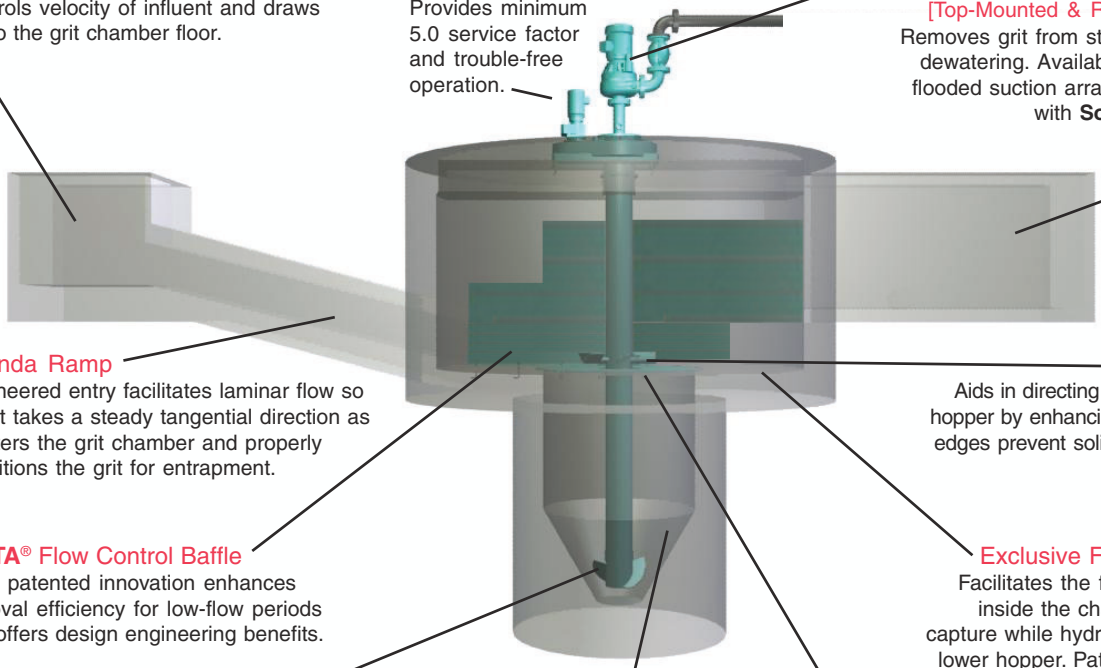
PISTA® Grit Removal System — 360° Grit Chamber Features and Benefits

With Flow Control Baffle, Model B

Inlet Channel
Controls velocity of influent and draws grit to the grit chamber floor.

Bull Gear Drive
Provides minimum 5.0 service factor and trouble-free operation.

PISTA® Turbo Grit Pump
[Top-Mounted & Remote-Mounted Options]
Removes grit from storage hopper to washing dewatering. Available in vacuum-primed and flooded suction arrangements. Now available with **SonicStart®** prime sensing.



Outlet Channel
S&L can assist with design information for optimal performance.

Coanda Ramp
Engineered entry facilitates laminar flow so that it takes a steady tangential direction as it enters the grit chamber and properly conditions the grit for entrapment.

Axial-Flow Propeller
Aids in directing organic-free grit into lower hopper by enhancing flow patterns. Rounded edges prevent solids build-up, thus ensuring high efficiency.

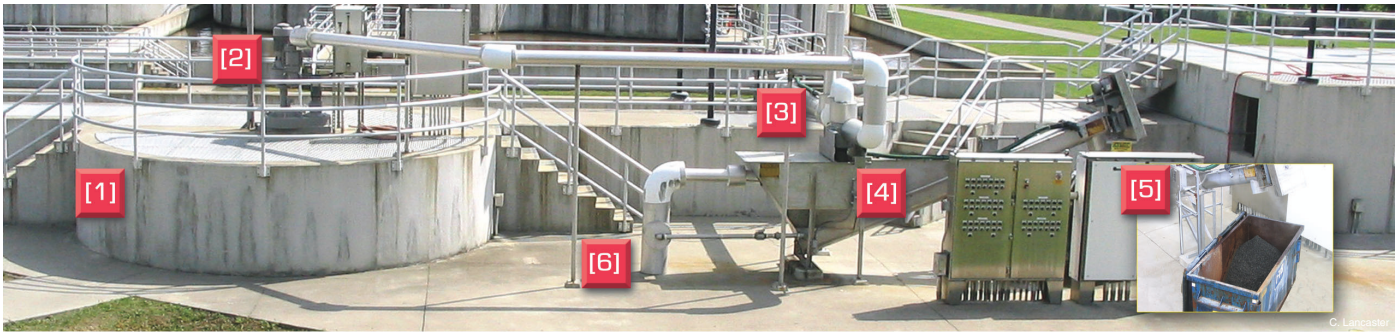
PISTA® Flow Control Baffle
New, patented innovation enhances removal efficiency for low-flow periods and offers design engineering benefits.

Exclusive Flat-Bottom Basin Floor
Facilitates the forced vortex flow pattern inside the chamber. Minimizes organic capture while hydraulically directing grit into lower hopper. Patented, 360-degree in-line design.

PISTA® Grit Fluidizer
Patented blade exclusive to S&L design. Loosens collected grit, preventing compacting.

Storage Hopper
Stores removed grit prior to dewatering.

Hopper Cover Plate
Stationary and recessed, it removes for quick access to storage hopper.



PISTA® Grit Removal System — Grit Removal, Handling & Dewatering System Flow Scheme

[1] ***PISTA® Grit Chamber*** — Influent enters flat-floor grit chamber hydraulically guided by coanda ramp, internal baffles and central, low-speed propeller. Forced vortex drives grit particles to center chamber floor and into lower grit hopper while organics and flow continue to plant.

[2] ***PISTA® Turbo Grit Pump*** — Top-mounted or remote mounted unit pumps collected grit slurry (kept fluid by the **PISTA®** Grit Fluidizer) to the **PISTA®**'s second-stage grit washing and dewatering system while also providing proper head.

[3] ***PISTA® Grit Concentrator*** — Specifically engineered for the **PISTA®** system, this abrasion-resistant Ni-Hard unit washes and separates grit further. It positions on the grit discharge line.

[4] ***PISTA® Grit Screw Conveyor*** — Grit from the concentrator deposits into the parallel (lamella) plate section of the S&L dewatering screw conveyor, which aids in retaining finer grit and reducing the stream's turbulence and overflow rate.

[5] ***Dewatered Grit Discharges*** from the top of the inclined screw conveyor into a container for disposal.

[6] ***The Flow and any Residual Organics are Returned*** to the inlet channel prior to the grit chamber, typically 93% of flow and 95% of organics.

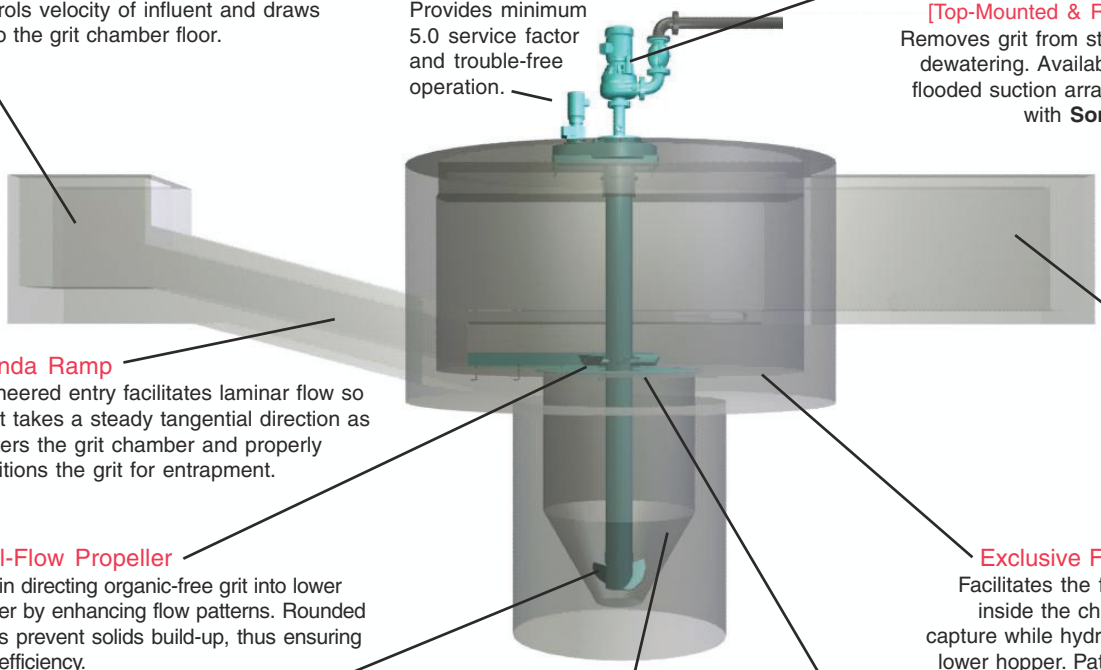
360° Grit Chamber Features and Benefits

Model A

Inlet Channel
Controls velocity of influent and draws grit to the grit chamber floor.

Bull Gear Drive
Provides minimum 5.0 service factor and trouble-free operation.

PISTA® Turbo Grit Pump
[Top-Mounted & Remote-Mounted Options]
Removes grit from storage hopper to washing dewatering. Available in vacuum-primed and flooded suction arrangements. Now available with **SonicStart**™ prime sensing.



Coanda Ramp
Engineered entry facilitates laminar flow so that it takes a steady tangential direction as it enters the grit chamber and properly conditions the grit for entrapment.

Outlet Channel
S&L can assist with design information for optimal performance.

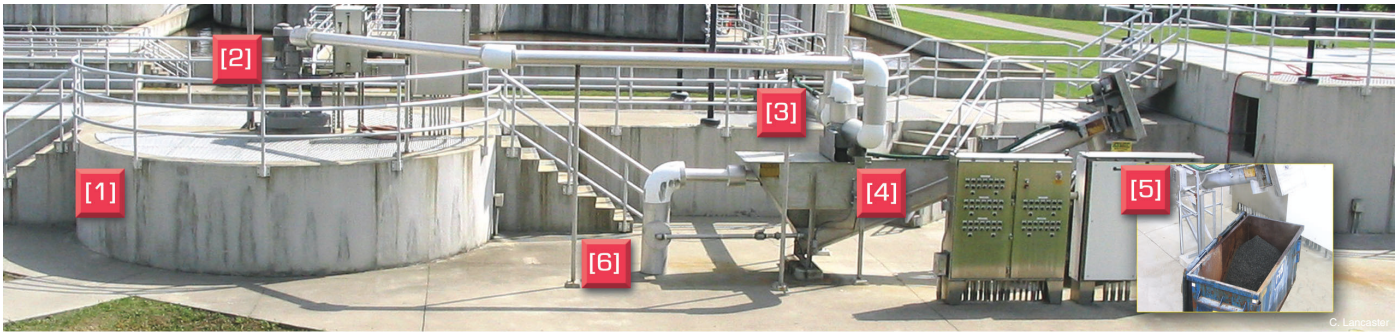
Axial-Flow Propeller
Aids in directing organic-free grit into lower hopper by enhancing flow patterns. Rounded edges prevent solids build-up, thus ensuring high efficiency.

