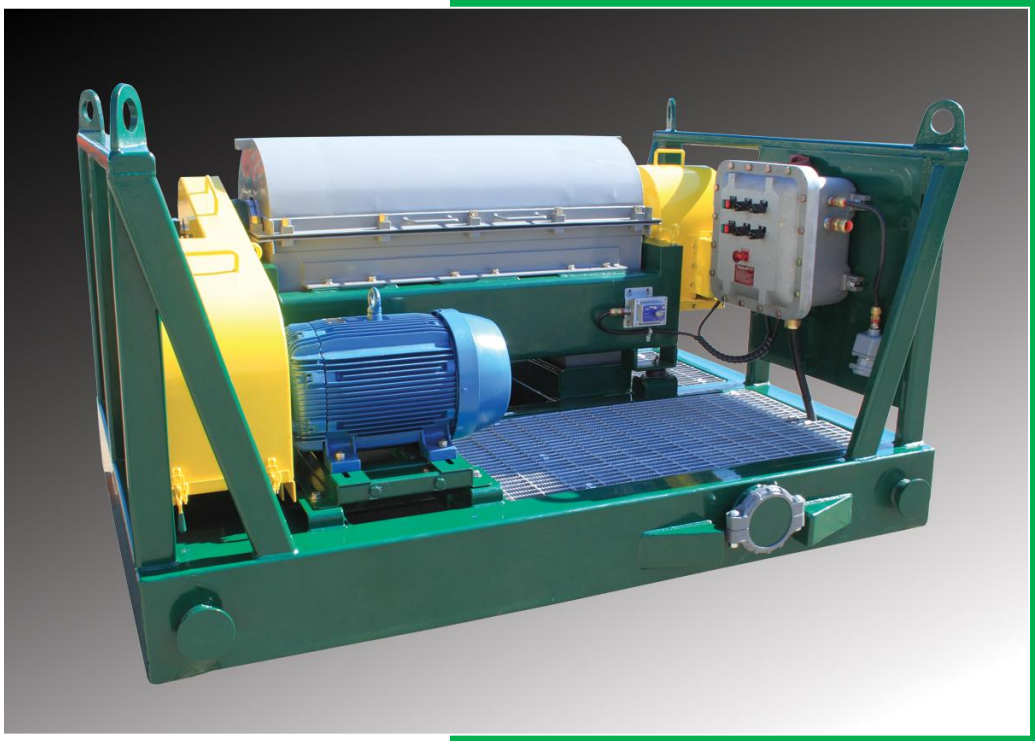
Proposal #5469 – Revision A

BRH-Garver Construction, L.P.
KEMTRON's KT-1448 HD Centrifuge



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Jay Mackey

Regional Business Development

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3/21/2013

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Mr. Ellett,

Thank you for the opportunity to submit our proposal for KEMTRON's Solids Control Equipment. KEMTRON has built a long-standing reputation as a quality provider of solids control and dewatering products. With our recent improvements in both product design and quality control practices, we believe that our products provide the best value available in the today's market.

The following proposal provides a general description of the products you have expressed interest in, the applicable technical specifications, the sales price and the anticipated delivery date.

Please take a moment to review the information included in the attached proposal. If you have any questions, please do not hesitate to contact me directly. KEMTRON is committed to providing the greatest value available for quality solids control and management equipment.

Respectfully,

Jay Mackey
Regional Business Development
713.560.0486

KT-1448 HD Centrifuge General Description

Whether you are working toward maximizing barite recovery or looking to get the most out of your "zero-discharge" closed-loop system, KEMTRON's field proven solids control and dewatering centrifuges are a perfect choice. With over 500 centrifuges installed worldwide, KEMTRON has now added the KT-1448 HD to its portfolio.

