grindex

PUMP HANDBOOK


**US**
**60 Hz**

**Welcome to Grindex Pump handbook!**

With this handbook we want to share some of our wide experience in pumping with submersible pumps. You will find an overview of all Grindex pumps with technical details and a pump school, intended to help pump users with common matters in pumping with submersible pumps. The handbook also contains more sophisticated technical information, like pH tables and graphs that show friction losses in pipes and hoses.

We are sure you will find this handbook handy. This handbook is also available for download from our website, www.grindex.com.

If you need more copies, please contact a Grindex representative near you.

# INDEX

# Drainage pumps

Grindex drainage pumps are designed for professional use in tough applications like mines, construction sites, tunnel sites and other demanding industries.

**They are designed for:**

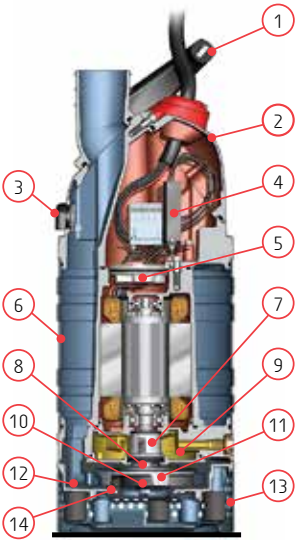
- Pumping water that may contain solids – up to the size of the strainer holes
- Pumping water with abrasive solids
- Pumping ground water
- Pumping raw water
- Pumping spillage water

Grindex drainage pumps are designed for continuous, unattended operation. They have proven their reliability and dependable performance in demanding areas like building and construction, mining, tunnelling, quarries, industries and rental applications.

This page is a "target image" for the "Grindex Cutaway"-app with 3D and Augmented Reality functions

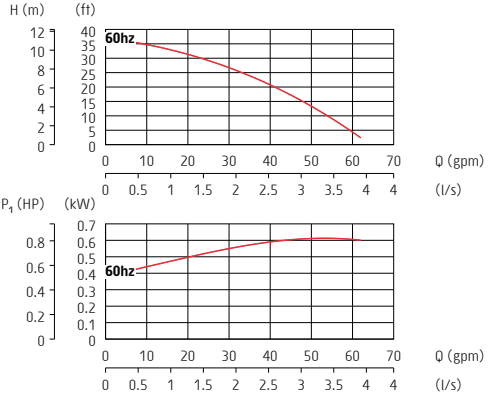
# FEATURES

Drainage Pumps




1. Ergonomic handle with a rubber grip on a metal frame
2. Inspection cover with large opening for easy access to junction box
3. Air valve cools the pump when no water is pumped
4. SMART motor protection including phase-failure guard, temperature guard and phase-sequence control eliminating the need for external start box
5. Enhanced terminal board with quick release terminal plate and sealing function
6. Durable outer jacket made from corrugated stainless steel
7. Easy service cartridge seal in rugged metal housing for improved heat transfer and longer pump life
8. Built-in particle repeller carries particles away from the seal for increased pump life
9. Simplified oil inspection and service, thanks to external plugs
10. Single adjustment screw for easy adjustment of the impeller and better performance
11. Hard-Iron™ impeller for maximum durability and performance
12. Heavy-duty polyurethane coating (optional for drainage pumps)
13. Durable strainer in stainless steel with ergonomic grip
14. Wear Protection system for increased life of hydraulic parts