Exclusive Flat-Bottom Basin Floor
Facilitates the forced vortex flow pattern inside the chamber. Minimizes organic capture while hydraulically directing grit into lower hopper. Patented, 360-degree in-line design.

PISTA® Grit Fluidizer
Patented blade exclusive to S&L design. Loosens collected grit, preventing compacting.

Storage Hopper
Stores removed grit prior to dewatering.

Hopper Cover Plate
Stationary and recessed, it removes for quick access to storage hopper.



PISTA® Grit Removal System

Grit Removal, Handling & Dewatering System Flow Scheme

[1] ***PISTA® Grit Chamber*** **—** Influent enters flat-floor grit chamber hydraulically guided by coanda ramp, internal baffles and central, low-speed propeller. Forced vortex drives grit particles to center chamber floor and into lower grit hopper while organics and flow continue to plant.

[2] ***PISTA® Turbo Grit Pump*** **—** Top-mounted or remote mounted unit pumps collected grit slurry (kept fluid by the **PISTA®** Grit Fluidizer) to the **PISTA®**'s second-stage grit washing and dewatering system while also providing proper head.

[3] ***PISTA® Grit Concentrator*** **—** Specifically engineered for the **PISTA®** system, this abrasion-resistant Ni-Hard unit washes and separates grit further. It positions on the grit discharge line.

[4] ***PISTA® Grit Screw Conveyor*** **—** Grit from the concentrator deposits into the parallel (lamella) plate section of the S&L dewatering screw conveyor, which aids in retaining finer grit and reducing the stream's turbulence and overflow rate.

[5] ***Dewatered Grit Discharges*** from the top of the inclined screw conveyor into a container for disposal.

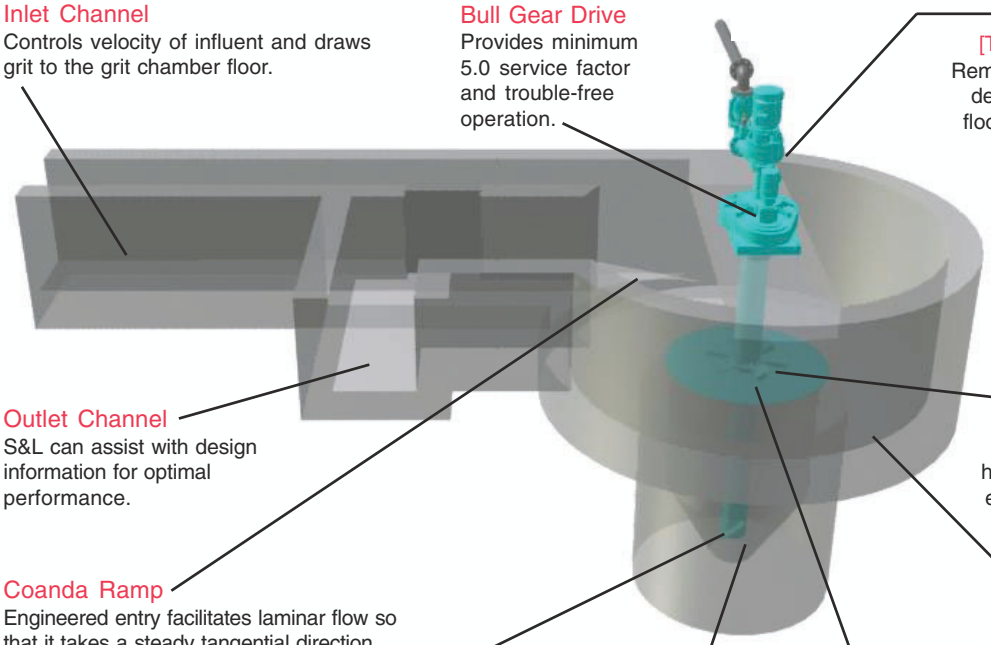
[6] ***The Flow and any Residual Organics are Returned*** to the inlet channel prior to the grit chamber, typically 93% of flow and 95% of organics.

270° Grit Chamber Features and Benefits

Inlet Channel
Controls velocity of influent and draws grit to the grit chamber floor.

Bull Gear Drive
Provides minimum 5.0 service factor and trouble-free operation.

PISTA® Turbo Grit Pump
[Top-Mounted & Remote-Mounted Options]
Removes grit from storage hopper to washing dewatering. Available in vacuum-primed and flooded suction arrangements. Now available with **SonicStart**™ prime sensing.



Outlet Channel
S&L can assist with design information for optimal performance.

Axial-Flow Propeller
Aids in directing organic-free grit into lower hopper by enhancing flow patterns. Rounded edges prevent solids build-up, thus ensuring high efficiency.

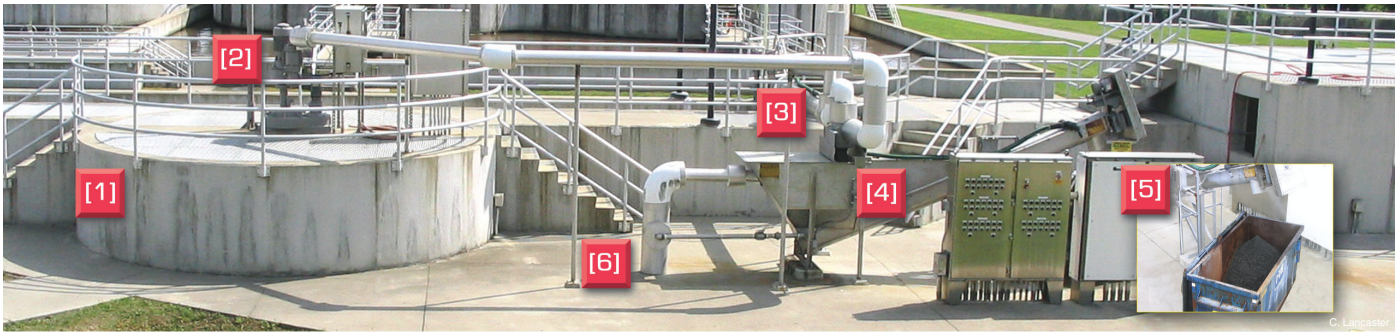
Coanda Ramp
Engineered entry facilitates laminar flow so that it takes a steady tangential direction as it enters the grit chamber and properly conditions the grit for entrapment.

Exclusive Flat-Bottom Basin Floor
Facilitates the forced vortex flow pattern inside the chamber. Minimizes organic capture while hydraulically directing grit into lower hopper. Patented, 360-degree in-line design.

PISTA® Grit Fluidizer
Patented blade exclusive to S&L design. Loosens collected grit, preventing compacting.

Storage Hopper
Stores removed grit prior to dewatering.

Hopper Cover Plate
Stationary and recessed, it removes for quick access to storage hopper.



PISTA® Grit Removal System — Grit Removal, Handling & Dewatering System Flow Scheme

[1] ***PISTA® Grit Chamber*** **—** Influent enters flat-floor grit chamber hydraulically guided by coanda ramp, internal baffles and central, low-speed propeller. Forced vortex drives grit particles to center chamber floor and into lower grit hopper while organics and flow continue to plant.

[2] ***PISTA® Turbo Grit Pump*** **—** Top-mounted or remote mounted unit pumps collected grit slurry (kept fluid by the **PISTA®** Grit Fluidizer) to the **PISTA®**'s second-stage grit washing and dewatering system while also providing proper head.

[3] ***PISTA® Grit Concentrator*** **—** Specifically engineered for the **PISTA®** system, this abrasion-resistant Ni-Hard unit washes and separates grit further. It positions on the grit discharge line.

[4] ***PISTA® Grit Screw Conveyor*** **—** Grit from the concentrator deposits into the parallel (lamella) plate section of the S&L dewatering screw conveyor, which aids in retaining finer grit and reducing the stream's turbulence and overflow rate.

[5] ***Dewatered Grit Discharges*** from the top of the inclined screw conveyor into a container for disposal.

[6] ***The Flow and any Residual Organics are Returned*** to the inlet channel prior to the grit chamber, typically 93% of flow and 95% of organics.

PURPOSE

The **PISTA®** Grit Removal System is a complete grit removal system that includes the **PISTA®** Grit Chamber, the Turbo **PISTA®** Grit Pump, the **PISTA** Grit Concentrator, and the **PISTA®** Grit Screw Conveyor. Each component has been specifically designed for the capture, washing and dewatering of fine grit.

The **PISTA®** Grit Chamber solves grit removal problems whether it is sewage, water, or an industrial liquid flow application. It removes grit from an incoming water or wastewater stream. It is designed to remove grit in its standard configuration down to 0.15 mm in size (100 mesh). The **PISTA®** Grit Chamber also does an excellent job separating organics from the grit. Ideally, the upper magnitude for the grit would be approximately 2.0 mm (9 mesh). Larger sizes would be collected as long as the specific gravity is around 2.5 or greater. Organics are kept in suspension in the waste by means of the density difference. Where other grit removal devices are sensitive to flow variations the **PISTA®** Grit Chamber's velocities at the middle of the unit, where organics are separated from the grit, are maintained near an optimum design value at all flows.

Organics are kept in suspension because of their lighter density or specific gravity. The grit and any organics that are captured in the **PISTA®** Grit Chamber are moved along the flat bottom of the grit chamber. As they near the center, the particle velocity is increased by a specially designed axial flow propeller and resultant induced spiral flow. The lifting force on the particle attached to the bottom is a function of the cross-sectional area and the velocity squared. The lighter and larger organics are fluidized into the main stream through the **PISTA®** Grit Chamber. Only a small gap is provided between the torque tube and the floor plate to allow the grit to enter the storage hopper while the lighter organics are detached from the flat bottom and drawn upward to the effluent flume.

Because no device is 100% efficient, a small percentage of organics will be trapped with the grit. The second stage **PISTA®** Grit Concentrator, located on the grit discharge line, is designed for ultimate separation of organics. This second stage concentrator returns virtually all organics and most of the excess water to the inlet channel of the **PISTA®** Grit Chamber. Final dewatering may be accomplished by discharging directly into the Smith & Loveless dewatering screw, with parallel plate separator.

TURBO GRIT REMOVAL PUMP

The Smith & Loveless, Inc. Turbo **PISTA®** Grit Pump is mounted directly on top of the flanged center pipe for discharging the grit from the storage hopper of the **PISTA®** Grit Chamber. Remote mounted arrangements are available, but the top mounted configuration is best. The Turbo **PISTA®** Grit Pump, when used in conjunction with the **PISTA®** Grit Concentrator, eliminates the necessity for air blowers for lifting and provides the pumping head and capacity necessary for optimizing the efficiency of the second stage **PISTA®** Grit Concentrator. The reduced discharge rate/under-flow from the second stage concentrator greatly improves the performance of the final dewatering screw or other device.

POSITION IN THE TREATMENT PROCESS

The nature of the operation of the **PISTA®** Grit Chamber dictates where it should be installed. Our general recommendation is that it should be placed before anything else in the treatment plant except a suitable bar rack to prevent sticks and other foreign objects from entering the **PISTA®** Grit Chamber. Being located ahead of all other equipment in a treatment plant, it will remove the grit which can quickly cause mechanical failure, excessive wear on downstream mechanical devices, or accumulate in basins and channels.

The head loss in the **PISTA®** Grit Chamber (1/4" or 6mm maximum, except for Model B), is no more than in an open flume. Consult the factory for Model B Type **PISTA®** head loss, as it differs per application. This makes it ideal for installation as an initial phase of a treatment process. It also makes it ideal for the insertion into an already existing flow scheme.