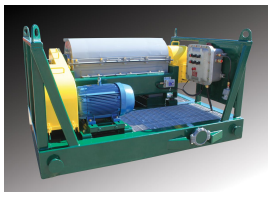
KEMTRON's KT-1448 HD is fitted with a NEMA Premium, continuous duty, energy-efficient, poly-chain driven, 50 hp main drive. All KT-1448 HD explosion proof motors used by KEMTRON are suitable for applications requiring UL or CSA certification for hazardous locations and are specifically designed to meet or exceed all EISA 2007 requirements for energy efficiency.

The 50 hp main drive can operate the centrifuge up to a maximum rotational speed of 3,300 rpm's, therefore generating more than 2,100 G's of force. Using an adjustable motor mount, motor and belt maintenance is made easy by the adjustment of two jack screws. No additional motor mounts, brackets or tensioning devices are required.

Assembled in an "offset field skid" configuration, KEMTRON's KT-1448 requires limited effort to install. Utilizing explosion-proof electrical and controls, the control panel is provided with a convenient "pig-tail" electrical connection.

KEMTRON has also optimized the required footprint and redesigned its lifting system so that the entire assembly may be lifted from either the base lifting mounts or the rated lift eyes.

Not only does the offset main-drive configuration allow direct access to the motor and belts for efficient maintenance, but it also achieves a shorter end-to-end centrifuge length and lower center of gravity, therefore providing a greater level of installation flexibility.

Table 1	KT-1448HD
Equipment Image:	
Maximum G Force:	2,100
Maximum Speed:	3,400 rpm
Capacity:	185 gpm (11.7 lps)
Bowl Construction:	Stainless Steel
Bowl Diameter:	14" (356 mm)
Bowl Length:	48" (1,218 mm)
Gearbox Ratio:	52:1 or 125:1
Skid Dimensions:	102"/2591 mm (L) x 75.6"/1920 mm (W) x 56.7"/1440 mm (H)
Weight:	7,190 lbs (3,261 kgs)

KEMTRON's latest KT-1448HD also incorporated a completely redesigned set of machine guards. Unlike comparable units, KEMTRON's KT-1448HD has tightened all machine guard tolerances therefore ensuring

no incidental contact with rotating or moving parts while in operation. To ensure maximum equipment protection, the KT-1448 is equipped with a factory set vibration switch and torque-arm.

KEMTRON's KT-1448 HD centrifuge uses four, stainless steel, epicentric liquid-end discharge ports. Each port can be rotated to the desired setting therefore allowing the operator to make efficient changes in pool depth by simply loosening the set screws.

After discharge from the liquid-end effluent ports, the fluid is routed to a discharge hopper. The KT-1448 HD discharge hopper is then ported to allow front or rear fluid discharge. Each of the three fluid discharge connections are fitted with 6" (152.4 mm) Victaulic connections.

The KT-1448 HD utilizes a 360 degree discharge port arrangement that ensures smooth directed discharge of the solids. By using four, "wide-mouth", Delchrome Alloy 90 erosion-resistant discharge ports and plows, the KT-1448 HD is capable of handling large volumes of erosive solids without damaging the centrifuge.

KEMTRON's KT-1448 HD stainless steel rotating assembly is 14" in diameter and 48" in length. By using a length over diameter ratio of 4.0, KEMTRON achieves an extremely stable centrifuge. The rotating assembly is given further stability by the use of two SKF™ roller bearings. Both bearings are installed in precision-machined pillow blocks. Equipped with externally accessible grease ports, daily greasing can be performed without the removal of machine guards.

The internal flights are lined with tungsten carbide tiles along their entire length of both the clarification and the tapered section, extending the KT-1448 HD's ability to manage erosive solids.

To protect the upper cover from the radial discharge of solids, a 180 degree radial, protective deflector plate has been incorporated into the upper stainless steel centrifuge lid.