# MICRO

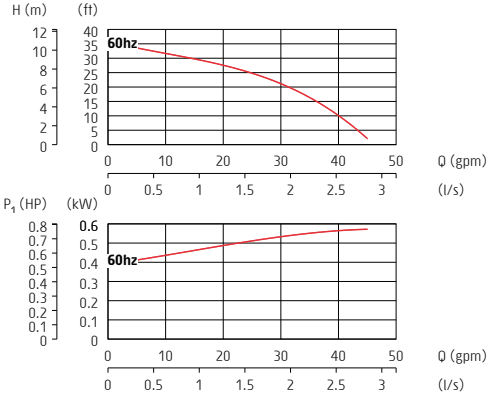




| Technical Data 60 Hz | Micro |
|---|---|
| Pump type | 8121.211 |
| Discharge connection | 2" |
| Rated power P2 | 0.56 Hp (0.42 kW) |
| Max. power cons. P1 | 0.87 kW |
| Shaft speed | 3300 RPM |
| Rated current at 115V | 5.5 A |
| Rated current at 230V | 2.9 A |
| Solids passage | 0.4x0.2" (11x5 mm) |
| Max. height | 17.25" (440 mm) |
| Max. width | 7.25" (185 mm) |
| Weight | 26.5 lbs (12 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

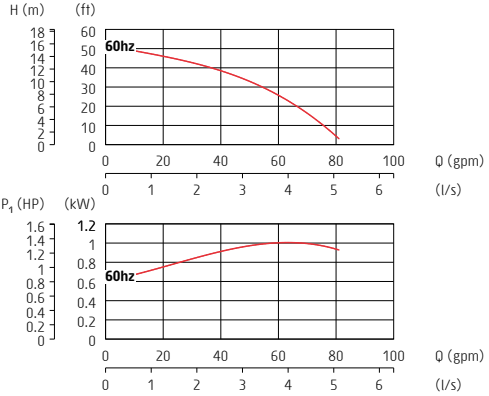
# MILLI


| Technical Data 60 Hz | Milli |
|---|---|
| Pump type | 8125.230 |
| Discharge connection | 2″ |
| Rated power P2 | 0.6 HP (0.45 kW) |
| Max. power cons. P1 | 0.65 kW |
| Shaft speed | 3300 RPM |
| Rated current at 115V | 5.5 A |
| Rated current at 230V | 2.9 A |
| Solids passage | 0.25″ (6.2 mm) |
| Max. height | 18.25″ (464 mm) |
| Max. width | 7.4″ (188 mm) |
| Weight | 28.7 lbs (13 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# MINI

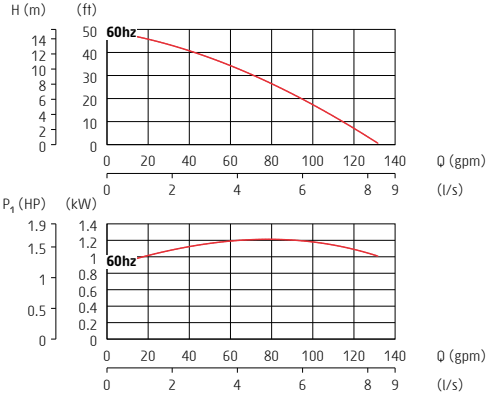




| Technical Data 60 Hz | Mini |
|---|---|
| Pump type | 8122.211 |
| Discharge connection | 2" |
| Rated power P2 | 1.1 HP (0.82 kW) |
| Max. power cons. P1 | 1.1 kW |
| Shaft speed | 3400 RPM |
| Rated current at 115V | 9.8 A |
| Rated current at 230V | 4.8 A |
| Solids passage | 0.4x0.2" (11x5 mm) |
| Max. height | 17.3" (440 mm) |
| Max. width | 7.3" (185 mm) |
| Weight | 32 lbs (14.5 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