PISTA® Grit Chambers can be installed above ground or below ground. They can be supplied in steel for easy installation and/or attachment to a concrete channel. They can be installed in multiples for added flow and reliability. Their low cost and small space requirement make it possible to protect almost any size plant from the detrimental effects of grit. The low power usage requirements for the grit chamber also make it ideal for any size plant.

The **PISTA®** Grit Chamber can be applied in the municipal or industrial process schemes for pretreatment of raw water or wastewater. Industrially, there are many

applications. Independent tests have, for example, proven the Smith & Loveless, Inc. **PISTA®** Grit Chamber to be far superior to other grit removal devices in the handling of fly ash from power generating plants. Smith & Loveless, Inc. has the technical expertise and laboratory facilities to test samples and we are anxious to assist you in utilizing this cost effective separation system.

OPERATION

The **PISTA®** Grit Chamber operates on the vortex principle. The hydraulics force the grit to the chamber floor. The grit is propelled to the floor sufficiently in one revolution of the chamber's contents so as not to be within the influence of the outlet of the chamber. The grit on the bottom, along with other material, is propelled along the bottom towards the center. The flow moves circumferentially and downward to the bottom, across the bottom still moving in a circle, up the middle to the top, across the top still moving in a circle to the outside. As the captured solids move towards the center, they pick up velocity because the area of flow is decreasing. When the solids approach the middle, the propeller increases the velocity to the point where lighter organics are lifted and returned to the flow passing through the **PISTA®** Grit Chamber. The grit moves inward and drops into the center storage hopper.

Each feature of the **PISTA®** Grit Chamber makes an important contribution to the overall performance. Any alteration in dimension or placement can seriously affect the efficiency of grit removal. The **PISTA®** Grit Chamber offers more discrete separation and superior handling of organics. Specific design features surrounding the inlet baffle when used in conjunction with the coanda ramp, upper chamber and other velocity control mechanisms should not be altered.

When sufficient grit is accumulated in the storage hopper, the grit must be removed. Grit removal may be performed manually or automatically.

Manual operation involves only the following steps:

1. Close the discharge plug valve.
2. Turn the switch for the Turbo **PISTA®** Grit Pump to the "On" position. This will initiate the pump priming cycle. When the vacuum pump stops running the Turbo **PISTA®** Grit Pump is primed and will start.
3. Open the discharge plug valve and operate the pump until all the grit is removed.
4. Shut off the pump and leave the discharge plug valve open so that the contents of the discharge pipe and pump can drain back into the **PISTA** Grit Chamber. In cold weather, the discharge valve should be left open to prevent freezing in the closed position.

The manual grit removal operation is now completed.

Automatic operation is as follows:

1. The 24-hour timer, or push to initiate button, initiates the grit removal cycle.
2. When the grit removal cycle is initiated, the pneumatically operated pinch valve on the pump discharge closes.
3. The vacuum pump starts simultaneously with the pneumatic valve operator and draws water up into the pump. The vacuum pump runs until the liquid level reaches the **SONIC START®** sensor.
4. The liquid touches the **SONIC START®** sensor, which signals the control system to close the priming solenoid valve and shut-off the vacuum pump.
5. The Turbo **PISTA®** Grit Pump starts and the pneumatically operated valve opens. The Turbo **PISTA®** Grit Pump operates for an adjustable period set for the amount of time for the grit to be removed. This should be set for the early morning period and other such times during the day as may be necessary.
6. When the Turbo **PISTA®** Grit Pump stops, the valve remains open to allow the contents of the discharge pipe and pump to drain back into the **PISTA®** Grit Chamber.

This completes the automatic grit removal cycle.

The second stage **PISTA®** Grit Concentrator operates on the constant flow principle and is sized to match the discharge from the Turbo **PISTA®** Grit Pump. The grit is discharged out the bottom, while most of the water and organic material are returned to the inlet of the **PISTA®** Grit Chamber via a return line connected at the top of the second stage concentrator.

The pressure required to effectively operate the second stage concentrator is readily available from the Turbo **PISTA®** Grit Pump. An airlift device is not adequate for this purpose.

HYDRAULICS

The influent flow, in a typical wastewater treatment system, is subjected to a significant degree of variation during the day and from start-up to design conditions. The Smith & Loveless, Inc. **PISTA®** Grit Chamber should be selected so that the peak design flow rate is within the recommended maximum flow of the unit. An important feature of the **PISTA®** Grit Chamber is that no decrease in efficiency is experienced at flows less than the design rate.

PISTA® Model	Recommended Maximum Flow English	Recommended Maximum Flow Metric
0.5/0.5A/0.5B	0.5 MGD	1,892 CMD
1.0/1.0A/1.0B	1.0 MGD	3,785 CMD
2.5/2.5A/2.5B	2.5 MGD	9,465 CMD
4.0/4.0A/4.0B	4.0 MGD	15,140 CMD
7.0/7.0A/7.0B	7.0 MGD	26,495 CMD
12.0/12.0A/12.0B	12.0 MGD	45,420 CMD
20.0/20.0A/20.0B	20.0 MGD	75,700 CMD
30.0/30.0A/30.0B	30.0 MGD	113,550 CMD
50.0/50.0A/50.0B	50.0 MGD	189,250 CMD
70.0/70.0A/70.0B	70.0 MGD	265,000 CMD
100.0/100.0A/100.0B	100.0 MGD	378,500 CMD

Specific dimensional data dealing with each size **PISTA®** Grit Chamber is provided with the drawings. It is important to adhere to the recommendations in these tables. Liquid levels tabulated are for peak design flow rates. Since the design flow rate is normally not present during the initial installation, the velocity envelope, Figure 1, is provided to assist you in optimizing influent channel velocities. It at all possible, the velocities in the influent channel should fall within these guidelines, when used in conjunction with the influent channel widths given in the tables.

Ideal inlet channel velocities at average flow and acceptable for all flows – 2 to 3 FPS (0.6 to 0.9 m/sec).
Absolute maximum inlet channel velocity at peak flow – 3.5 FPS (1.07 m/sec).
Initial minimum inlet channel velocity must exceed – 0.5 FPS (0.15 m/sec).

Initial peak flows must exceed 2 FPS (0.6 m/sec) to wash any grit that may have accumulated in the inlet flume at the lower flows into the grit chamber for removal. The **PISTA®** can pass higher flow volumes than the rated peak, however the removal efficiency of the unit may decrease. The use of flow control baffles provides proper velocities over the widest range of flows, and reduces the outlet channel length.

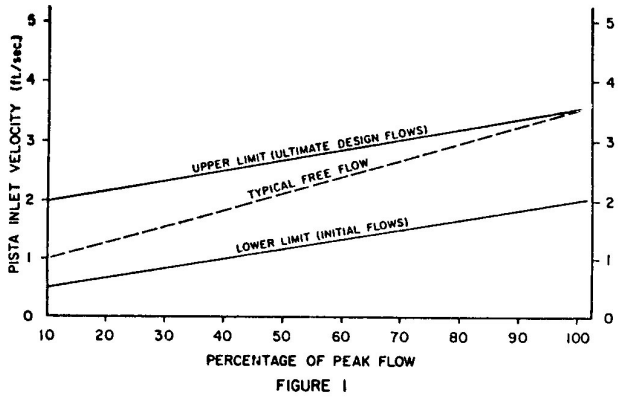


FIGURE 1

2 FPS (0.6 m/sec) is required to wash any grit that may have accumulated in the inlet flume at the lower flows into the grit chamber for removal.

The entrance flume or pipe into the **PISTA®** Grit Chamber should provide for a smooth laminar type flow with little turbulence. To optimize this, we recommend a straight run into the **PISTA®** Grit Chamber as shown on the drawings. Note this requirement is greatly reduced in the Model A and B, 360◦ units.

If at all possible, the entrance to the **PISTA®** Grit Chamber should be exactly as shown on the drawings. Please contact Smith & Loveless for any needed assistance.

The downstream channel should maintain a constant elevation and be without 90° bends or channel narrowing that is not shown on the drawings. The 270° unit needs the channel raised and narrowed for flow control. The use of flow control baffles (Model B units) eliminates the required downstream channel. To maintain proper water velocities in the **PISTA®**, there can be no downstream restrictions that would cause the water levels in the effluent channel to be higher than it would be with a free-flowing flume. We again ask that you contact us if there are any questions, or it is not possible to optimize the installation using these guidelines.

Smith & Loveless, Inc.®

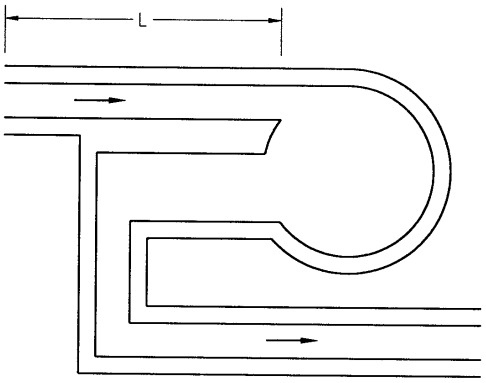
14040 West Santa Fe Trail Drive
Lenexa, Kansas 66215-1284

The **PISTA®** Grit Chamber is designed such that the most ideal velocity arrangement is if the downstream channel is a free flowing flume. On certain larger Model A units, the level is controlled by a submerged weir located in the discharge channel. The downstream side of the weir should be a free flowing flume.

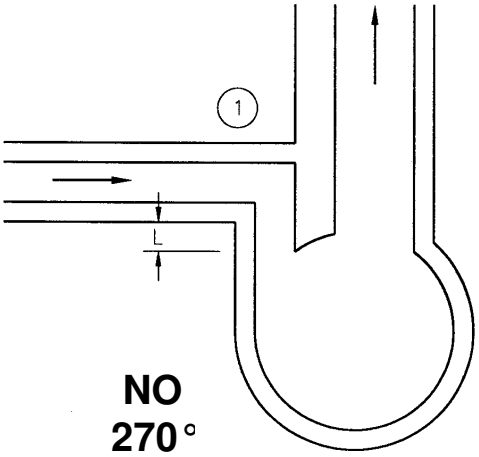
PISTA® GRIT CHAMBER LAYOUT

The straight length of influent channel required varies according to the model and type of chamber configuration. The 360° Model A and B units have greatly reduced influent channel straight lengths, as shown on the drawings. If obtaining the necessary influent channel length becomes a problem for the 270° models, consider rotating the chamber such that any required bends are placed in the effluent flume, in accordance with the downstream channel limitations.

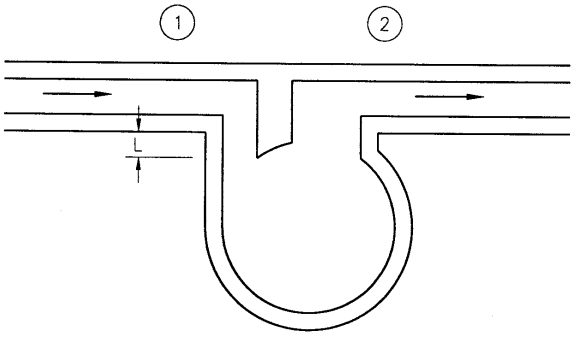
The straight-in arrangement (seen on this page) for the 270° units offer increased length of the influent channel having virtually the same space requirement, and an equivalent number of 90° bends.



