DERRICK®
EQUIPMENT COMPANY

DE-1000™ VFD™ Smart Centrifuge

Part of the Derrick DE-1000™ Centrifuge Series

A totally new concept in centrifuge operation and control

SYSTEM CHARACTERISTICS

CENTRIFUGE

Bowl size:	14” (356 mm) Diameter
Bowl type:	Contour cylinder
Conveyor:	Helical (Radial/ Axial)
Effluent ports:	Variable – Eccentric
Differential conveyor speed:	1-100 RPM Bowl
Speed range:	0-4000 RPM Maximum G’s: 3180
Sigma (Σ) maximum:	4.34 x 10^6 in^2 (2800 m^2)
Electrical:	
Bowl Drive:	50 Horsepower (37 kw) 480V
Conveyor Drive:	10 Horsepower (7.5 kw) 480V
Pump Drive:	15 Horsepower (11 kw) 480V
Scroll:	
System:	Counter-current
Lead direction:	Left
Related movement to bowl:	Lagging

PUMP

Type:	Positive displacement progressing cavity
Capacity:	14 - 200 GPM

ADVANTAGES

- Suitable for use in Class 1, Division 1, Group “D” areas.
- Control system capable of both local and remote control.
- Critical temperature and vibration points continuously monitored – allows for planned maintenance.
- Bowl/scroll drive and control systems built onto skid.
- Higher throughput/efficiency with direct feed pump control.
- Automatic cleaning cycle initiated during routine shutdown.
- Higher operating torque capacity.
- Direct RPM and torque readouts for bowl and conveyor drive motors.
- Direct GPM readout for positive displacement feed pump.
- Troubleshooting and maintenance time significantly reduced with online help screens.
- Integrated pump, complete with a fixed ratio gearbox and variable speed motor.
- Investment cast stellite #12 wear inserts, case plows and feed accelerator
- Reversible conveyor feed nozzles with replaceable tungsten carbide liners
- Conveyor tiles with 93.3 “A” Rockwell scale average hardness installed over the **full length** of the conveyor

OPTIONS LISTS

- Conveyor Type: Radial flow or Axial flow.
- Conveyor Wear Surfaces: Tungsten carbide tiles or hard surface alloy.
- Automatic control of fresh water into feed line for slurry dilution or cleanout during shutdown.
- Optional feed cleaning line/dilution line control.
- Available without enclosure purge system for use in non-hazardous areas.
- Electrical Configurations: 380/460 VAC – 50/60 Hz.

The individual components of the DE-1000 are dynamically balanced to exceed the ISO 1940 balance quality grade of G-1.0. The total assembly easily exceeds the G-2.5 quality standard.

Rugged PC can be operated locally or remotely via Local Area Network (LAN) or analog phone line.

Stainless steel bowl and cover are extremely durable and easy to clean and maintain.

Replaceable wear inserts and case plows, designed to protect your investment, are matched for simple field replacement.

The adjustable effluent ports provide for fast precise pond depth configuration.

Radial flow conveyor (top) and Axial flow conveyor (bottom) provide different levels of agitation in removing solids.

DE-1000™ VFD™ SMART CENTRIFUGE

PART OF THE DE-1000™ SERIES

The Derrick DE-1000™ VFD™ (Variable Frequency Drive) brings a totally new concept in centrifuge operation and control to the market place. The centrifuge offers the ultimate flexibility in system control enabling it to handle a wide range of feed slurries. Automatic load sensing and feed pump control enable automated performance optimization. The bowl assembly can be operated between 0 and 4000 RPM, which can result in an internal centrifugal acceleration of more than 3000 G's. To accommodate low levels of agitation and rapid solids removal, the conveyor is capable of differential speeds from 1 to 100 RPM.

The DE-1000 VFD is mounted on a rugged, portable skid that includes a two point effluent discharge for easy setup. All rotating assembly components are manufactured from corrosion resistant 316 grade and high strength stainless steel alloy materials. Liquid and solid bowl heads are machined from forgings while the bowl and conveyor hubs are constructed from centrifugally cast stock. The drive system consists of two explosion-proof inverter duty motors. The first is a 50 HP motor which is directly connected to the bowl through a 1.4:1 pulley ratio. The second consists of a 10 HP motor which is connected to the conveyor gearbox input pinion shaft.

Each motor is powered by a high performance Pulse Width Modulated (PWM) AC drive with Insulated Gate Bipolar Transistor (IGBT) outputs. In turn, each of the motor drives and other peripheral devices are controlled by an environmentally hardened IBM compatible Pentium PC. The PC and all devices communicate through a high-speed, machine level control network.

