



case study



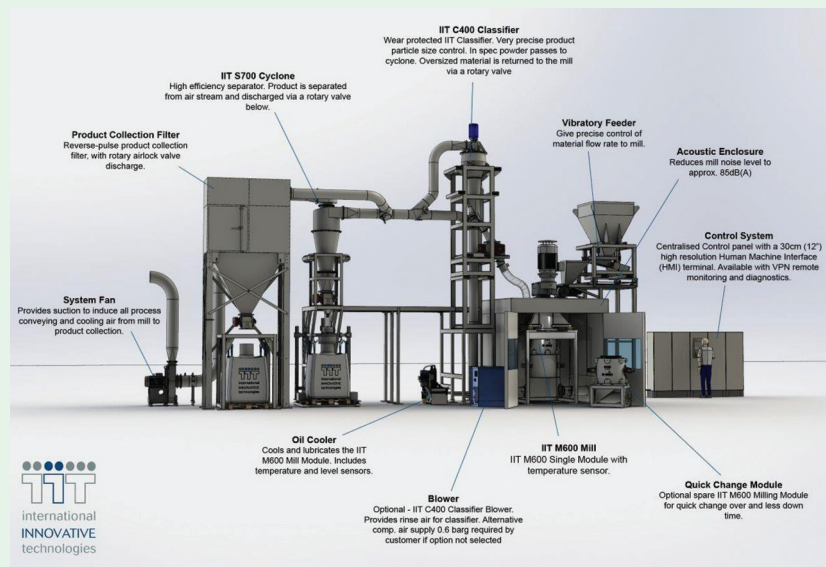
Halifax Mercury design perfect for abrasive application on innovative powder mill

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Time was, powder milling was an energy intensive process, involving traditional ball, hammer and impact mills and crushers. Today, IIT Ltd (International Innovative Technologies) based in a state-of-the-art facility in Gateshead, have developed a range of powder mills and classifiers that provide high performance but with a much reduced specific energy requirement.

They offer milling technology in areas where previously milling was less economic. Such scrap materials as GRP off-cuts, glass cullet, fly ash and many more can now be economically milled to an accurately defined powder. For instance, recycled glass can be milled, cost effectively, down to sub 75 micron powders, for use in foam glass production or as a fluxing agent in brick manufacture as well as coarser specifications for recycled inclusion in new container glass production. The use of milled and classified fly ash in the production of advanced ceramics has also led to orders for IIT's technology.

IIT's m-series® mills are of a unique design with a Non-Captive Bed roller/ring system, differentiating them from typical roller mills where the material is held captive in the milling zone until ground finely enough. In the IIT m-series® mills,



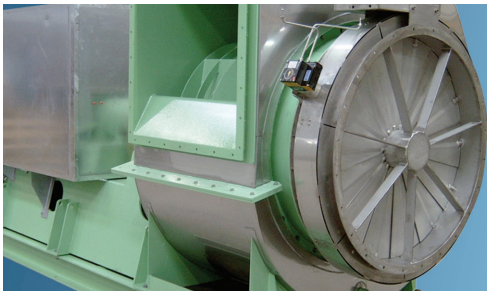
Typical high performance powder mill and classifier set-up

the residence time in the milling zone is less than a second, contributing to the very low specific energy requirement and low wear rates.

The mills employ gravitational and centrifugal forces whereby a top mounted electric geared-motor unit drives a vertical shaft at up to 500 rpm, within a grinding chamber lined with high chrome steel. In the chamber, is a rotor onto which are mounted six high-chrome steel rollers linked to swinging arms. As the shaft rotates, centrifugal force causes the rollers to move outwards, bringing them into contact with the inner face of the grinding ring, in turn causing them to rotate. The raw material is fed in from above and the spreader plate throws it outwards to be ground between the rollers and the ring. There the high centrifugal force is transmitted in a split second

to the particles which are immediately discharged vertically down. Many of these materials, such as silicon carbide, aluminium oxide and bauxite are highly abrasive, hence the need for high chrome steel components in the grinding section. By varying the speed of the rotation of the central shaft, the centrifugal force is varied which regulates the milled particle size distribution. The milled material is then either collected below the mill, screened – for coarse particle size distribution (PSD) – or air conveyed to the IIT c-series® turbo air classifier, from where the rejected oversize particles are fed back by gravity to the mill.

“Powder processing systems inevitably work under suction so the system air fan is a crucial



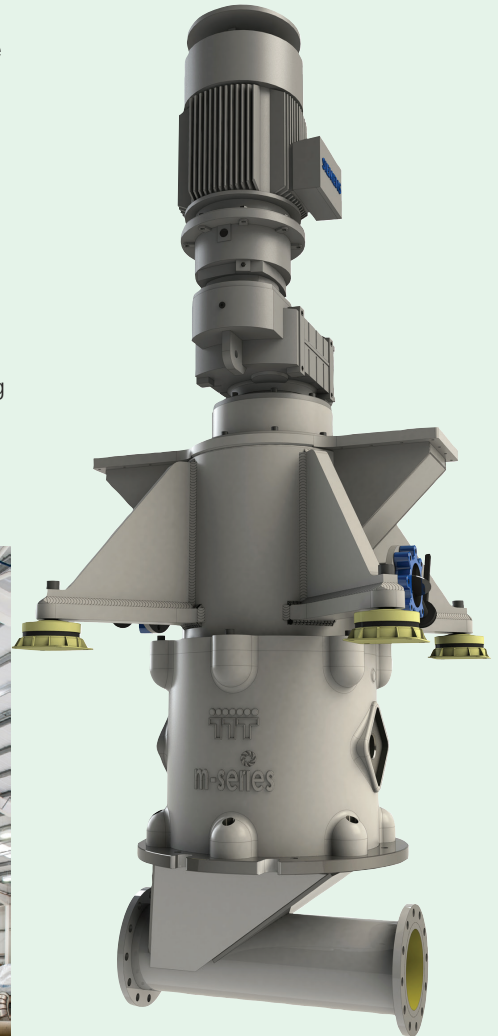
element of the peripheral equipment. The accuracy of the air classifier's performance to give a consistent product PSD depends highly on the stability of the chosen fan and is key to our customer's Product Quality Assurance." explained George Milburn, Applications Manager at IIT "and IIT has shown great trust in Halifax Fan for their system air stability".

Though based upon Halifax's Mercury range, the fans are custom designed for this application and are powered typically by 22kW 2-pole motors. They develop 11,000 Pa suction at 4000m³/h air flow and are fitted with anti-vibration mounts and flexible connections. Some powders may even be potentially explosive and come within the ATEX classifications so the choice of fan is critical to long-term efficiency and reliability.

IIT has an order for 4 mills for Shandong, China, where they will be employed to mill power-station fly ash as well as other mineral constituents for use in ceramic tile manufacture. From their factory in Shenzhen, Halifax was able to work with both end user V-Tong in China and IIT in the UK, to develop the fan specification and to supply the specified fan components, direct to site in China, to the identical specification as those produced and supplied in the UK as well as offering rapid on-site service and commissioning as required.

Application benefits

- Custom designed to meet the application need for high air stability
- Built in China to full UK specification, for use in China – lower cost solution.
- Full on-site installation and commissioning service available
- Designed for medium particulate loading in an abrasive environment
- High efficiency design for lowest operating costs



Above: IIT M series M600 Mill.

Left: Halifax Mercury based small volume, higher pressure classifier fan with anti-vibration mounting.

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