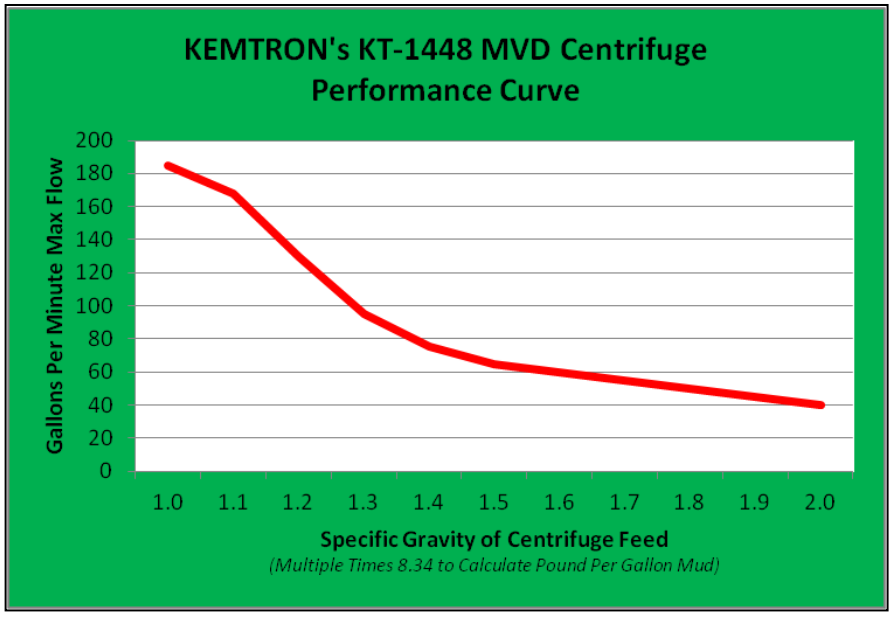
Table 2	Recommended G-Force	Typical Cut Point	Recommended Control System	Recommended Gear Box
Barite Recovery System:	700 to 850	10 microns	DSP MVD	52:1
Solid/Liquid Classifying Unit:	850 to 1,700	2+ microns	DSP MVD or VFD	52:1
Chemically-Enhanced Dewatering:	1,700 to 2,300*	0-2 microns	VFD	125:1

**When using performance dewatering chemicals available from KEMTRON.*

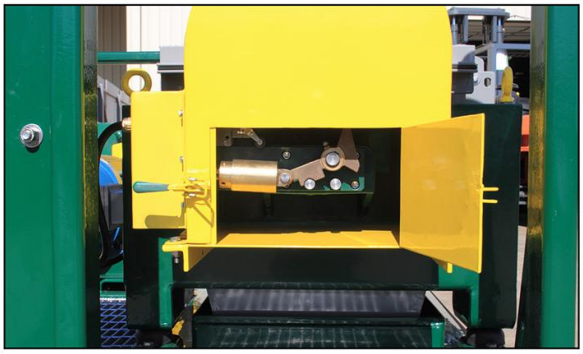
KT-1448 HD Centrifuge Technical Specifications

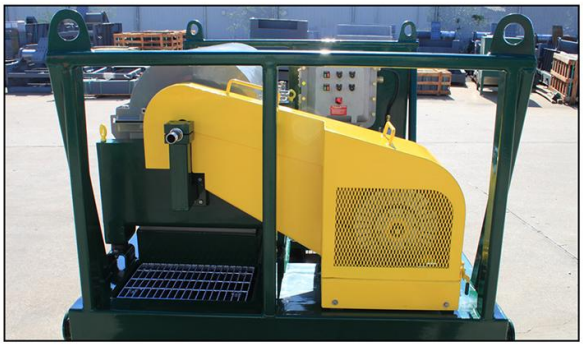
General Performance			
Maximum Hydraulic Flow Rate			**Cut Size**
185 GPM	11.7 lps		5 μ (Without Polymer Addition)

Major Equipment			
Maximum G Force		**Maximum Speed**	
2,100		3,200 rpm	
Bowl Construction		**Bowl Diameter**	
316 Stainless Steel		14”	35.6cm
Gearbox Ratio		**Bowl Length**	
52:1		48”	121.8cm
Skid Dimensions (LxWxH)		**Weight**	
102” x 75” x 58”	2.59m x 1.90m x 1.47m	6,943 lbs	3,150 kgs
Main Motor		**Back Drive**	
50 HP 380v/50hz	3 Phase	N/A	N/A
Base Control System			
Controls included for 50 HP main drive and 7.5 HP PC pump drive. Class 1 Div 1, Div II and Div I Compliant.			



