

# Flow electronics

LEADERS IN DIAMOND RECOVERY TECHNOLOGY

ESTABLISHED IN 1971

## **FLOW SORT™ X-RAY DIAMOND RECOVERY MACHINES**



### **XR 400 DW**

**OVER 620 SORTERS SOLD WORLD WIDE**



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## TECHNICAL SPECIFICATIONS

### XR 400 DW

### X-RAY DIAMOND RECOVERY MACHINE

#### GENERAL

FLOW X-ray diamond recovery machines are based on X-ray induced luminescence of diamonds. Although this basic principle goes back to the 1930s and became popular in South Africa in the early 70s FLOW has pioneered and introduced much advancement in this technology.

FLOW SORT 'XR' diamond recovery machines are designed to sort WET or DRY diamondiferous material, under virtually any conditions. Model XR400DW is the latest addition to the FLOW SORT sorting machine stable.

All FLOW SORT models are equally suitable for 'fixed' installations as for 'mobile' plants, be it on terra firma or on board a 'marine' diamond-mining vessel.

Since the launch of FLOW'S "XR" sorter range in 1993, FLOW has sold over 600 units to diamond miners and diggers all over the world.

It is our sorter's robustness, reliability, high recovery efficiency, easy operation and low maintenance, as well as our uncompromising after-sales service that earned our products acceptance in the market place.

Today's 3<sup>rd</sup> generation of our XR and TSXR sorter models incorporate features such as a fully automatic calibration system with long term sorting parameter stability control (ACSS).

An optical scanning system specifically designed for the recovery of low luminescent diamonds is a standard feature on the XR 400 DW.

#### FLOW SORT MODEL & CONFIGURATION

The XR 400 DW sorter is available as a standard (STD) as well as a marine (SEA) model. In its basic configuration this machine is set up as a primary sorting machine with a 400 mm wide feed channel which is divided into 16 optical diamond detection channels. Material flow is automatically limited to a single layer. 'DW' indicates that these machines can sort either dry or wet material.

#### ELECTRIC SUPPLY SPECIFICATION:

**380 Volt (+/- 10%), 50 Hz, 3 Phase + Neutral, + Earth. Power consumption approx. 3kVA.**

Other Electrical Supply Specifications can be accommodated on request.

Flow Sort lightning and surge protection units, as well as phase failure detection, and voltage stabilizer units, available as optional extra, are specifically designed for FLOW SORT™ products.

#### WATER SUPPLY SPECIFICATION:

<b>QUALITY:</b>	Water supply must be filtered through a 100 Micron filter.
<b>PRESSURE:</b>	Recommended water supply pressure is 600kPa. (minimum of 400kPa and maximum 800kPa)
<b>TEMPERATURE:</b>	Minimum: +2.5°C                      Maximum: +30°C
<b>CONSUMPTION:</b>	Typically 80 liters / min.

Note that feed water consumption (flow rate) largely depends on feed-rate, material size and type of material to be sorted (from 60 l/min to 160 l/min)



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### **OPERATING TEMPERATURE RANGE:**

<b>SORTER:</b>	MIN: +2.5°C	MAX: +45°C
	RELATIVE HUMIDITY:	95% non-condensing
<b>CONTROL PANEL:</b>	MIN: -5°C	MAX: +45°C
	RELATIVE HUMIDITY:	95% non-condensing

SORTER INSTALLATION PLATFORMS SHOULD BE ISOLATED FROM HEAVY VIBRATING MACHINERY SUCH AS SIZING-SCREENS, CRUSHERS ETC.

### **FEED MATERIAL SPECIFICATIONS:**

<b>Minimum SIZE</b>	Recommended minimum is <b>10 mm</b> .
<b>Maximum SIZE</b>	Recommended maximum is <b>60 mm</b> . ( <b>Absolute max particle size is 75 mm</b> )

### **PARTICLE SIZE RATIO 3:1**

NOTE FLOW SORT OFFERS A PROFESSIONAL CONSULTING SERVICE TO ADVISE ON OPTIMAL SIZE SPLITS FOR SPECIFIC APPLICATIONS.

FEED MATERIAL PRESENTED TO THE SORTERS MAY BE WET OR DRY. IT IS HOWEVER IMPORTANT THAT THE MATERIAL IS 'CLEAN' i.e. FREE OF CLAY, SLIME, VEGETATION OR OTHER FOREIGN OBJECTS.

IT IS ALSO OF IMPORTANCE THAT THE MATERIAL TO BE SORTED IS APPROPRIATELY SIZED AND FREE OF UNDERSIZED AS WELL AS OVERSIZED MATERIAL.

### **FLOW SORT CONCENTRATE BINS:**

AS AN OPTIONAL EXTRA FLOW SORT SUPPLIES SPECIAL HIGH SECURITY CONCENTRATE BINS THAT FIT DIRECTLY ONTO THE SORTERS CONCENTRATE OUTLETS.

For details refer to the specific FLOW CONCENTRATE BIN BROCHURE / SPECIFICATION.

### **FEED RATE SPECIFICATIONS**

Sorter feed rate 'FR' (kg/hr) is computed by using the following approximations:

$$\text{FR (kg/h)} = \text{SC} \times \text{d (mm)} \times \text{SF} \times \text{s.g.}$$

**d** = AVERAGE PARTICLE DIAMETER (IN A GIVEN SIZE FRACTION) in **mm**

**SC** = "SORTER CONSTANT" This value varies with sorter configuration and application (for model XR400DW from 200 to 400). For primary recovery application this value is typically 300

**SF** = 'SHAPE FACTOR' = the particle volume expressed as a portion of the volume of a sphere with diameter 'd'. (A particle with 60% of volume of a sphere of diameter 'd' results in a 'SHAPE FACTOR' = 0.6)

**s.g.** = AVERAGE SPECIFIC GRAVITY OF FEED MATERIAL (g/cm<sup>3</sup>)

<b>FEED RATE (kg/hr) for XR 400</b> machine with SC=300 sorting 'NORMAL' shaped material ( <b>SF ± 0.6</b> ) with <b>s.g. ± 2.7</b> . is approx equal to <b>FR ≈ 500 x d</b>
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## **YIELD:**

The sorters produce concentrate equivalent to approx.:  $24 \times \text{FR} \times 10^{-6}$  per ejection (0.0024% of FR)

## **RECOVERY EFFICIENCY:**

Diamond recovery efficiency is influenced by many factors such as feed rate, feed material particle size ratio, feed material temperature, feed material contamination with fines and dirt, and so on.

Diamond detectability based on x-ray luminescence, varies with a diamond's colour, impurities, level of transparency, its nitrogen content etc.

**FLOW SORT has developed technology that is capable of detecting the most faintly luminescent diamonds under the most difficult of circumstances!**

In practice, based on over 600 FLOW SORT machines operating around the world, we are proud to say, that we have never encountered a case where actual diamond recovery efficiency of a properly set-up and maintained FLOW SORT was below 98 % (percentage calculated by number)! Recovery efficiency figures run very close to 100 %, when based on diamond value rather than number.

**FLOW SORT OFFERS A DIAMOND LUMINESCENCE EVALUATION SERVICE, GEARED TO DETERMINE EXACTLY WHAT RECOVERY EFFICIENCY CAN BE EXPECTED IN SPECIFIC SORTER APPLICATIONS.**

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DESIGN AND MANUFACTURE  
**Flow sort**<sup>TM</sup>  
X-RAY DIAMOND RECOVERY EQUIPMENT