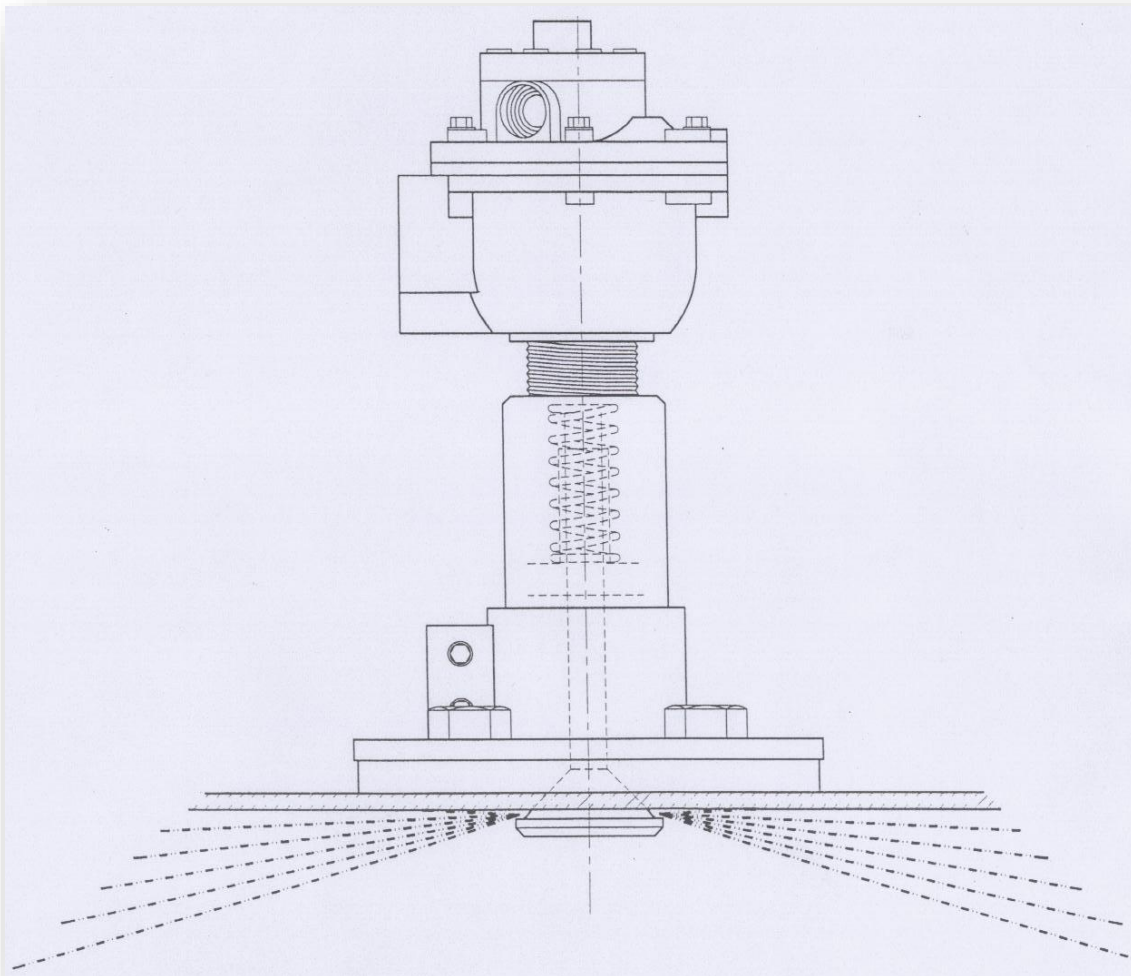


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The nozzle body assembly is mounted flush with the chute surface. The valve head extends into the material stream. When activated by a blast of compressed air, the valve pops out approximately 3mm. The valve then retracts back to its original position through spring loading.

The PACS<sup>®</sup> nozzles use up approximately 15 SCFM of air at 6 to 8 Bar for 0.5 seconds per firing. The system controls are designed to suit customer requirements, from stand-alone to fully integrated systems controlled by the customers Network PLC