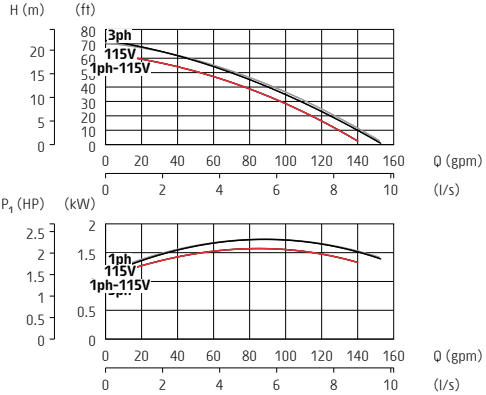
# MINEX LITE


| Technical Data 60 Hz | Minex Lite 1-ph |
|---|---|
| Pump type | 8101.172 |
| Discharge connection | 2" |
| Rated power P2 | 1.3 HP (0.97 kW) |
| Max. power cons. P1 | 1.3 kW |
| Shaft speed | 3410 RPM |
| Rated current at 115V | 11 A |
| Rated current at 230V | 5.6 A |
| Solids passage | 0.3" (7.5 mm) |
| Max. height | 24.25" (616 mm) |
| Max. width | 7.9" (200 mm) |
| Weight | 47.5 lbs (21.5 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# MINEX





| Technical Data 60 Hz | Minex 1-ph 115V | Minex 1-ph 230V | Minex 3-ph |
|---|---|---|---|
| Pump type | 8101.160 | 8101.160 | 8101.172 |
| Discharge connection | 2" | 2" | 2" |
| Rated power P2 | 1.8 HP (1.3 kW) | 2.0 HP (1.5 kW) | 1.9 HP (1.4 kW) |
| Max. power cons. P1 | 1.7 kW | 1.8 kW | 1.8 kW |
| Shaft speed | 3415 RPM | 3460 RPM | 3355 RPM |
| Rated current at 115V | 15A | - | - |
| Rated current at 230V | - | 8.2 A | 5.2 A |
| Rated current at 460V | - | - | 2.6 A * |
| Rated current at 575V | - | - | 2.1 A * |
| Solids passage | 0.3" (7.5 mm) | 0.3" (7.5 mm) | 0.3" (7.5 mm) |
| Max. height | 24.3" (616 mm) | 25.5" (646 mm) | 24.3" (616 mm) |
| Max. width | 7.9" (200 mm) | 7.9" (200 mm) | 7.9" (200 mm) |
| Weight | 47.5 lbs (21.5 kg) | 55 lbs (25 kg) | 47.5 lbs (21.5 kg) |

** Also available in MSHA-approved design (curves and ratings may differ from above) - US only.*
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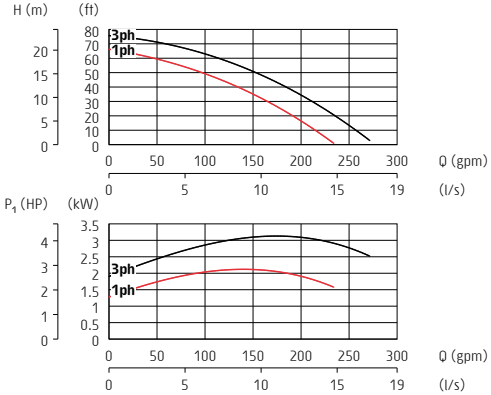
# MINETTE


| Technical Data 60 Hz | Minette 1-ph | Minette 3-ph |
|---|---|---|
| Pump type | 8102.172 | 8102.172 |
| Discharge connection | 3" | 3" |
| Rated power P2 | 2.4 HP (1.8 kW) | 3.5 HP (2.6 kW) |
| Max. power cons. P1 | 2.2 kW | 3.1 kW |
| Shaft speed | 3405 RPM | 3410 RPM |
| Rated current at 230V | 9.9 A | 9.5 A |
| Rated current at 460V | - | 4.7 A * |
| Rated current at 575V | - | 3.5 A * |
| Solids passage | 0.35" (9 mm) | 0.35" (9 mm) |
| Max. height | 26.5" (676 mm) | 26.5" (676 mm) |
| Max. width | 9.5" (240 mm) | 9.5" (240 mm) |
| Weight | 64 lbs (29 kg) | 64 lbs (29 kg) |