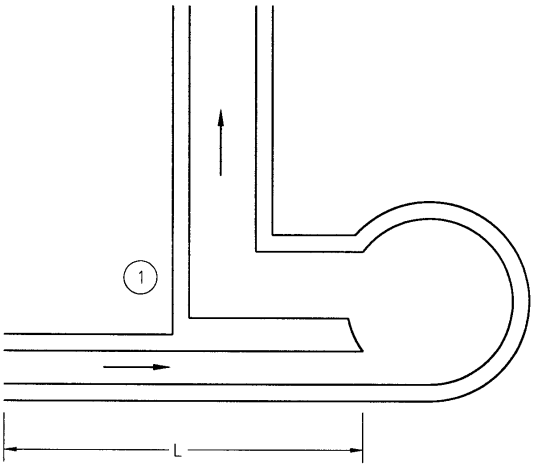
YES
270°



NO
270°



NO
270°



YES
270°

PISTA® TURBO GRIT PUMP SELECTION

The Smith & Loveless, Inc. Turbo **PISTA®** Grit Pump is an excellent grit pumping device, and in most cases, will satisfy the need for lifting the grit to the required elevation. Suction lift, of course, should be held to a minimum, placing the Turbo **PISTA®** Grit Pump directly on top of the **PISTA®** Grit Chamber whenever possible.

The Turbo **PISTA®** Grit Pump discharge line should be as short as practical and will need to contain a full opening eccentric plug valve as shown on the drawings. The plug valve is required for priming and if automatic grit removal is desired, it will need to be a pneumatically operated pinch valve.

The vacuum priming system should be located adjacent to the Turbo **PISTA®** Grit Pump. It will normally be provided in a weatherproof enclosure mounted on the drive unit for the **PISTA®** Grit Chamber.

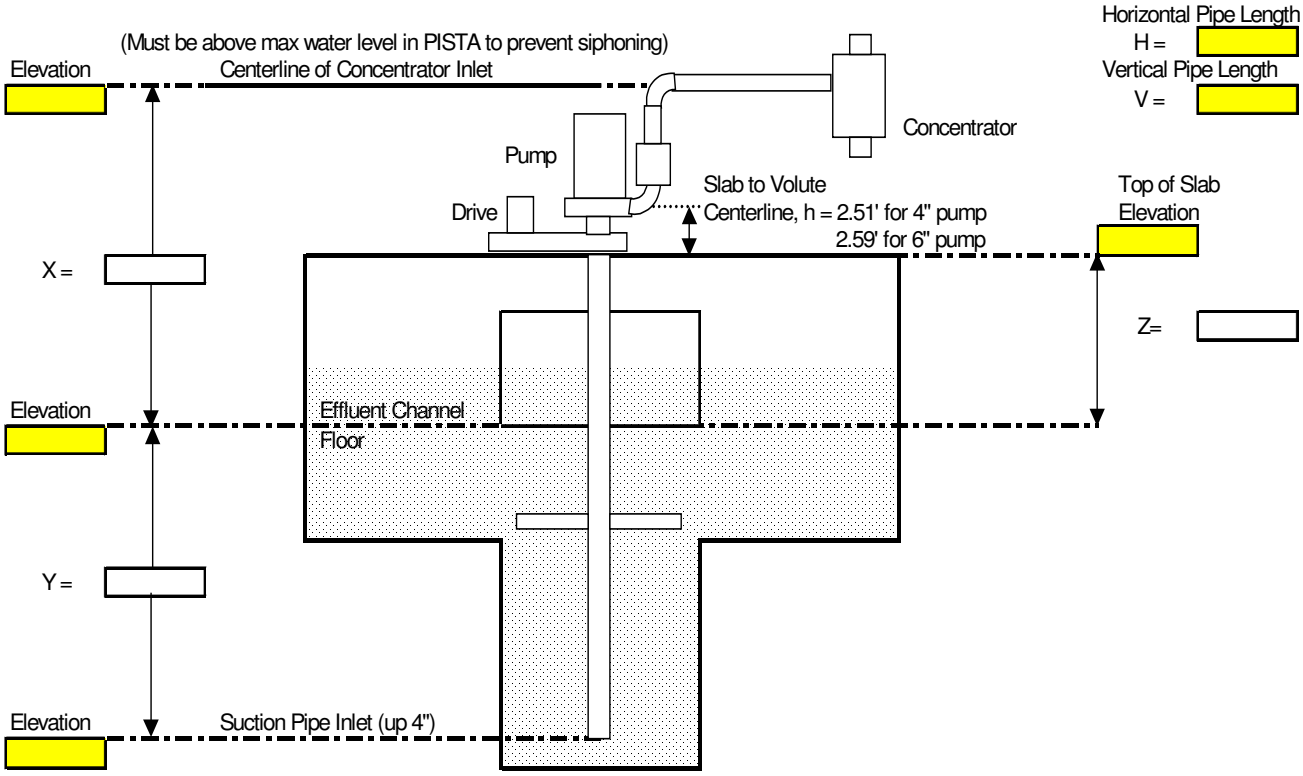
The top-mounted vacuum primed Turbo **PISTA®** Grit Pump should always be employed in conjunction with the Smith & Loveless, Inc. second stage **PISTA®** Grit Concentrator. The optimum rate through the **PISTA®** Grit Concentrator is established by selecting the pump for 250 GPM (15.8 lps) based on the following friction coefficients applicable to Schedule 40 steel pipe. Typically, Models 0.5 to 20.0 will use a four-inch (4") pump and a 250 GPM concentrator. Typically, Models 30.0 and larger will use a six-inch (6") pump and 500 GPM concentrator.

Nominal Pipe Size		Flow		Velocity		Friction Loss
Inch	mm	GPM	lps	Ft/Sec	m/sec	Ft/100 Ft
4"	100	250	15.8	6.3	1.9	4.6
6"	150	500	31.5	5.7	1.7	2.4

When selecting the Turbo **PISTA®** Grit Pump, the first thing to consider is the allowable static suction lift. Referring to the pump performance rating curves in this section, you will note that the allowable static suction lift varies from 0' to 20' (0 to 6.1 m). These static suction lift ratings shown should be reduced one-foot (0.3 m) for each 1000' (305 m) elevation above mean sea level. They relate to the physical lift as shown on the drawings and the friction loss in the 4" (100 mm) suction pipe need not be considered.

However, to compensate for lifting the grit, it will be necessary to correct the actual elevation difference between the centerline of the pump casing and the low water level in the grit chamber, for the specific gravity of the slurry. See Pages C6 and C7 for Pump Design Calculations.

TOP MOUNTED PUMP CALCULATIONS



Formula Constants Dependent on Design of Plant:

Friction Factor f =	4.6'/100' pipe for 4" grit piping
	2.4'/100' pipe for 6" grit piping
Concentrator C =	12' for 250 GPM concentrator
	25' for 500 GPM concentrator

To Calculate Equivalent Pipe Length:

EPL = H + V + (Qty elbow * EPL elbow) =

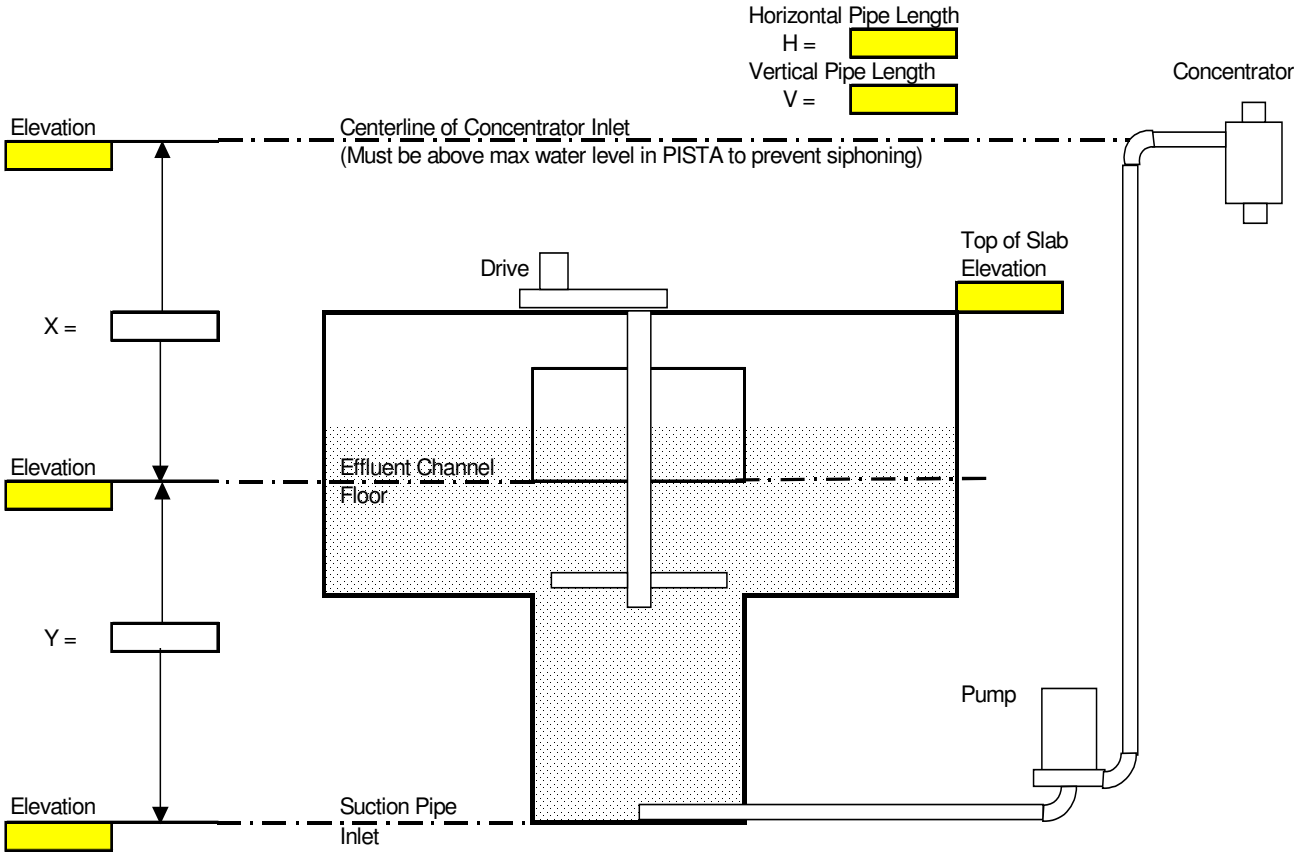
90 deg elbow	11' for 4" piping
	16' for 6" piping
90 deg long radius	7' for 4" piping
	11' for 6" piping
45 deg elbows	5' for 4" piping
	7.7' for 6" piping

TOTAL DYNAMIC HEAD (TDH)

Static Head A =	(X) (1.4) =	
Static Head B =	(Y) (0.4) =	
Friction Head F =	(EPL) (f) (1.4) =	
Pump P =		2.0
Concentrator C =		
TDH =	**A + B + F + P + C =**	
Suction Lift (MSL) = (Z + h)(1.4) + (Y)(0.4) =		
Pump Pick		
RPM	BHP from curve	
(BHP from curve)(1.4) = HP draw at design		
	Impeller Size	

PISTA® Grit Removal System

REMOTE MOUNTED PUMP CALCULATIONS



Formula Constants Dependent on Design of Plant:

Friction Factor f =	4.6'/100' pipe for 4" grit piping
	2.4'/100' pipe for 6" grit piping
Concentrator C =	12' for 250 GPM concentrator
	25' for 500 GPM concentrator