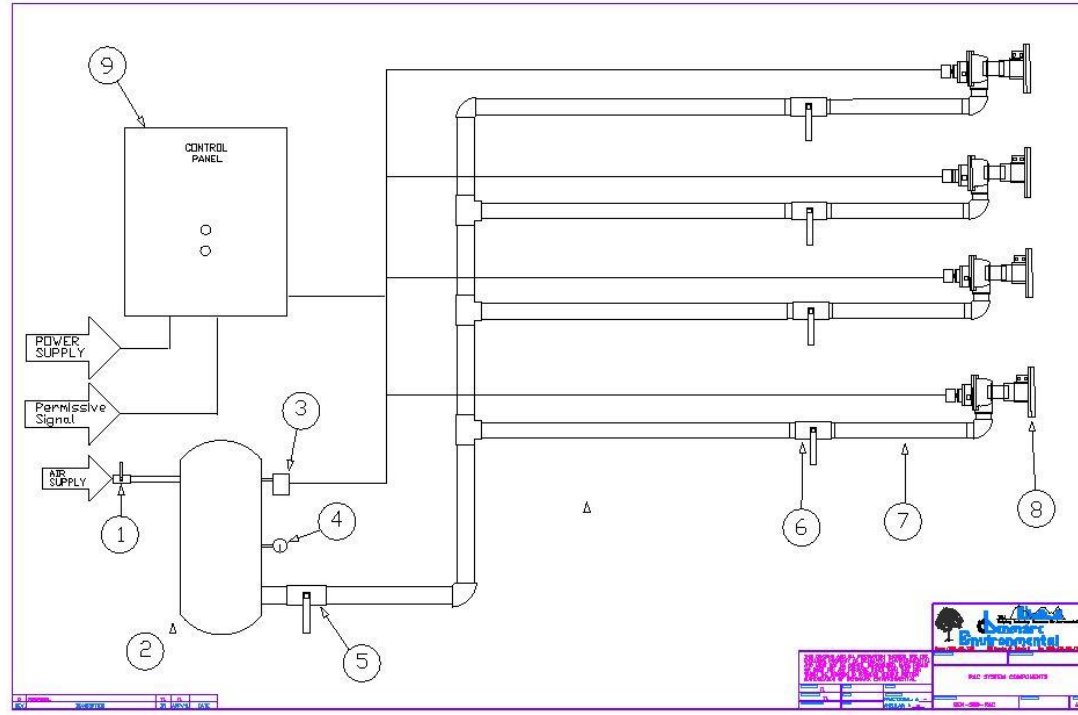
Benmarc's PAC Nozzle



## 3. Installation

The drawing below shows the major components of a PAC system. It does not show a air compressor which is mandatory for a PAC system. Benmarc can size and provide the air compressor system as well as the PAC system.

The Major components are: 1) air supply shut off/isolation valve 2) air reservoir tank 3) air pressure switch 4) air pressure gauge 5) Isolation valve 6) nozzle isolation valve 7) high pressure flex hose 8) PAC nozzle 9) control timer panel



***Not all nozzles fire at same time they fire in a timed sequence reducing the overall air used so many nozzles can be used in a single system***



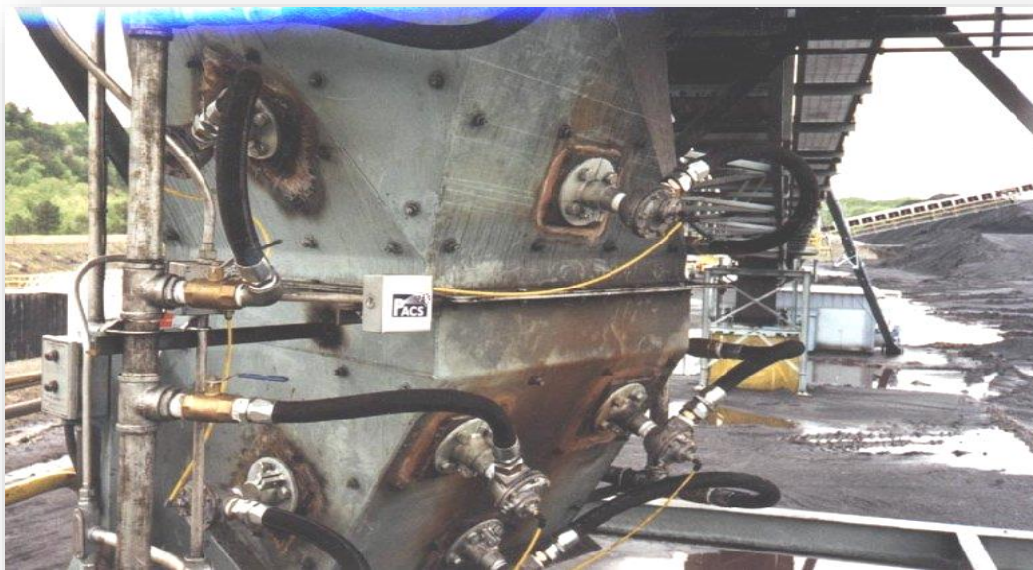


## 4. Advantages of Using PACs- Budget and Cost Savings

Installation and use of a properly installed and operated PACS® system will reduce the amount of normal operator attention and eliminate production costs due to handling of sticky material. Manpower presently utilized for keeping these chutes unplugged can also be directed to other productive tasks. The magnitude of savings in this area is dependent upon wage structures and total hours eliminated. The occurrence of previous production losses will also be eliminated which will result in considerable cost savings.