KT-1448 HD PVD Centrifuge Equipment Photos





KT-1448 Centrifuge Selectable Options

VFD Control Panel Option
Stainless steel fan-cooled VFD control cabinet. Local explosion proof junction box is standard.
Air Conditioning
Upgrade fan-cooled system to an 8,000 to 10,000 BTU air conditioned unit for environments with elevated temperatures.
Dual Sheave Poly-Chain
Upgrade the sheave arrangement to a dual-sheave poly-chain capable of achieving two separate speeds without a VFD or the disassembly of the motor and sheaves. Standard dual speeds are set at 1,250 rpm and 3,250 rpm. Other speed configurations are available upon request.
Pump
Progressive Cavity Pump (Shall be Borneman, Nitchze, Monoflo or Equal).
Telescopic Skid
Fully Coated Telescopic Skid Cost. Includes Pins for Manual Height Adjustment. Hydraulically Actuated System is Available Upon Request.

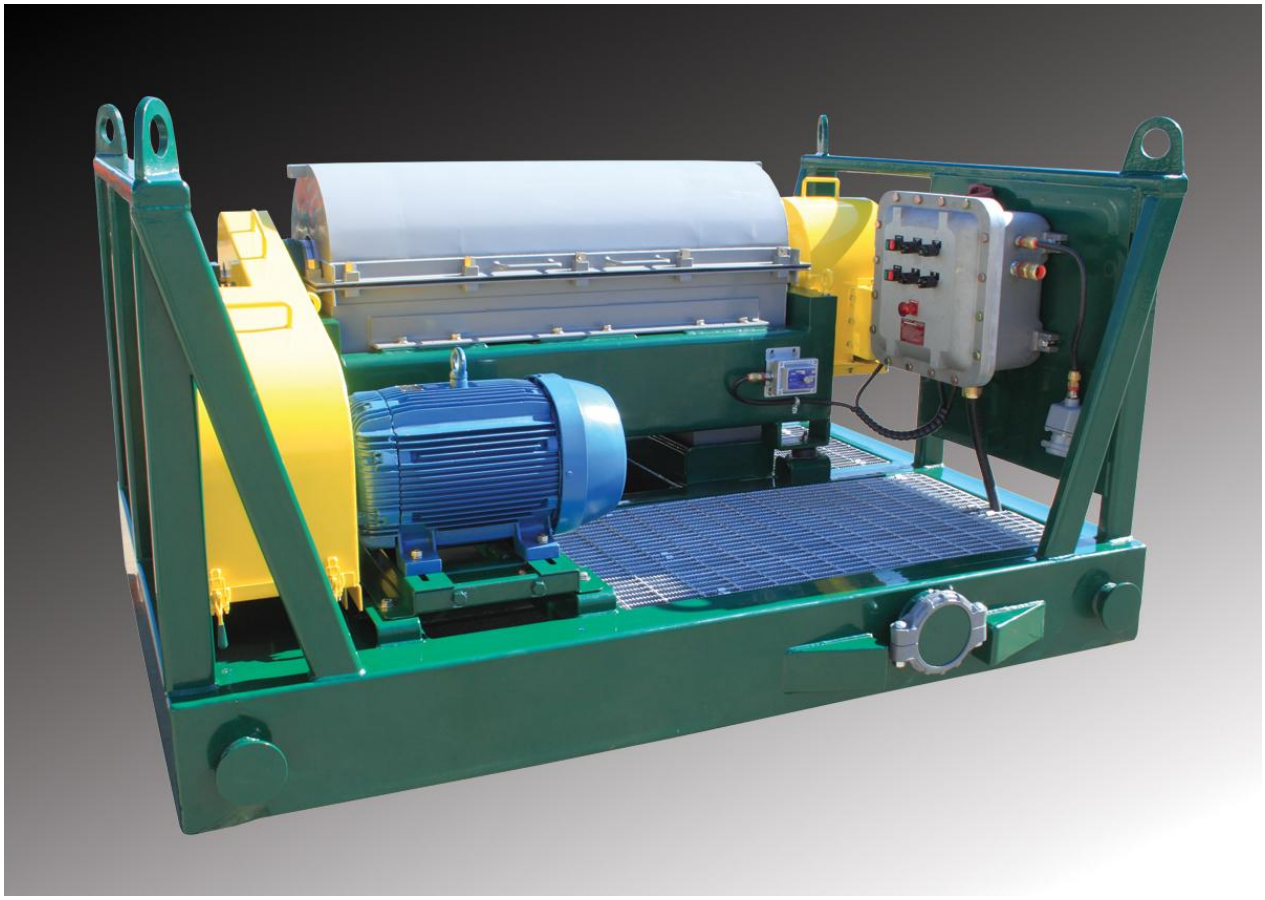
Depending on your budget and performance needs, the KT-1448 HD can be fitted with either a Dual-Sheave Polychain Mechanical Variable Drive ("DSP MVD") or Variable Frequency Drive ("VFD"). In comparison to Variable Frequency Control drives, KEMTRON's new DSP MVD provides a new low-cost, but high flexibility alternative to operators. KEMTRON's DSP MVD allows operators to operate the KT-1448 HD at two different speeds without the complete disassembly of the fluid-end and sheaves, or the cost of the VFD control system. Instead, by simply loosing the jack bolts on the motor mount base-plate, the polychain can be adjusted to the adjacent sheave. As a result KEMTRON's KT-1448 HD centrifuges fitted with a DSP MVD drive can achieve both 1,250 and 3,200 rpms without having two sets of sheaves or belt.