To Calculate Equivalent Pipe Length:

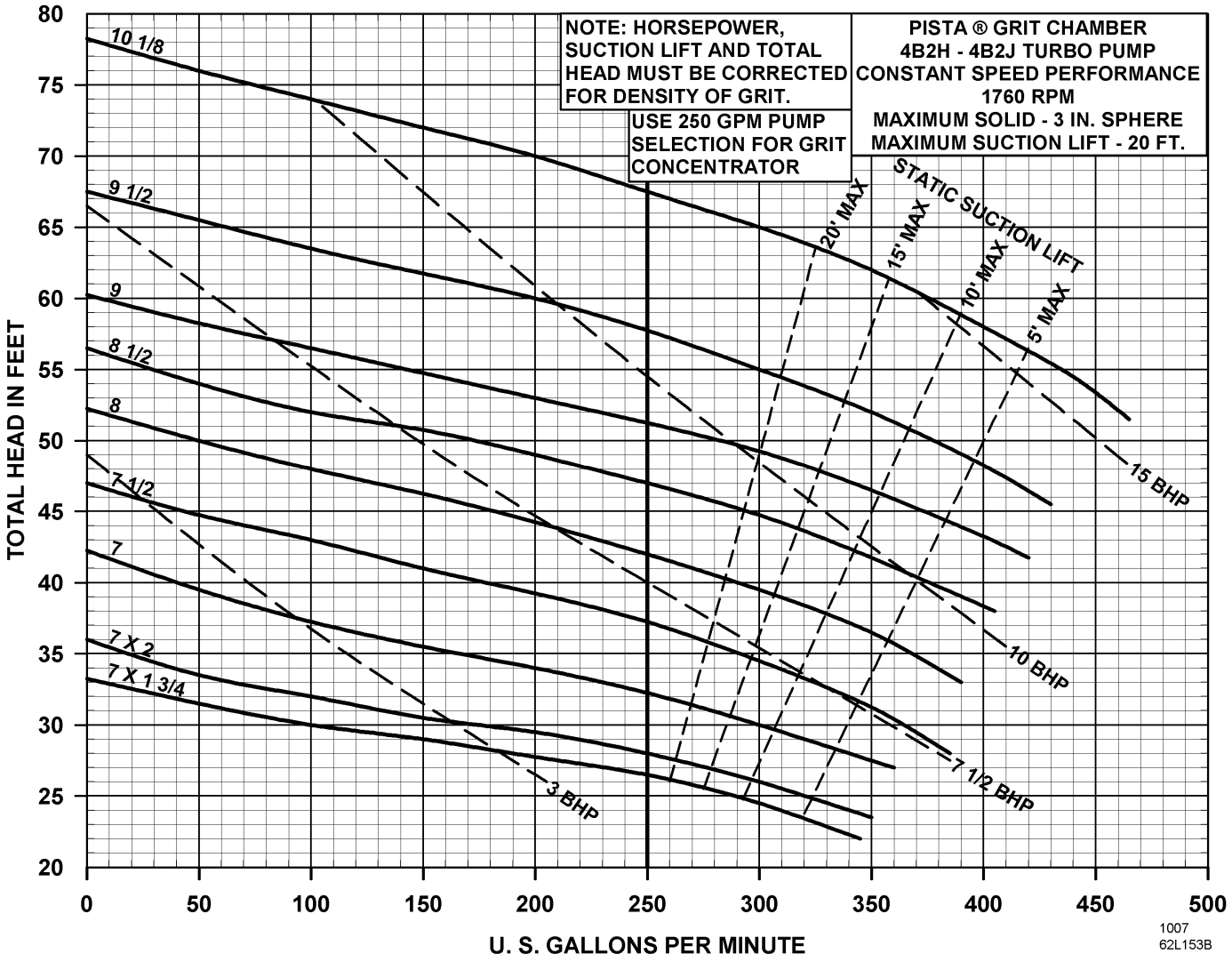
EPL = H + V + (Qty elbow * EPL elbow) =

90 deg elbow	11' for 4" piping
	16' for 6" piping
90 deg long radius	7' for 4" piping
	11' for 6" piping
45 deg elbows	5' for 4" piping
	7.7' for 6" piping

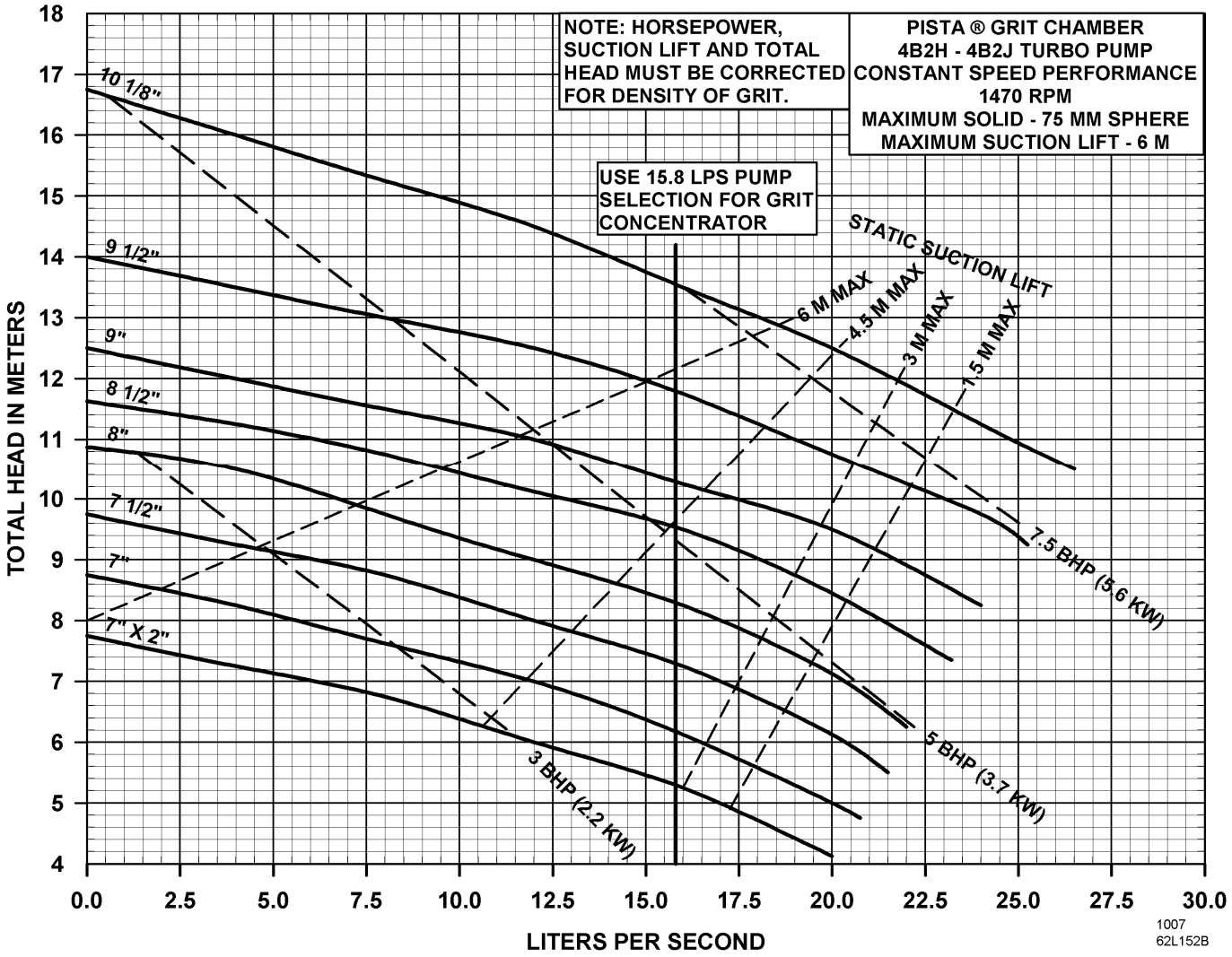
Static Head A =	(X) (1.4) =	
Static Head B =	(Y) (0.4) =	
Friction Head F =	(EPL) (f) (1.4) =	
Pump P =		2.0
Concentrator C =		
TDH =	A + B + F + P + C =	

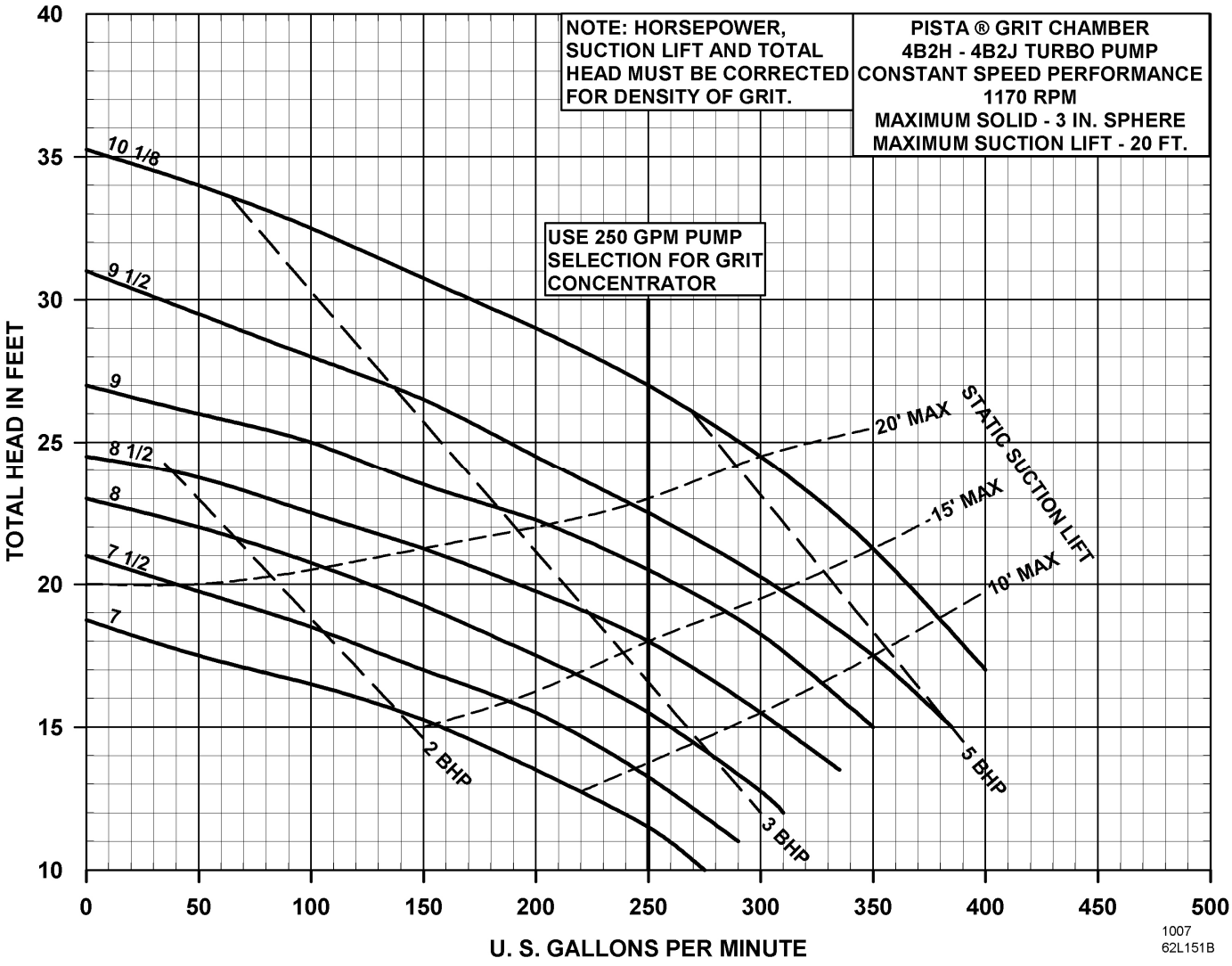
Pump Pick
RPM
BHP from curve
(BHP from curve) (1.4) = HP draw at design
Impeller Size

