

Flow electronics

LEADERS IN DIAMOND RECOVERY TECHNOLOGY

ESTABLISHED IN 1971

FLOW SORT™ DIAMOND X-ray Media Separators



XMS Bulk Sorters

an alternative to DMS

FLOW SORT X-ray Media Separators (SA Pat. Appl. 2004/6706), an alternative to

Dense Media Separators in Diamond Recovery Plants

HERE ARE SOME OF THE FEATURES OF THIS NEW SORTER CONCEPT:

- XMS configurations are flexible, they come as:
 - Single channel (XMS 1/?), Two channel (XMS 2/?), or Three channel (XMS 3/?)
- Each channel can be configured as single pass (XMS ?/1) or dual pass (XMS ?/2)
- Sorting channels can be added, removed and re-configured as called for by changing operational requirements.
- The material flow to each channel is controlled by individual vibrating feeders, all fitted with automatic feed rate control gates.
- Each channel has its own dedicated X-ray source. In each XMS stage feed particles are exposed for over ½ a second to X-ray radiation, an important factor when it comes to recovering diamonds with a slow luminescence rise time!
- Each feed channel is divided into 16 (sixteen) optic channels, being scanned every thousands of a second means that even the smallest diamond is viewed at least 3 times! A fully fitted XMS 3/2 consists of 96 individual optic channels yet only uses 12 Photo Multiplier tubes. (Reducing operating costs!)
- Individual sorter feed channels, depending on application, are either serviced by 4 of FLOW'S standard electro-mechanical ejectors or by 16 (sixteen) of our newly developed high precision "water-ejectors" (Pat Pending). Our water ejectors produce about 35% concentrate of standard ejectors
 - Note that the design of our water-ejectors allows for retrofitting any FLOW SORT XR or TSXR model that has been fitted with a scanning optics system.
- Each XMS feed channel provides for typically 2½ times the feed capacity of a standard FLOW SORT XR / TSXR model. XMS can sort different size fractions simultaneously!
- FLOW SORT XMS are designed to sort material size ranges from [+0.5mm -1.0mm] up to [+40mm -75mm.]
- All channels are fitted with a fully automatic diamond tracer dispensers / collection system. Recovered tracers are automatically counted and collected, no operator involvement required.
- A total material re-mix between sorting stages eliminates diamond "masking" at high feed-rates.
- XMS are fitted with electronic diamond simulators providing an "absolute" diamond luminescence reference level, essential for precision optics sensitivity calibration.
- XMS come with a new, improved feed water transport system which allows for substantially higher material throughputs in the -5.0mm "fines" size fractions.
- XMS use FLOW'S OPTIC SCANNING SYSTEM (SA Pat. Appl. 2011/07547) designed to view luminescent particles individually and close up. The elimination of lead glass filters has further improved diamond detection sensitivity.
- FLOW'S XMS are fitted with an internal IR camera surveillance system that allows **real time**, observation of feed material and sorter operation.
 - Maintenance down time is reduced by easy access to all sorter wear parts. A maintenance technician can simply "walk into" the sorter and change / service the relevant part(s)! For example: Changing a complete feed slide takes approx. 20 minutes, replacing an ejector takes less than 10 minutes
- **Should a sorter develop a fault, the effected sorter section / component can be isolated and / or shut-down whilst the remainder of the sorter continues with normal operation until it is convenient to shut down the sorter for maintenance.**
- XMS access level are split into several levels, for operating, maintaining as well as sorter-parameter set-up / and adjustments etc. Security and Safety levels are strictly controlled by means of **fingerprint readers** and **special access keys**.
 - Note that all activities are automatically recorded for further reference.
- **Radiation safety is of the highest standard.** Three (3) totally independently operating interlock circuits (200% redundancy) ensure that no accidental access to irradiated zones within the sorter is possible.
 - There is **NO measurable X-ray radiation leakage** to the sorters operating section or the outside of the XMS container
- XMS are PLC based controlled. Operator interface is provided via finger-print readers, which open dedicated touch screen menus.
- FLOW'S XMS, with control panel, comes fitted into a standard 20 foot shipping container making for convenient transportation and installation.