By utilizing an optional carbon fiber poly-chain drive system, no belt retentioning is required after installation is complete. The carbon fiber tensile cords are length-stable and can withstand shock loads that frequently lead to belt failure. The poly-chain's polyurethane body withstands harsh environments and the nylon fabric teeth resist wear. More importantly, KEMTRON's carbon fiber poly chain will not require quarterly replacement and can last years before a new belt is required. The combined savings achieved by eliminating belt tensioned and 75% of the typically required belt replacements (when compared to a standard V belt), will save thousands in annual maintenance expenses.

Another significant advantage relative to the use of poly-chains is the lowered energy consumption. Since the poly-chain operates with a positive tooth/groove engagement, there is no start-up or operational slippage. V-belts typically maintain a 96% efficiency, where as poly-chains maintain a 99% efficiency. By eliminating the potential for slippage, the use of a poly-chain actually reduces the energy consumption consumed.

Alternatively, Variable Frequency Controlled centrifuges allow the operator to change the centrifuge from a “barite recovery” to “ultra-fine solids removal” system with the flip of a switch. To ensure maximum operator flexibility, KEMTRON has invested in the development of a proprietary graphical user interface touch-screen VFD control system that is designed in KEMTRON’s own panel shop. Each stainless steel, NEMA 4X panel is built from the ground up using the most sophisticated electrical components and Yaskawa A1000 variable frequency drives. KEMTRON’s VFD systems include a variety of enhanced features, including internal lighting, ventilation and heating, Ethernet porting for diagnostics and programming updates, and a custom designed user interface that allows for maximum operating flexibility and control. KEMTRON’s proprietary user interface provides complete control of all systems, as well as, a sophisticated set of diagnostic tools, information libraries and read only fault logs.