PISTA® Grit Removal System

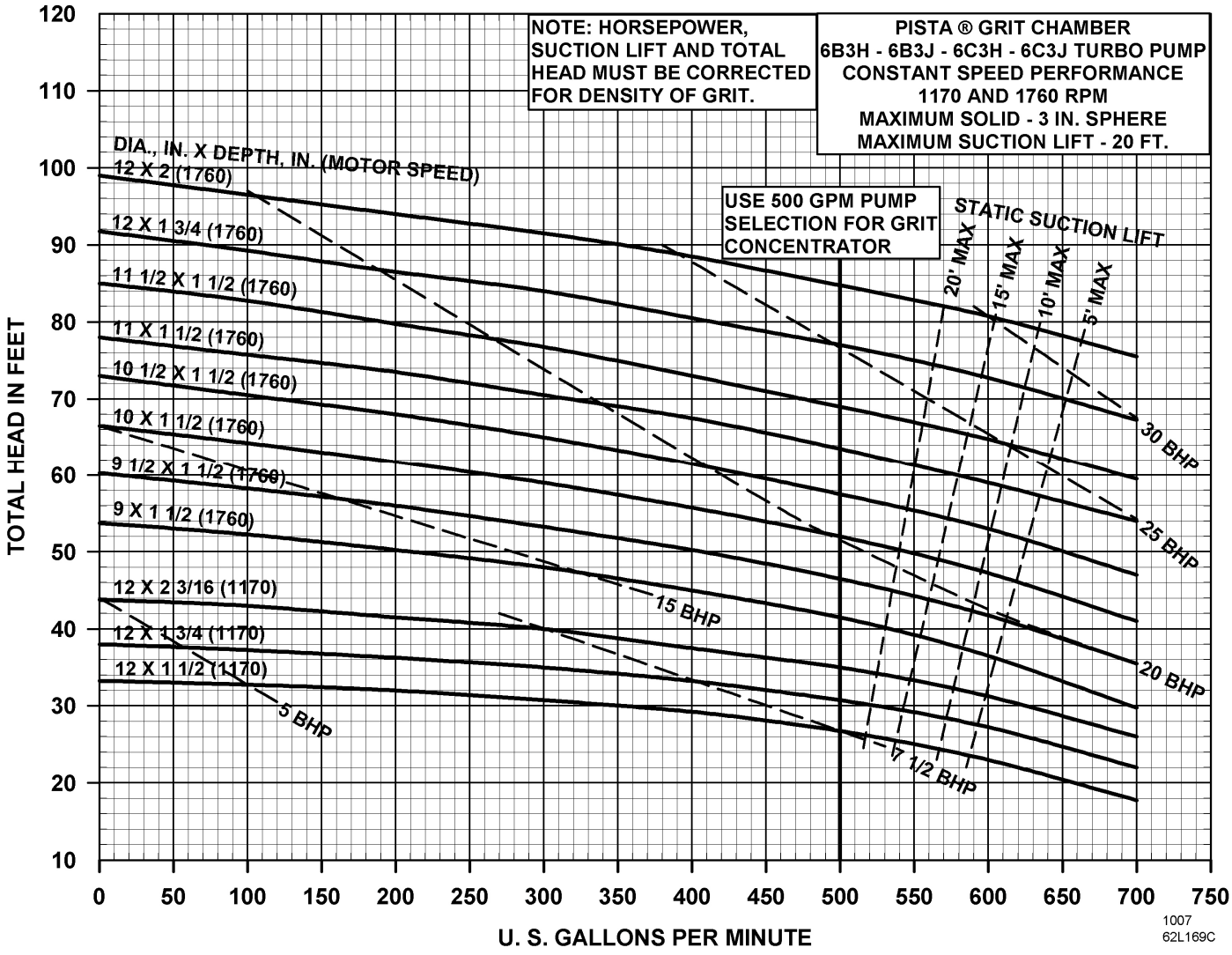


PISTA® Grit Removal System

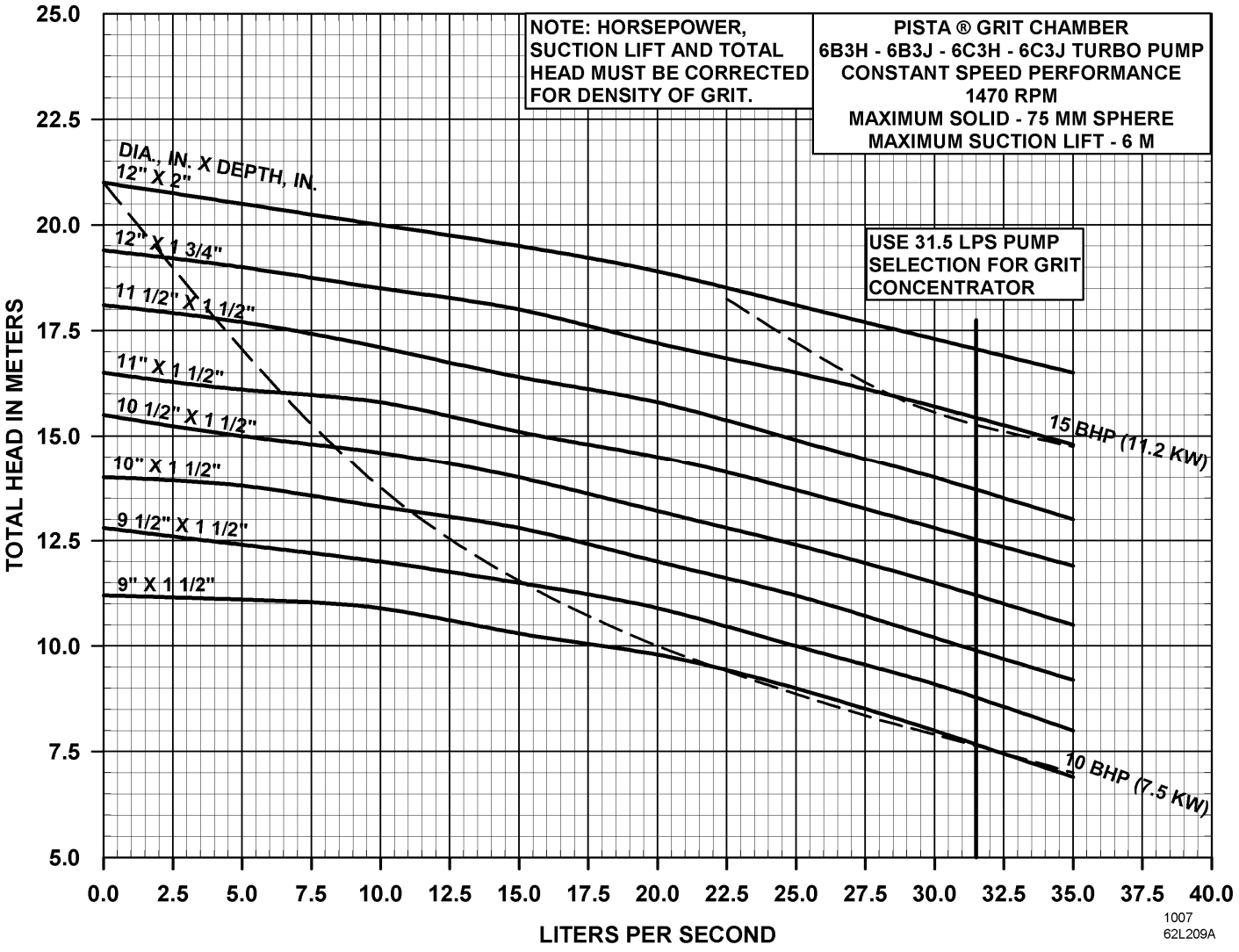




PISTA® Grit Removal System



PISTA® Grit Removal System



PISTA® Grit Removal System

BAR SCREEN

A suitable bar screen is recommended ahead of the **PISTA®** Grit Chamber to prevent sticks and other foreign objects from entering the unit. This bar screen should preclude material that might cause clogging in the grit storage hopper.

A mechanically cleaned bar screen, ahead of the **PISTA®** Grit Chamber, requires consideration in placement and operation. The mechanically cleaned bar screen that is used continually should be placed so that its flume centerline is in line with the **PISTA®** Grit Chamber influent centerline. A manually cleaned bypass bar screen should be placed to one side when the intent is to use it infrequently during maintenance of the mechanically cleaned screen.

The mechanically cleaned bar screen builds up a dam of debris when it is not operating. This dam traps water and grit, surcharging the influent sewer. When the bar screen starts its cleaning process the dam is immediately removed and a surge of water and grit from the sewer passes through the **PISTA®** Grit Chamber. The solution to this problem is to operate the bar screen often with a timer to prevent a high dam of debris on the screen. The bar screen should not be considered as part of the **PISTA®** Grit Chamber influent channel.

GRIT PUMPING

The location of the second stage **PISTA®** Grit Concentrator should be adjacent to the **PISTA®** Grit Chamber. The grit discharge line from the Turbo Pump should be 4" diameter to minimize clogging for 250 GPM flow, and 6" for 500 GPM flow.

The second stage **PISTA®** Grit Concentrator should always be employed and it is necessary to use the Turbo Pump for optimum flow and pressure to this device. The grit discharge line must be run as direct as possible, minimizing the number of bends and elbows.

The length of the grit discharge line should not exceed 50'. Consult the factory if more than 50' is required. Arrangement drawings 67C176, 67C177 AND 67C178 depict typical routing of the discharge line for various final dewatering devices. The return line, from the second stage **PISTA®** Grit Concentrator to the **PISTA®** Grit Chamber inlet channel, should be a minimum of 6" diameter.

Airlift type grit removal devices are not recommended, as the Turbo **PISTA®** Grit Pump and **PISTA®** Grit Concentrator combination provide much cleaner grit and allow for the dewatering unit to do a much better job.

ENVIRONMENTAL CONSIDERATIONS

The grit discharge line will need to contain a 4" or 6" valve as shown on the drawings. When the Top Mounted Turbo **PISTA®** Grit Pump is used, this valve may be manually or automatically controlled. Regardless of how employed, when the Turbo **PISTA®** Grit Pump is used we recommend the valve be left open when the pump is not operating. This keeps the discharge line free from grit and water and prevents freezing. The vacuum line should be heat taped where freezing is a consideration.

The second stage **PISTA®** Grit Concentrator is self-draining and should not be a problem in freezing temperatures. However, since the final dewatering device (screw conveyors, etc.) will set above grade, they will be totally exposed to the environment, and hence, subject to freezing problems encountered in cold climates. Depending on the climate, the only well engineered solution may be a heated housing around the entire **PISTA®** unit or location inside a building. Please consult the factory for any needed assistance in this area.