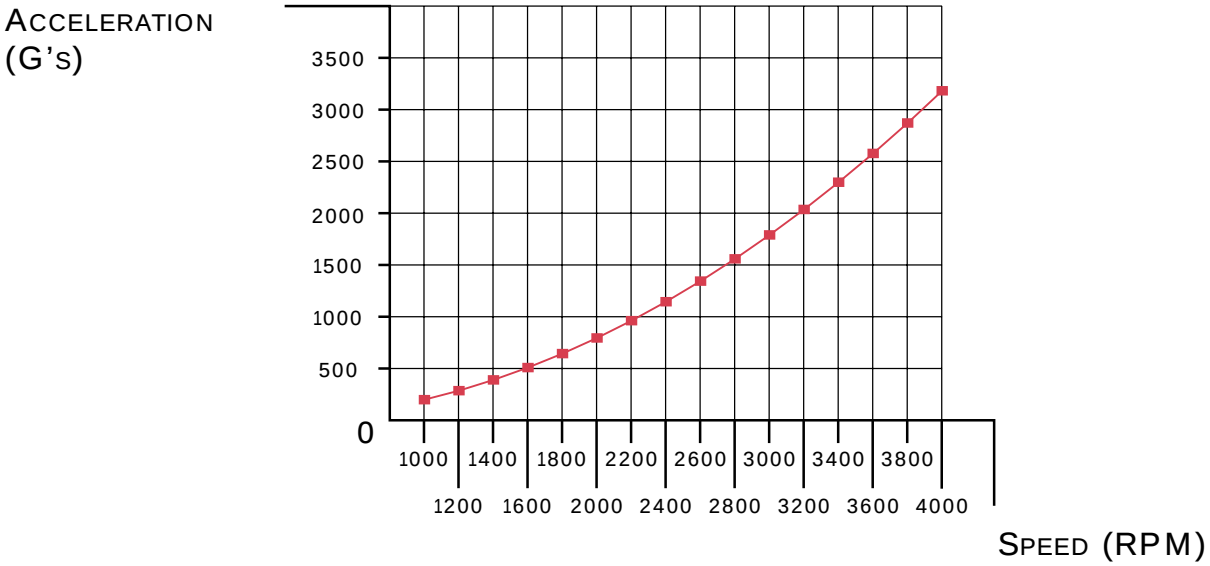
PC control offers unlimited operating flexibility while allowing long term data storage so that critical parameters can be logged into historical trends. In addition, remote monitoring and control of the centrifuge can be accomplished from an adjacent control room or from thousands of miles away. Various configurations are possible, regarding security and read/write capability, and a simple telephone line connection to the onboard high-speed modem or Ethernet connection to a Local Area Network (LAN) can provide multiple users "real-time" machine status information. Remote connection capability has proven to be a powerful tool for troubleshooting and correcting suspected malfunctions without going on-site.

The operational methodology of the VFD requires the PC to have complete control over the feed pump through a third AC drive. This enables multiple modes of operation, some being predefined and some being user configurable. Predefined modes consist of typical settings for Solids Removal and Barite Recovery. If these pre-defined settings are not sufficient, custom setups can be saved by the operator and recalled by clicking a single button. Additionally, feed pump control can be automatic or manual. Automatic control, primarily designed for Barite Recovery, maximizes centrifuge throughput by employing a Proportional-Integral-Derivative (PID) loop. This increases feed pump output to the centrifuge until the operator input torque setpoint is reached on either the bowl or the conveyor drive motors. If properties of the feed slurry change, the PID loop will dynamically adjust pump output to maintain the torque setpoint. This enables even less experienced users to safely and effectively operate and monitor this machine.

The PC continuously runs a complete diagnostics program which provides the operator with machine critical status information. Real-time trends of main bearing temperature and vibration levels as well as base vibration and enclosure temperature can be viewed on demand. Messages inform the operator when minimum and maximum bowl, conveyor and pump speeds have been reached. In the event alarms or faults do occur, detailed descriptions pinpoint the cause of the malfunction and enable rapid recovery. Coupled with automatic startup and shutdown routines, the DE-1000 VFD Centrifuge is essentially a machine designed for safe, consistent, unattended operation.

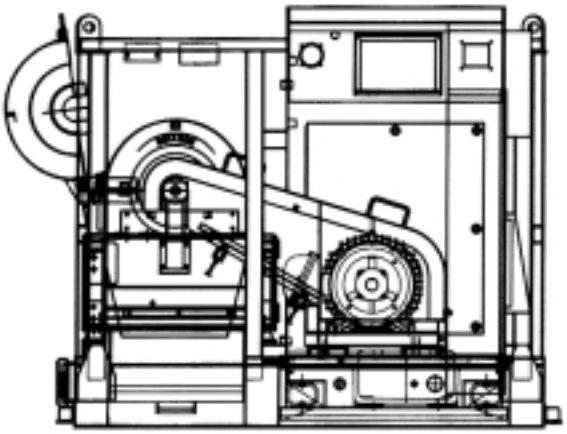
DE-1000™ VFD™ SMART CENTRIFUGE

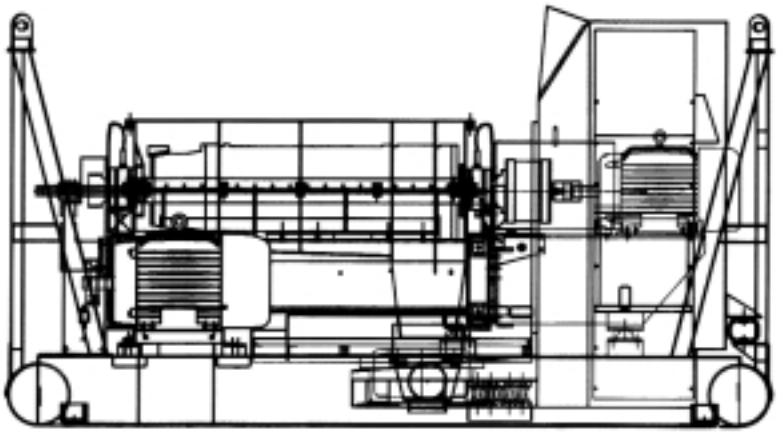
G-Force as a Function of Bowl Speed on a 14” Diameter Bowl



DIMENSIONS

Height:	77 5/8” (1972 mm)	
Width:	80” (2032 mm) – Lid closed	87 11/16” (2227 mm) – Lid open
Feed Height:	40 1/4” (1022 mm)	
Length:	129 7/16” (3287 mm)	
Weight:	9,800 lbs (4449 kg)	





DERRICK® EQUIPMENT COMPANY

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