KEMTRON’s KT-1448 HD centrifuge can be fitted with either a 52:1 or a 125:1 planetary gear box for dewatering applications. These two options provide a large performance window, therefore granting the KT-1448 HD maximum flexibility when managing the solid/liquid cut-point and the moisture content of discharged solids.



KT-1448 Centrifuge Recommended Spare Parts

1 Year Recommended Spares: KT-1448 Centrifuge				
Item	**Description**	**Unit price**	**Qty**	**Total**
KTC-RA-530-001	Centrifuge KT-1448 Pillow Block Bearing SE	440	1	440
KTC-RA-150-001	Centrifuge KT-1448 Pillow Block Bearing LE	495	1	495
KTC-RA-040-002	Conveyor Thrust Bearing LE	319	2	638
KTC-RA-500-001	Conveyor Support Bearing	227	1	227
KTC-RA-010-002	Centrifuge KT-1448 Grease Seal (LE)	53	2	106
KTC-RA-470-002	Centrifuge KT-1448 Conveyor Grease Seal Inner SE	41	2	82
KTC-RA-480-002	Centrifuge KT-1448 Conveyor Grease Seal Outer SE	48	2	96
KTC-RA-430-002	Centrifuge KT-1448 Bowl Extension Plow (Set of 2)	361	1	361
KTC-RA-353-004	Centrifuge KT-1448 Feed Nozzle O-Ring	1	4	4
KTC-RA-352-004	Centrifuge KT-1448 Feed Nozzle Carbide Insert	231	1	231
KTC-FC-160-001	Fluid Clutch Input Shaft	1,298	1	1,298
BBLT-5R3VX950	Drive belt 3V 5G-950	385	1	385
KTC-RA-410-001	Feed Tube	1,458	2	1,458
KTC-RA-370S-004	Centrifuge KT-1448 Solid Discharge Wear Insert (Set of 4)	440	1	440
			Total:	**$ 5,821**

1 Year Recommended Spares: PC Pump				
Item	**Description**	**Unit price**	**Qty**	**Total**
KTP-P1-056-001	PC Pump P101 Gland Packing Set	40	2	80
KTP-P1-036-002	PC Pump P101 Bearing Lip Seal	21	2	42
KTP-P1-025-001	PC Pump P101 Bearing Housing Gasket	6	2	12
KT-P1-508	PC Pump P101 GB Variable Drive Belt	165	2	
			Total:	**$ 464**

Pricing Summary

Itm	Qty	Description	Sales Price ($ USD)	Discount Price ($ USD)	Extended Price ($ USD)
1	1	**KT-1448 HD Centrifuge** • 460v/60hz – 3 Phase Explosion Proof • Field Skid Configuration • 50HP NEMA Premium Main Drive • Epoxy Powder Coated • Dual-Sheave Polychain – *Allows Centrifuge to Operated at 1,250 and 3,250 RPM without Changing Sheave or Requiring VFD.*	159,000	145,000	145,000
2	1	**KT-1448 Telescoping Stand with Discharge Chute** • Carbon Steel ASTM A36 ¼" Plate Steel • Epoxy Powder Coated	15,250	13,750	13,750
				Total:	**158,750**

Item	Qty	Selectable Options (Not Included in Above Price	Sales Price ($ USD)	Discount Price ($ USD)	Extended Price ($ USD)
1	1	**185 GPM Progressive Cavity Feed Pump**	12,500	11,500	11,500
2	1	**KT-1448 HD Centrifuge VFD Controls** • NEMA 4X Stainless Steel Enclosure • Yaskawa A1000 VFD Drives	47,500	45,000	45,000

PAYMENT: 50% down and 50% prior to shipment.

DELIVERY: 4 weeks from down payment, depending on options selected.

PRICING: Ex-works Stafford, Texas USA. Tax, Title and Licensure not included.

NOTE: KEMTRON is not responsible for items that are not specifically stated in our quotation – even if they are mentioned in the original inquiry.

VALIDITY: 30 days.

TERMS: See attached.