TECHNICAL SPECIFICATIONS:

ELECTRIC SUPPLY:

220 Volt (+/- 10%), 50 Hz, Single Phase. Power consumption varies between 4.5kVA and 7kVA depending on sorter configuration. Other supply voltages and frequencies on request.

WATER SUPPLY:

QUALITY: The water supply to the sorter must be filtered through a 250 Micron filter (or smaller).
PRESSURE: +400kPa and -800kPa.
TEMPERATURE: min: +2.5°C max: +30°C
VOLUME: Between 50 and 300 liters / min depending on feed rate and material size and type.

OPERATING TEMPERATURE:

SORTER and C/P: min: +2.5° max: +45°C (air conditioning is optional)
Relative Humidity: 95% non-condensing

FEED MATERIAL SPECIFICATIONS:

Min SIZE: **There is no minimum size limit!** Recommended minimum is **1.5mm**.
Max SIZE: Recommended maximum is **65mm**. **Absolute maximum is 75mm**.
Particles exceeding 75mm in any dimension may cause blockages!

PARTICLE SIZE RATIO:

For maximum recovery efficiency we recommend a size ratio of 2:1 for material below 3mm and up to 3:1 for material above 3mm.

IN GENERAL IT IS IMPORTANT THAT SORTER FEED MATERIAL IS APPROPRIATELY SIZED, FREE OF UNDERSIZED AND OVERSIZED MATERIAL. FEED MATERIAL MAY BE WET OR DRY. IT IS IMPORTANT THAT FEED MATERIAL IS "CLEAN" i.e. FREE OF CLAY, SLIME, VEGETATION AND OTHER "FOREIGN" OBJECTS.

FEED RATE:

An XMS feed rate limits depends on many factors, the most important ones being:

- Average feed particle size, Material size range, average specific gravity of the feed material
- The typical shape of feed particles (flat, round, flitches etc)
- Concentration of luminescent material in sorter feed

Refer to the feed rate graph at the back page, typical for an XMS treating alluvial pre-DMS material (s.g. = 2.0)

YIELD:

Yield changes with the size and type of material sorted. As a guide line we can quote that each ejection generates concentrate (in grams) equivalent to approx. 2 x FEED RATE (in tons /hour) i.e.: an ejection of a sorter running at 50 t/hr will produce approx. 100g of concentrate

DIAMOND RECOVERY EFFICIENCY:

Statistics obtained over the past 20 years from over 600 of FLOW SORT machines operating around the world, sorting many different types of diamondiferous materials, show that diamond recovery efficiency, based on number of diamonds is well above 98%. And most importantly, "diamond-by-value" recovery efficiency of FLOW SORT machines has **proven** to be very close to 100% indeed!