### Case Study New Vaal Coal

Large amounts of fine, wet devolatallised coal and sludge are treated through New Vaal plant. This leads to blockages and build-ups within chutes causing major production losses. Throughout New Vaal's history, both laboratory scale and extensive field testing has been done to overcome this problem. No practical solution was found until Benmarc's PAC's.



***New Vaal Stockyard Transfer Point***

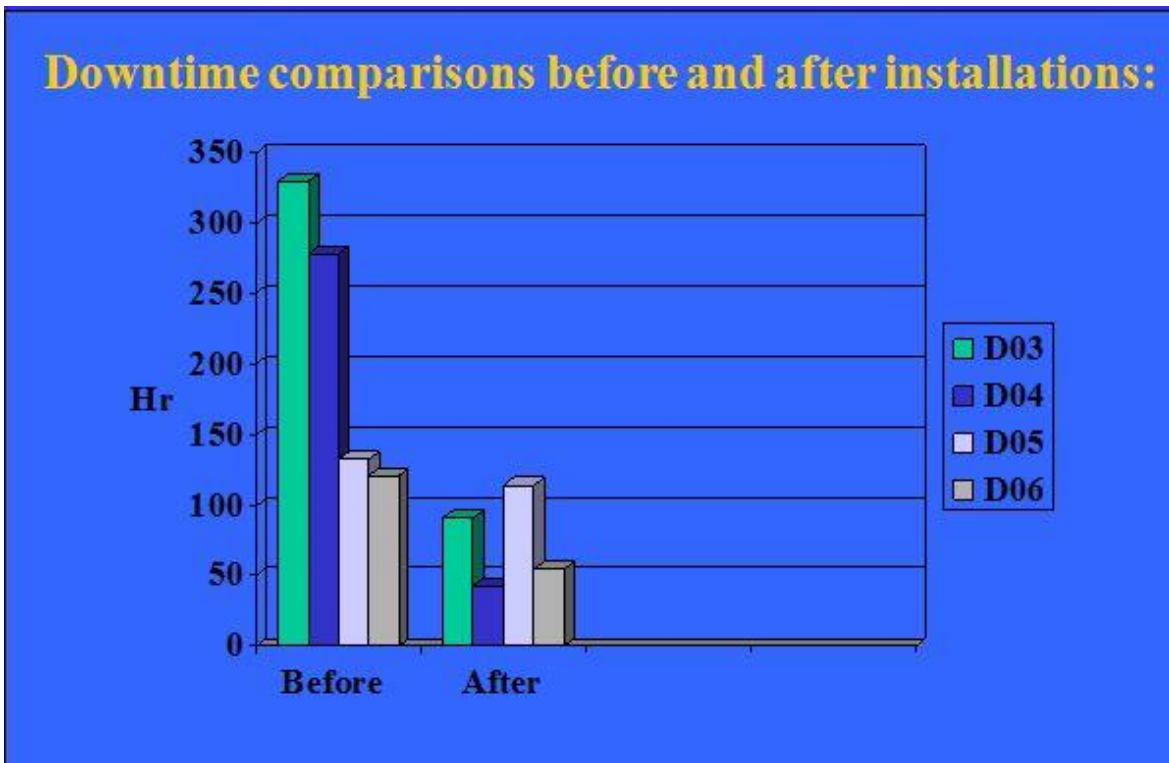




Blaster compressed air canons from Vac Air were tested in D04 underpan in 1993. This was abandoned due to poor service from the suppliers as well as the ineffectiveness of the unit.

Other investigations included chute liner materials, Linatex “socks”, surfactants and chute modifications with poor results.

The first PACS were installed on D03 underpan in October 1999 followed by D04, D05 & D06 underpans in March 2000. And the benefits were seen right away.



*No more plugged chutes means better production number*





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**Systems have been installed by:**

**Anglo  
Ispat  
Mittel  
Dubswana**

**Contact Us for More Information**

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***Mining Charter Compliant & BBBEE Level 2***