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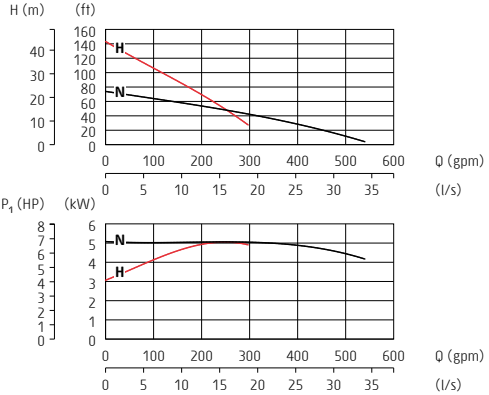
# MINOR





| Technical Data 60 Hz | Minor N | Minor H |
|---|---|---|
| Pump type | 8103.181 | 8103.181 |
| Discharge connection | 4" | 3" |
| Rated power P2 | 6.0 HP (4.4 kW) | 6.0 HP (4.4 kW) |
| Max. power cons. P1 | 5.2 kW | 5.2 kW |
| Shaft speed | 3480 RPM | 3480 RPM |
| Rated current at 230V | 15 A | 15 A |
| Rated current at 460V | 7.1 A * | 7.1 A * |
| Rated current at 575V | 5.5 A * | 5.5 A * |
| Solids passage | 0.4" (10 mm) | 0.4" (10 mm) |
| Max. height | 30.2" (768 mm) | 30.2" (768 mm) |
| Max. width | 11.3" (286 mm) | 11.3" (286 mm) |
| Weight | 110 lbs (50 kg) | 110 lbs (50 kg) |

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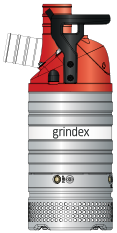
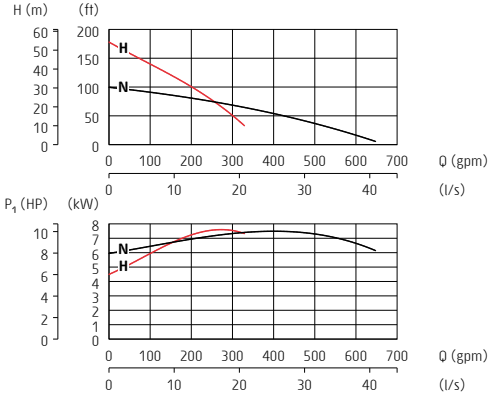
# MAJOR




| Technical Data 60 Hz | Major N | Major H |
|---|---|---|
| Pump type | 8104.181 | 8104.181 |
| Discharge connection | 4" | 3" |
| Rated power P2 | 9.0 HP (6.6 kW) | 9.0 HP (6.6 kW) |
| Max. power cons. P1 | 7.7 kW | 7.7 kW |
| Shaft speed | 3470 RPM | 3470 RPM |
| Rated current at 230V | 22 A | 22 A |
| Rated current at 460V | 11 A * | 11 A * |
| Rated current at 575V | 8.7 A * | 8.7 A * |
| Solids passage | 0.4" (10 mm) | 0.4" (10 mm) |
| Max. height | 30.2" (768 mm) | 30.2" (768 mm) |
| Max. width | 11.3" (286 mm) | 11.3" (286 mm) |
| Weight | 110 lbs (50 kg) | 110 lbs (50 kg) |

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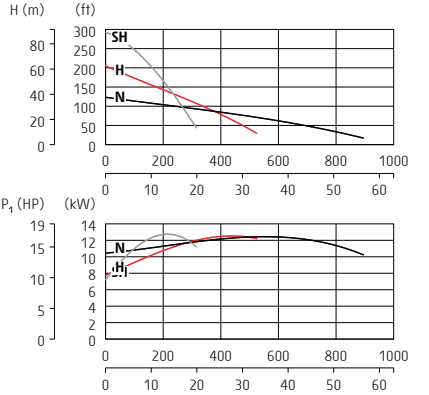
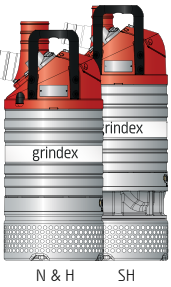
# MASTER