A suitable floor drain should be provided in the area of the final dewatering equipment to facilitate runoff and wash down. It is suggested that this drain be sized to handle a maximum flow of 200 GPM. A hose bib for wash-down is also recommended.

PISTA® GRIT CHAMBER VARIABLE AND FIXED DIMENSIONS

The following dimensions are fixed for each model:

Steel Tank	Models 0.5 – 7.0 *	Models 0.5A – 7.0A **
ID Upper Chamber	A	A
Width of Discharge Flume	B	B
Width of Inlet Flume	C	B
ID Storage Hopper	F	36”
ID Base of Grout	H	12”
Slope of Storage Hopper	--	--

*** Refer to Drawing 67D168.**

**** Refer to Drawing 67D133.**

Concrete Tank	Models 0.5 – 100.0 *	Models 0.5A – 100.0A **	Models 0.5B – 100.0B ***
ID Upper Chamber	A	A	A
Width of Discharge Flume	B	B	B
Width of Inlet Flume	C	B	B
ID Storage Hopper	F	--	--
ID Base of Grout	H	--	--
Slope of Storage Hopper	--	--	--
Diameter of Floor Plate	N	--	--

*** For 4” pump, reference Drawing 67D132 or 67D135.**
For 6” pump, reference Drawing 67B252 or 67B254.
**** For 4” pump, reference Drawing 67D167 or 67D179.**
For 6” pump, reference Drawing 67B246 or 67B248.
***** For 4” pump, reference Drawing 67B310 or 67B315.**
For 6” pump, reference Drawing 67B316 or 67B317.

The upper chamber height and storage hopper depth may be increased, but affect Turbo **PISTA®** Grit Pump suction lift. See Notes on Design applicable to selection of the Turbo **PISTA®** Grit Pump.

Dimension L (C – on Models 0.5A – 100.0A and 0.5B – 100B) is a maximum water level at the design peak flow of the unit for a specific downstream condition. This level should not be exceeded, as bridge interference or other problems may occur. The most important thing is to make sure the inlet channel velocities are in accordance with the described requirements.

PRINCIPLES OF GRIT PIPING

As we all know, a chain is only as strong as the weakest link. This also applies to grit removal. In many cases, the weak link is the grit piping between the grit storage hopper and the grit handling equipment.

Grit plugging can be a real problem if the piping is not laid out correctly. For this reason, Smith & Loveless recommends the use of the top mounted Turbo **PISTA®** Grit Pump. This arrangement prevents any chance of plugging within the pump suction line because the suction line is in the vertical position, and drains after every pumping cycle.

If a remote mounted suction-type pump is used, the pump suction line should be as short as possible, preferably less than 10' long. The ideal situation is to have a short, straight suction run directly into the side of the bottom of the grit storage chamber with an eccentric plug valve to isolate the pump. Smith & Loveless recommends a slight incline (1/8" per foot) up from the pump to the storage chamber. This prevents air entrapment from occurring. Do not use a "turn down" elbow for the suction line in the grit storage hopper. Never have the suction line exit the grit storage hopper vertically down through the bottom, or plugging will occur.

When using the remote mounted suction pump, the grit storage hopper should be pumped completely out every cycle. This prevents grit from accumulating within the suction line. A flushing connection should also be incorporated into the grit pump suction line to allow for flushing should plugging occur. Never use elbows in the suction line; however, if elbows are necessary, sanitary tees with clean out capability must be used.

The eccentric plug valve located in the pump suction line should be turned, so that the rubber face seals against the flow from the **PISTA®** Grit Chamber. If it is not turned in this direction, grit will pack around the movable plug, on the backside, and prevent it from turning. Small engineering details such as this can prevent a real problem from occurring.

Smith & Loveless often sees two grit pumps specified in order to provide 100% back-up. Normally when this occurs, the pumps are tied in together. Smith & Loveless does not recommend this because it only provides additional elbows and piping. Bottom line, it creates additional places for grit to plug the line. Instead, Smith & Loveless recommends specifying a spare rotating assembly for 100% backup. As you know, the Smith & Loveless pump is designed so that the rotating assemblies can be changed out in a matter of minutes, limiting any down time.

The discharge piping length should be kept to a minimum (less than 20'), and as straight as possible. Doing this eliminates unnecessary elbows and fittings. The piping must not contain any traps that can accumulate grit.

The isolation valve on the discharge side of the pump must be a pinch valve. A pinch valve is preferred because it seals even if grit is present within the valve. The pinch valve must be located in the vertical position to eliminate accumulation of grit within the valve. Check valves must never be used in any grit pumping line. Not only do they provide the opportunity for plugging; but they also very rarely work properly, and will wear quickly due to the presence of grit. The pump must also operate for a sufficient length of time to clear the line entirely of grit.

Another link in the grit removal chain is the use of good screening equipment ahead of the **PISTA®** Grit Chamber. This prevents large debris from entering the system and plugging the pipelines.

Smith & Loveless offers a complete line of grit handling equipment – the **PISTA®** Grit Removal System – along with diagrams showing the best possible arrangement.

In summary, Smith & Loveless recommends the use of the top mounted Turbo **PISTA®** Grit Pump, which eliminates the possibility of plugging within the pump suction pipe. The Turbo **PISTA®** Grit Pump incorporates a recessed Ni-Hard impeller for added wear resistance. Smith & Loveless further recommends coupling the Turbo **PISTA®** Grit Pump with the **PISTA®** Grit Concentrator, which provides for secondary treatment of residual organics and secondary grit dewatering. The **PISTA®** Grit Concentrator returns 93-94% of the water pumped to it along with 95-96% of the residual organic matter. Along with the Turbo **PISTA®** Grit Pump and the **PISTA®** Grit Concentrator, Smith & Loveless recommends the use of the new **PISTA®** Grit Screw Conveyor with parallel plates. The **PISTA®** Grit Screw Conveyor provides unequaled retention of fine grit. When you couple grit-handling equipment, such as this, along with the straight thru **PISTA®** Grit Chamber, you have a grit removal system that was designed specifically for grit removal

PISTA® GRIT REMOVAL SYSTEM

applications, coordinated to work as a complete system, and is second to none. This system removes more grit from the incoming wastewater than any other system, and provides a low maintenance grit handling system.

The following is a layout checklist for the grit pumping equipment.

1. The top mounted Turbo **PISTA®** Grit Pump is recommended for use because it limits the possibility of grit plugging within the suction line.

2. If a remote mounted suction pump is used, incorporate the following:

    a. Plug valves or pinch valves to isolate the pump.

    b. A flushing connection.

    c. Slope up the pump suction line from the pump to the **PISTA®** Grit Chamber.

    d. Never use elbow in the suction line; however, if they are necessary, you must use quick disconnect fittings or sanitary tees with a clean-out.

    e. Suction line must be less than 10’ long.

    f. Discharge piping must be less than 20’ long.

    g. All unnecessary elbows, bends, dips or manifolds should be eliminated.

    h. The discharge valve is recommended to be a pinch valve.

    i. The grit pumping cycle must be long enough to completely move all of the grit out of the **PISTA®** Grit Storage Hopper and also continue to pump long enough to remove all grit from the line.

    j. Do not locate traps in the suction or discharge line.

    k. Do not use check valves in grit piping.

ELECTRICAL SEQUENCE OF OPERATION FOR THE PISTA® GRIT REMOVAL SYSTEM USING THE TOP MOUNTED TURBO PISTA® GRIT PUMP

The Smith & Loveless **PISTA®** Grit Removal System is a complete grit removal system. It includes a paddle drive unit for the **PISTA®** Grit Chamber, a Top Mounted Turbo **PISTA®** Grit Pump for grit removal from the **PISTA®** Grit Chamber, a **PISTA®** Grit Concentrator for grit washing and hydraulic load reduction, and a **PISTA®** Grit Screw Conveyor for dewatering material discharged by the Turbo **PISTA®** Grit Pump. Additionally, Smith & Loveless supplies a control panel to automatically control the operation of this system. The proper sequence of each piece of equipment is important to maintain efficient operation of the system.

The **PISTA®** Grit Chamber's paddle drive runs continuously. There is no reason to shut down the paddle drive except for preventative maintenance or repair. An "Off-On" selector switch on the front of the control panel controls the drive.

The Turbo **PISTA®** Grit Pump and **PISTA®** Grit Screw Conveyor operate as a unit in the automatic mode to remove the grit from the bottom of the **PISTA®** Grit Chamber. Each has its own Hand-Off-Auto selector switch, if needed, for manual operation.

The Turbo **PISTA®** Grit Pump is controlled by a 24-hour, 96-pin clock timer controlling the frequency of initiation of the pump. In parallel with the timer, there is a pushbutton on the panel for manual starting of the Turbo **PISTA®** Grit Pump at anytime without interfering with the timed cycle. Once the Turbo **PISTA®** Grit Pump is running there is a timer to control the length of time the pump operates each cycle. The Turbo **PISTA®** Grit Pump stops when the timer "times out". The priming of the pump starts automatically within the startup sequence of the Turbo **PISTA®** Grit Pump. The Turbo **PISTA®** Grit Pump will only start after it receives a signal from a control relay saying that it has primed. There is also a "Fail" timer on the prime circuit. If it takes too long to prime, the grit cycle shuts down and a prime fail light on the panel illuminates.

The **PISTA®** Grit Screw Conveyor will start once the Turbo **PISTA®** Grit Pump is proven to be running. It is connected to an adjustable "Off Delay" timer to continue running (10-15 minutes) to remove all the grit once the Turbo **PISTA®** Grit Pump is shut off. Once the conveyor stops, the entire system is reset and ready for the next cycle. If the conveyor fails to start within 30 seconds, a timer will time out and shut down the Turbo **PISTA®** Grit Pump also.

PISTA® GRIT REMOVAL SYSTEM

ELECTRICAL SEQUENCE OF OPERATION FOR THE PISTA® GRIT REMOVAL SYSTEM USING THE REMOTE MOUNTED TURBO PISTA® GRIT PUMP

The Smith & Loveless **PISTA®** Grit Removal System is a complete grit removal system. It includes a paddle drive unit for the **PISTA®** Grit Chamber, a Remote Mounted Turbo **PISTA®** Grit Pump for grit removal from the **PISTA®** Grit Chamber, a **PISTA®** Grit Concentrator for grit washing and hydraulic load reduction, and a **PISTA®** Grit Screw Conveyor for dewatering material discharged by the Turbo **PISTA®** Grit Pump. Additionally, Smith & Loveless supplies a control panel to automatically control the operation of this system. The proper sequence of each piece of equipment is important to maintain efficient operation of the system.

The **PISTA®** Grit Chamber's paddle drive runs continuously. There is no reason to shut down the paddle drive except for preventative maintenance or repair. An "Off-On" selector switch on the front of the control panel controls the drive.

The Turbo **PISTA®** Grit Pump and **PISTA®** Grit Screw Conveyor operate as a unit in the automatic mode to remove the grit from the bottom of the **PISTA®** Grit Chamber. Each has its own Hand-Off-Auto selector switch, if needed, for manual operation.

The Turbo **PISTA®** Grit Pump is controlled by a 24-hour, 96-pin clock timer controlling the frequency of initiation of the pump. In parallel with the timer, there is a pushbutton on the panel for manual starting of the Turbo **PISTA®** Grit Pump at anytime without interfering with the timed cycle. Once the Turbo **PISTA®** Grit Pump is running there is a timer to control the length of time the pump operates each cycle. The Turbo **PISTA®** Grit Pump stops when the timer "times out".

