PISTA
Grit Removal System

Complete Grit Handling, Washing, & Dewatering

Unparalleled Research & Development

Highest Grit Removal Efficiencies

by Smith & Loveless Inc.
Smith & Loveless’ commitment to market leadership in grit removal kindles on-going research and development, which leads to continued system innovations. Since the introduction of the original vortex PISTA® Grit Chamber in the early 1970s, S&L has developed numerous patented and exclusive components to further enhance the capability for complete grit removal, handling, and dewatering. This innovation and experience makes the unparalleled PISTA® the industry's most specified grit removal system today.

Exclusive & Patented Features
- Flat Bottom PISTA® Grit Chamber
- PISTA® Grit Flow Control Baffle
- PISTA® 360-degree In-Line Design
- Low Energy-Use PISTA® Propeller
- S&L PISTA® Coanda Ramp Design
- PISTA® Grit Fluidizer Vane
- PISTA® Turbo Grit Pumps with SonicStart™
- PISTA® Grit Handling System

PISTA® Unparalleled Vortex Grit Removal

Removing grit reduces accumulation in downstream basins, channels and piping, thus preventing excess wear and abrasion on mechanical equipment and reduction of basin volumes and detention times.

The PISTA® Grit Removal System maintains the highest proven grit removal efficiencies on the market over a wide range of daily flows. In fact, Smith & Loveless—backed by the experience and evidence of more than 2,000 system installations—publishes its removal efficiencies for a range of grit sizes, including fine grit. The PISTA® efficiencies are based on actual WWTP performance—not hypothetical testing or theorizing.

High removal efficiencies originate from the PISTA®'s unparalleled hydraulic design, including its flat grit chamber floor, engineered baffle arrangements and low-energy axial-flow propeller. The combination creates a true vortex which effectively separates grit from organics and the waste stream. Forced vortex action distinguishes the PISTA® because it does not rely only on less efficient particle settling or gravity.

Grit Characteristics & Removal
Grit consists of a variety of particles including sand, gravel and other heavy, discrete inorganic materials. A large majority of grit found in typical domestic sewage—in upwards of 90% and more—are coarser particles 50 mesh size grit and larger (300 μm). The remainder composition of smaller grit particles mostly ranges between 50 and 100 mesh (150 μm). Grit particles can reach 200 mesh (100 μm) in size—like silt—but turbulence in the flow prevents them from settling anywhere in the treatment scheme (not posing problems like typical grit). S&L's published removal efficiencies demonstrate percentage removal at various particulate sizes and total removal. Our field tests consistently prove that the PISTA® meets or exceeds 95 percent removal efficiency for all grit in a waste stream.

VISIT PISTAGRITCHAMBER.COM
**PISTA® Grit Chamber Features and Benefits**

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

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

- **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 entrainment.

- **PISTA® Flow Control Baffle**
  - New, patented innovation enhances removal efficiency for low-flow periods and offers design engineering benefits (see page at right).

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

- **Storage Hopper**
  - Stores removed grit prior to dewatering.

- **PISTA® Turbo Grit Pump** [Top-Mounted & Remote-Mounted Options]

- **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.

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

---

**PISTA® Complete Grit Removal, Handling & Dewatering System Flow Scheme**

- **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.

- **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.

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

- **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.

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

- **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.
PISTA® Design & Application

PISTA® offers flexible application for true grit removal, whether from domestic sewage in a municipal WWTP headworks, distribution network pump stations or industrial process streams in a commercial production facility. The grit chamber can be installed above-grade or below ground with either concrete, carbon steel, or stainless steel tankage.

Individual units can handle waste streams less than 0.5 MGD all the way to 100 MGD. In large treatment works, multiple units arrange to efficiently remove grit from hundreds of millions of gallons of flow a day.