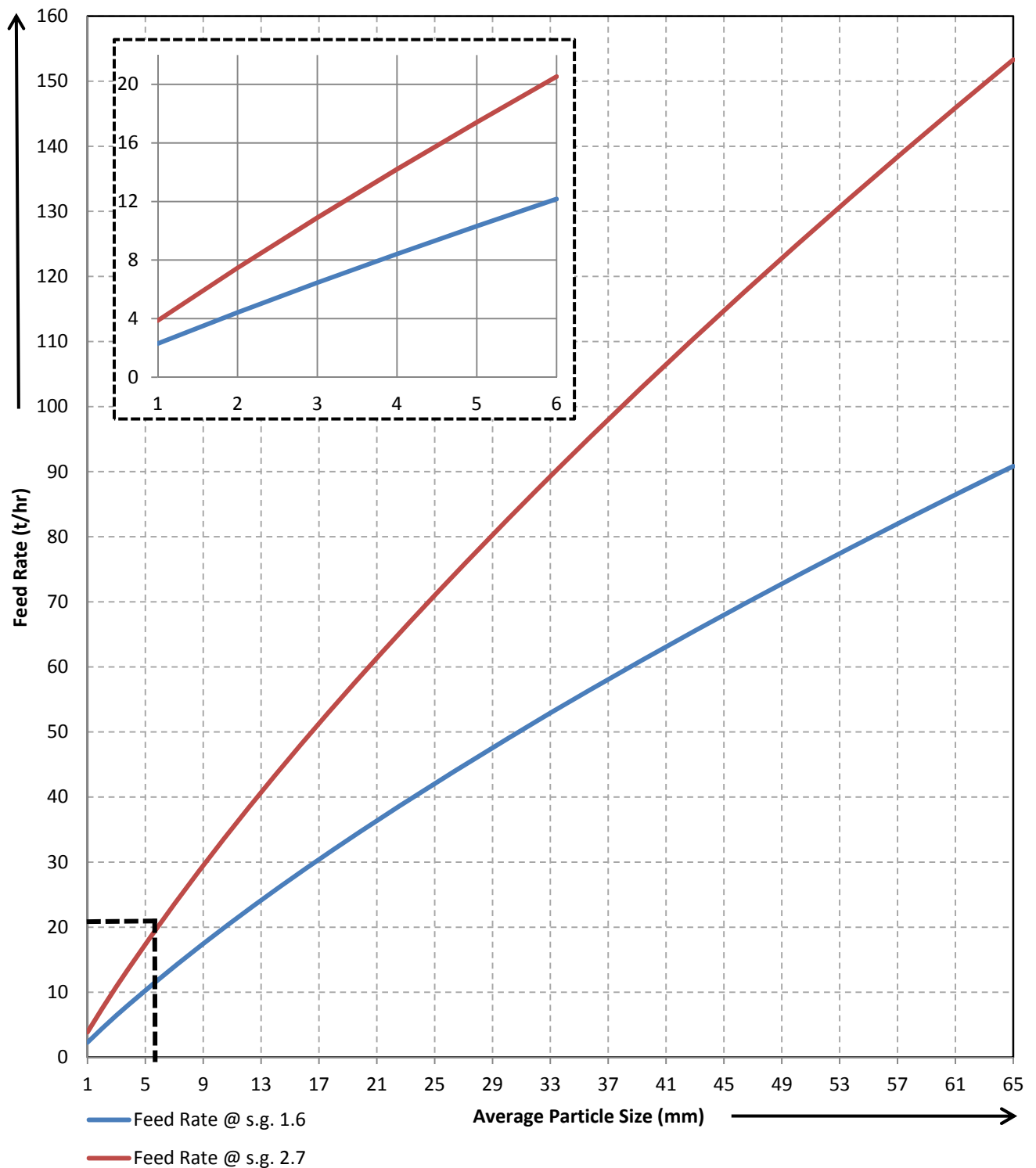
OPERATING COST:

XMS operating cost do vary substantially with feed-rate, size and type of material to be sorted. ZAR 5.60 / ton sorted can be used as a general guide line. This includes all sorter maintenance costs (labour & parts) as well as operating costs but excludes the cost of operating personnel.

DIMENSIONS AND WEIGHT

XMS comes in a standard 20 Foot shipping container. (6m x 2.5m x 2.6m)
Weight of the XMS-3/2 is approximately 7.5tons

Typical XMS-3 Feed Rate Graph



FLOW ELECTRONICS (PTY) LTD

No 4 Engwena Road, Sebenza, Edenvale,
1609, Johannesburg, South Africa
P O Box 366, Edenvale,
1610, South Africa

Tel: +27 11 452 6006 / +27 11 452 6816
Fax: +27 11 609 4951
E-mail: info@flow.co.za

www.flow.co.za