The **PISTA®** Grit Screw Conveyor will start once the Turbo **PISTA®** Grit Pump is proven to be running. It is connected to an adjustable "Off Delay" timer to continue running (10-15 minutes) to remove all the grit once the Turbo **PISTA®** Grit Pump is shut off. Once the conveyor stops, the entire system is reset and ready for the next cycle. If the conveyor fails to start within 30 seconds, a timer will timeout and shut down the Turbo **PISTA®** Grit Pump also.

DESIGN DATA TABLES

The following ten (10) tables will assist you in sizing and specifying your **PISTA®** Grit Removal System. Tables 1 & 2 detail the straight through or 360-degree **PISTA®** Grit Chamber utilizing concrete for the chamber. Table 3 details the **PISTA®** Grit Chamber utilizing a steel chamber. Table 4 is the 270-degree **PISTA®** Grit Chamber utilizing concrete for the chamber. Table 5 covers the **PISTA®** grit storage volume. Table 6 details the Turbo **PISTA®** Grit Pump. Table 7 covers the **PISTA®** Grit Concentrator and Tables 8, 9 and 10 are three (3) final dewatering **PISTA®** systems to select from.

Starting on page F5, you will find tables that contain the design date in metric units.

Table 1
PISTA® GRIT CHAMBER DESIGN DATA – CONCRETE TANK – 360° UNITS

Model	0.5A, 0.5B	1.0A, 1.0B	2.5A, 2.5B	4.0A, 4.0B	7.0A, 7.0B	12.0A, 12.0B	20.0A, 20.0B
Maximum Flow (MGD)	0.5	1.0	2.5	4.0	7.0	12.0	20.0
Chamber Diameter	6' – 0"	6' – 0"	7' – 0"	8' – 0"	10' – 0"	12' – 0"	16' – 0"
Chamber Depth	3' – 8"	3' – 8"	4' – 6"	4' – 8"	5' – 0"	6' – 8"	7' – 6"
Grit Hopper Diameter	3' – 0"	3' – 0"	3' – 0"	3' – 0"	3' – 0"	5' – 0"	5' – 0"
Grit Hopper Depth	5' – 0"	5' – 0"	5' – 0"	5' – 0"	5' – 6"	6' – 8"	6' –10"
Drive: HP	3/4	3/4	3/4	1	1	1-1/2	1-1/2
Input RPM	54	54	54	54	54	54	54
Output RPM	20	20	20	20	20	20	20
Estimated Shipping Wt. (Lbs.)	2000	2000	2000	2000	2500	2500	3000

Table 2
PISTA® GRIT CHAMBER DESIGN DATA – CONCRETE TANK – 360° UNITS

Model	30.0A, 30.0B	50.0A, 50.0B	70.0A, 70.0B	100.0A, 100.0B
Maximum Flow (MGD)	30.0	50.0	70.0	100.0
Chamber Diameter	18' – 0"	20' – 0"	24' – 0"	32' – 0"
Chamber Depth	9' – 2"	11' – 6"	12' – 8"	12' – 8"
Grit Hopper Diameter	5' – 0"	5' – 0"	6' –0"	8' – 0"
Grit Hopper Depth	7' – 0"	8' – 0"	8' – 0"	10' – 0"
Drive: HP	2	2	2	2
Input RPM	54	54	54	54
Output RPM	20	20	20	20
Estimated Shipping Wt. (Lbs.)	3000	3700	4000	5000

Table 3
PISTA® GRIT CHAMBER DESIGN DATA – STEEL TANK – 360° UNITS

Model	0.5A, 0.5B	1.0A, 1.0B	2.5A, 2.5B	4.0A, 4.0B	7.0A, 7.0B
Maximum Flow (MGD)	0.5	1.0	2.5	4.0	7.0
Chamber Diameter	6'-0"	6' – 0"	7' – 0"	8' – 0"	9' – 10 ¼"
Chamber Depth	2' – 6 5/8"	2' – 6 5/8"	3' – 4 5/8"	3' – 6 ¾ "	3' – 10 ¾"
Grit Hopper Diameter	3' – 0"	3' – 0"	3' – 0"	3' – 0"	3' – 0"
Grit Hopper Depth	5' – 0"	5' – 0"	5' – 0"	5' – 0"	5' – 6"
Drive: HP	3/4	3/4	3/4	1	1
Input RPM	54	54	54	54	54
Output RPM	20	20	20	20	20
Estimated Shipping Wt. (Lbs.)	4000	4000	4500	5500	7000

Table 4 PISTA® GRIT CHAMBER DESIGN DATA – CONCRETE TANK – 270° UNITS											
Model	**0.5**	**1.0**	**2.5**	**4.0**	**7.0**	**12.0**	**20.0**	**30.0**	**50.0**	**70.0**	**100.0**
Maximum Flow (MGD)	0.5	1.0	2.5	4.0	7.0	12.0	20.0	30.0	50.0	70.0	100.0
Chamber Diameter	6' – 0"		7' – 0"	8' – 0"	10' – 0" *	12' – 0"	16' – 0"	18' – 0"	20' – 0"	24'– 0"	32' – 0"
Chamber Depth	3' – 8"		3' – 8"	4' – 0"	4' – 9"	5' – 0"	5' – 6"	6' – 6"	8' – 0"	8' – 0"	10' – 0"
Grit Hopper Diameter	3' – 0"		3' – 0"	3' – 0"	5' – 0"	5' – 0"	5' – 0"	5' – 0"	5' – 0"	6' – 0"	8' – 0"
Grit Hopper Depth	5' – 0"		5' – 0"	5' – 0"	5' – 6"	6' – 8"	6' – 10"	7' – 0"	8' – 0"	8' – 0"	10' – 0"
Drive: HP	3/4		3/4	3/4	1	1	2	2	2	2	2
Input RPM	54		54	54	37	37	36	36	36	36	36
Output RPM	20		20	20	14	14	13	13	13	13	13
Estimated Shipping Wt. (Lbs.)	2000		2000	2000	2500	2500	3000	3000	3000	3000	3000
Add for Steel Shell	2300		2600	3300	4800	N/A	N/A	N/A	N/A	N/A	N/A

* 9' – 10-¼" in Steel

Now that you have selected the **PISTA®** Grit Chamber model you require, you can determine the grit storage volume in the **PISTA®** Grit Chamber.

Table 5 PISTA® GRIT CHAMBER GRIT HOPPER STORAGE VOLUME **	
MODEL	**CUBIC FEET**
0.5, 0.5A, 0.5B	32
1.0, 1.0A, 1.0B	32
2.5, 2.5A, 2.5B	32
4.0, 4.0A, 4.0B	32
7.0A, 7.0B	35
7.0	76
12.0, 12.0A, 12.0B	100
20.0, 20.0A, 20.0B	102
30.0, 30.0A, 30.0B	106
50.0, 50.0A, 50.0B	125
70.0, 70.0A, 70.0B	164
100.0, 100.0A, 100.0B	335

** Volumes seen above are based on the hopper dimensions listed in Tables 1 through 4, and utilizing a 60° sloped bottom in the **PISTA®** Grit Chamber's grit hopper.

The following **PISTA®** Grit Removal System components will provide the end-user with the best removal and dewatering efficiencies in the market. In order to provide periodic pump out of the grit chamber, Smith & Loveless recommends the use of the Top Mounted Turbo **PISTA®** Grit Pump or Remote Mounted Turbo **PISTA®** Grit Pump (Table 6). Smith & Loveless then recommends the use of the **PISTA®** Grit Concentrator (Table 7) and one of three **PISTA®** Grit Dewatering Devices (Tables 8, 9, & 10). This total Grit Removal System will produce some of the best grit removal efficiencies and dewatering capabilities on the market today.

Table 6
RECOMMENDED FOR ALL PISTA® GRIT CHAMBER MODELS
GENERAL INFORMATION
TURBO PISTA® GRIT PUMP

Pump Rate, GPM	**250**	**500**
Casing Suction Size Discharge Nozzle	4” 4”	6” 6”
Impeller Max. Diameter Min.	10” 7”	12” 9”
Shaft Size for Mechanical Seal	1-7/8” or 2-1/8”	1-7/8”, 2-1/8” or 3”
Shaft	Stainless Steel	Stainless Steel
Seal Holder	Bronze	Bronze
Seal	Carbon and Ceramic	Carbon and Ceramic
Shaft Overhang (Lowest Bearing to Top of Impeller)	6” Max.	6” Max.
Motor Insulation	Class F	Class F
Casing	Ni-Hard	Ni-Hard
Impeller Design/Material	Recessed 5-Vane Turbo/Ni-Hard	Recessed 5-Vane Turbo/Ni-Hard
Estimated Shipping Weight – Lbs. (Including Motor)	750	970

Table 7
RECOMMENDED FOR ALL PISTA® GRIT CHAMBER MODELS
GENERAL INFORMATION
PISTA® GRIT CONCENTRATOR

Pump Rate, GPM - Inlet	**250**	**500**
Head loss through Concentrator, FT @ Design Pump Rate	12	25
Underflow, GPM @ Design Pump Rate	20	30
Inlet Diameter (outer diameter), Inches (plain end)	4-1/2	4-1/2
Underflow Outlet Diameter (outer diameter), Inches (plain end)	5-1/2	4-3/4
Drain Outlet Diameter, Inches (flanged)	6	6
Material – Nickel Hardened Iron, Brinell Hardness	550+	550+

Table 8
PISTA® GRIT SCREW CONVEYOR WITH PARALLEL PLATE SEPARATOR
RECOMMENDED FOR ALL PISTA® GRIT CHAMBER MODELS

Model	**15**	**17**
Drawing Number	67C168	67B202
Dewatering Trough Length	15' – 0"	17' – 0"
Dewatering Screw Diameter	9"	14"
Discharge	8"	12"
Outlet Weir Trough	4"	6"
Drive Motor (HP)	1	3
Screw Speed (RPM)	9	11
Angle of Inclination	22°	22°
Overall Length	18' – 8"	20' – 9"
Inlet Separator:		
Length	5' – 0"	6' – 8"
Width	2' – 6"	4' – 0"
Height	4' – 8"	5' – 6"
Settling Area	15.1 ft^2	33.0 ft^2
Approximate Shipping Weight (LBS.)	2000	3000
Maximum Capacity (GPM)	50	100

Table 9
SEPARATOR SCREEN WITH PISTA® GRIT CONCENTRATOR

HEIGHT	**WIDTH**	**DEPTH**	**INLET**	**OUTLET**	**EST. WT.**	**RECOMMENDED PISTA® MODELS**
80-7/8"	39-3/4"	49"	4"	6"	660 Lbs.	0.5, 0.5A, 0.5B, 1.0, 1.0A, 1.0B, 2.5, 2.5A, 2.5B, 4.0, 4.0A, 4.0B, 7.0, 7.0A, 7.0B

Table 10
PISTA® GRIT CART

APPROXIMATE OVERALL DIMENSIONS			**APPROX. SHIP. WT. POUNDS**	**RECOMMENDED PISTA® GRIT CHAMBER MODELS**
LENGTH	**WIDTH**	**HEIGHT**		
55"	35"	32"	200	0.5, 0.5A, 0.5B, 1.0, 1.0A, 1.0B, 2.5, 2.5A, 2.5B, 4.0, 4.0A, 4.0B

PISTA® Grit Removal System