<table>
<thead>
<tr>
<th>PISTA® Model Number</th>
<th>Max. Flow</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 / 0.5A</td>
<td>0.5 MGD</td>
<td>1,892 CMD</td>
</tr>
<tr>
<td>1.0 / 1.0A</td>
<td>1.0 MGD</td>
<td>3,785 CMD</td>
</tr>
<tr>
<td>2.5 / 2.5A</td>
<td>2.5 MGD</td>
<td>9,465 CMD</td>
</tr>
<tr>
<td>4.0 / 4.0A</td>
<td>4.0 MGD</td>
<td>15,140 CMD</td>
</tr>
<tr>
<td>7.0 / 7.0A</td>
<td>7.0 MGD</td>
<td>26,495 CMD</td>
</tr>
<tr>
<td>12.0 / 12.0A</td>
<td>12.0 MGD</td>
<td>45,420 CMD</td>
</tr>
<tr>
<td>20.0 / 20.0A</td>
<td>20.0 MGD</td>
<td>75,700 CMD</td>
</tr>
<tr>
<td>30.0 / 30.0A</td>
<td>30.0 MGD</td>
<td>113,550 CMD</td>
</tr>
<tr>
<td>50.0 / 50.0A</td>
<td>50.0 MGD</td>
<td>189,250 CMD</td>
</tr>
<tr>
<td>70.0 / 70.0A</td>
<td>70.0 MGD</td>
<td>265,000 CMD</td>
</tr>
<tr>
<td>100 / 100.0A</td>
<td>100.0 MGD</td>
<td>378,500 CMD</td>
</tr>
</tbody>
</table>

The patented 360-degree in-line design (Model A Series) allows for easy installation to existing headworks.

PISTA® New Flow Control Baffle Provides Engineering Benefits

The patented PISTA® Grit Flow Control Baffle provides many engineering benefits and cost-saving considerations. By increasing chamber velocity during low flow periods, the baffle extends the grit extraction path within the vortexing grit chamber. This is key because a longer grit path within in the flow pattern increases the likelihood of grit being captured on the chamber’s flat-floor.

Beyond this, the PISTA® Grit Flow Control Baffle also permits design flexibility so that water elevations can be controlled. Controlling the water level is important because it upholds the proper velocities approaching the grit chamber. Previously, the most common way to accomplish this was to back up the flow with a downstream submerged weir. The PISTA® Flow Control Baffle with its preset inlet and outlet openings supplants the need for the submerged weir. By integrating the water elevation settings with the baffle, the overall outlet footprint requirements decrease as much as half the typical distance. This also affords the design engineer the flexibility to allow an outlet channel to make sharp turns immediately after leaving the circular portion of the grit chamber. The resulting smaller footprint provides significant construction cost savings.

Flow Control Baffle Benefits

- Increases grit chamber velocity during low-flow periods and removal efficiency by lengthening grit extraction path.
- Controls flow velocity and eliminates need for downstream level control devices.
- Decreases overall grit system footprint requirements.

The PISTA® Grit Chamber Flow Control Baffle is the latest design innovation in the world's leading grit removal system. The baffle development offers many engineering and cost-saving benefits.
Unparalleled Innovation For 30+ Years.

1973 - PISTA® Grit Removal System (270°)
1974 - PISTA® Grit Screw Conveyor
1978 - Air Lift Vents
1981 - 50 MGD PISTA® Grit Chamber
1982 - 175 GPM PISTA® Grit Concentrator
1982 - 4" PISTA® Turbo Grit Pump
1984 - 70 MGD PISTA® Grit Chamber
1988 - 360° PISTA® In-Line Design
1988 - 250 GPM PISTA® Grit Concentrator
1989 - Parallel (Lamella) Plate Screw Conveyor
1992 - PISTA® Grit Fluidizer
1998 - 6" PISTA® Turbo Grit Pump
1998 - 500 GPM PISTA® Grit Concentrator (Ni-Hard)
1999 - 100 MGD PISTA® Grit Chamber
2004 - PISTA® Flow Control Baffle
2004 - PISTA® Turbo Grit Pump with SonicStart™
Smith & Loveless Inc. knows grit removal. Our experience flows from more than three decades of thorough R&D and 2000+ PISTA® installations throughout North America and the world. Along the way, we've continued to enhance the complete system with innovations that deliver unparalleled results. With the PISTA® Grit Removal System you receive the finest in system performance backed by the value-added experience and support of Smith & Loveless.

PISTA®
Grit Removal System

by Smith & Loveless Inc.