| Technical Data 60 Hz | Master N | Master H | Master SH |
|---|---|---|---|
| Pump type | 8105.182 | 8105.182 | 8105.182 |
| Discharge connection | 6″ | 4″ | 3″ |
| Rated power P2 | 15 HP (11.2 kW) | 15 HP (11.2 kW) | 15 HP (11.2 kW) |
| Max. power cons. P1 | 12.8 kW | 12.8 kW | 12.8 kW |
| Shaft speed | 3465 RPM | 3465 RPM | 3465 RPM |
| Rated current at 230V | 35 A | 35 A | 35 A |
| Rated current at 460V | 18 A * | 18 A * | 18 A * |
| Rated current at 575V | 14 A * | 14 A * | 14 A * |
| Solids passage | 0.4″ (10 mm) | 0.4″ (10 mm) | 0.4″ (10 mm) |
| Max. height | 32.8″ (832 mm) | 32.8″ (832 mm) | 35″ (887 mm) |
| Max. width | 13.7″ (346 mm) | 13.7″ (346 mm) | 13.7″ (346 mm) |
| Weight | 176 lbs (80 kg) | 176 lbs (80 kg) | 216 lbs (98 kg) |

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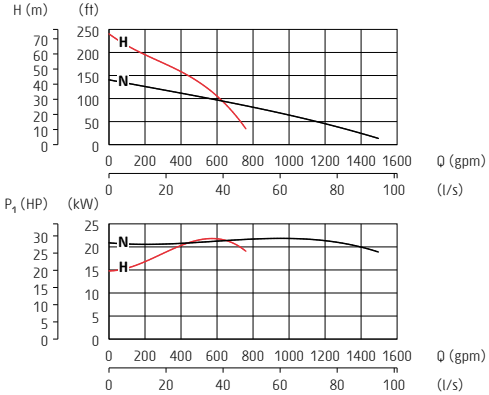
# MATADOR


| Technical Data 60 Hz | Matador N | Matador H |
|---|---|---|
| Pump type | 8106.181 | 8106.181 |
| Discharge connection | 6" | 4" |
| Rated power P2 | 27 HP (20 kW) | 27 HP (20 kW) |
| Max. power cons. P1 | 22 kW | 22 kW |
| Shaft speed | 3495 RPM | 3495 RPM |
| Rated current at 230V | 61 A | 61 A |
| Rated current at 460V | 31 A * | 31 A * |
| Rated current at 575V | 25 A * | 25 A * |
| Solids passage | 0.5" (12 mm) | 0.5" (12 mm) |
| Max. height | 37.6"(954 mm) | 37.6" (954 mm) |
| Max. width | 15.6" (395 mm) | 15.6" (395 mm) |
| Weight | 289 (131 kg) | 289 (131 kg) |

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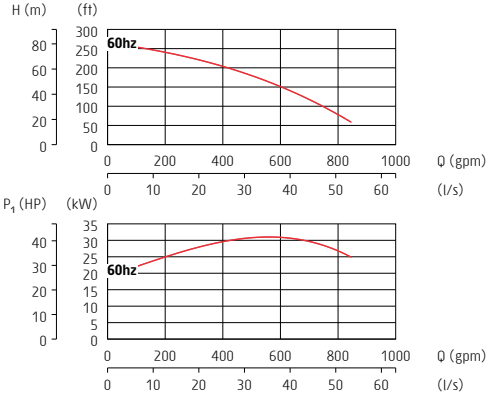
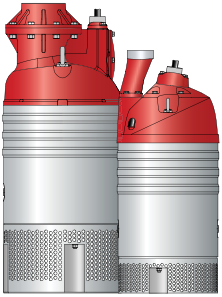
# MAXI H LITE



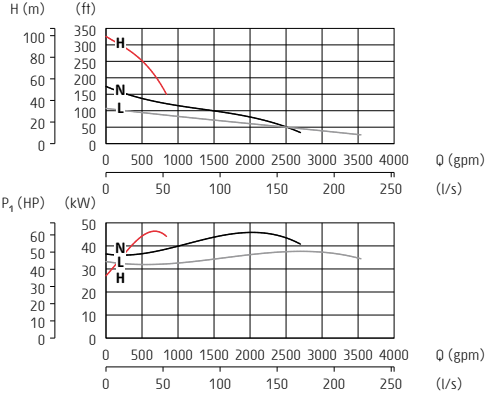

| Technical Data 60 Hz | Maxi H Lite |
|---|---|
| Pump type | 8107.300 |
| Discharge connection | 4" |
| Rated power P2 | 39 HP (29 kW) |
| Max. power cons. P1 | 32 kW |
| Shaft speed | 3505 RPM |
| Rated current at 230V | 87A |
| Rated current at 460V | 44 A |
| Rated current at 575V | 35 A |
| Solids passage | 0.5" (12 mm) |
| Max. height | 41" (1046 mm) |
| Max. width | 17" (436 mm) |
| Weight | 463 lbs (210 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# MAXI N, H & L



N & L H




| Technical Data 60 Hz | Maxi N | Maxi H* | Maxi L |
|---|---|---|---|
| Pump type | 8107.011 | 8107.011 | 8107.030 |
| Discharge connection | 8″ | 4″ | 8″ |
| Rated power P2 | 58 HP (43 kW) | 58 HP (43 kW) | 50 HP (37 kW) |
| Max. power cons. P1 | 48 kW | 48 kW | 42 kW |
| Shaft speed | 3545 RPM | 3545 RPM | 1765 RPM |
| Rated current at 230V | 136 A | 136 A | 120 A |
| Rated current at 460V | 65 A * | 65 A * | 64 A * |
| Rated current at 575V | 52 A * | 52 A * | 48 A * |
| Solids passage | 0.6″ (15 mm) | 0.5″ (12 mm) | 0.6″ (15 mm) |
| Max. height | 51.3″ (1302 mm) | 41″ (1046 mm) | 51.3″ (1302 mm) |
| Max. width | 20″ (506 mm) | 17″ (436 mm) | 20″ (506 mm) |
| Weight | 618 lbs (280 kg) | 530 lbs (240 kg) | 628 lbs (285 kg) |

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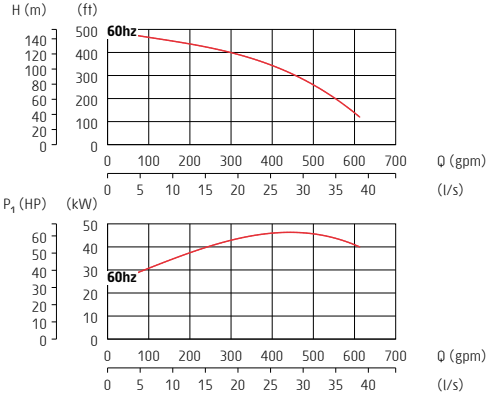
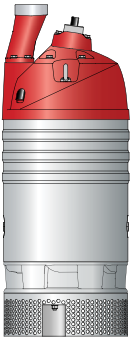
# MAXI SH

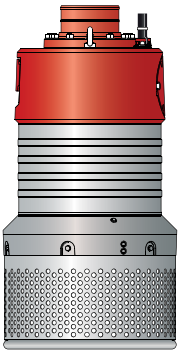


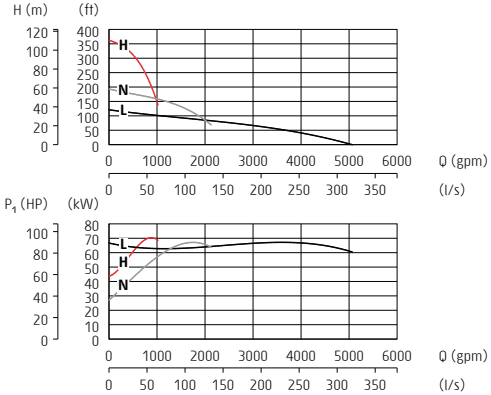



| Technical Data 60 Hz | Maxi SH |
|---|---|
| Pump type | 8107.011 |
| Discharge connection | 4" |
| Rated power P2 | 58 HP (43 kW) |
| Max. power cons. P1 | 48 kW |
| Shaft speed | 3550 RPM |
| Rated current at 230V | 133 A |
| Rated current at 460V | 65 A |
| Rated current at 575V | 52 A |
| Solids passage | 0.5" (12 mm) |
| Max. height | 45.2" (1148 mm) |
| Max. width | 17.3" (440 mm) |
| Weight | 595 lbs (270 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# MAGNUM

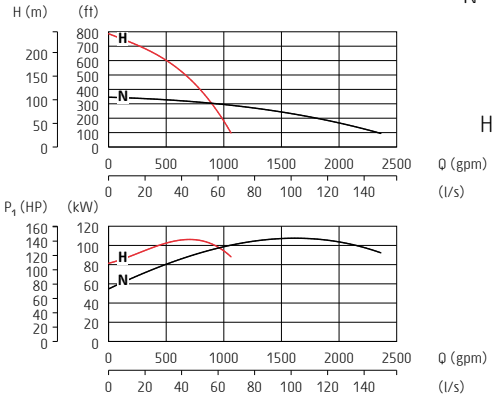


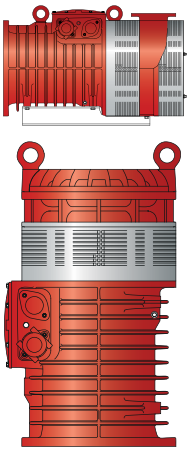



| Technical Data 60 Hz | N | H | L |
|---|---|---|---|
| Pump type | 8108.010 | 8108.010 | 8108.010 |
| Discharge connection | 8″ | 6″ | 10″ |
| Rated power P2 | 90 HP (67 kW) | 90 HP (67 kW) | 90 HP (67 kw) |
| Max. power cons. P1 | 73 kW | 75 kW | 73 kW |
| Shaft speed | 1770 RPM | 3540 RPM | 1770 RPM |
| Rated current at 230V | - | - | - |
| Rated current at 460V | 107 A | 101 A | 107 A |
| Rated current at 575V | 85 A | 81 A | 85 A |
| Solids passage | 0.5″ (12 mm) | 0.5″ (12 mm) | 0.5″ (12 mm) |
| Max. height | 58″ (1475 mm) | 58″ (1475 mm) | 58″ (1475 mm) |
| Max. width | 29.5″ (750 mm) | 29.5″ (750 mm) | 29.5″ (750 mm) |
| Weight | 1190 lbs (540 kg) | 1190 lbs (540 kg) | 1190 lbs (540 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# MEGA




| Technical Data 50 Hz | Mega N | Mega H |
|---|---|---|
| Pump type | 8124.400 | 8124.400 |
| Discharge connection | 6" (DN150) | 4" (DN100) |
| Rated power P2 | 140 HP (104 kW) | 140 HP (104 kW) |
| Max. power cons. P1 | 110 kW | 110 kW |
| Shaft speed | 3560 RPM | 3560 RPM |
| Rated current at 460V | 148 A | 148 A |
| Rated current at 575V | 118 A | 118 A |
| Solids passage | 0.4" (10 mm) | 0.4" (10 mm) |
| Max. height | 30.3" (770 mm) | 49" (1245 mm) |
| Diameter | 24" (610 mm) | 24" (610 mm) |
| Max. width | 46.5" (1180 mm) | 27.6" (700 mm) |
| Weight | 1984 lbs (900 kg) | 2172 lbs (985 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# NOTES

# Materials in drainage pumps

| Material | Micro | Milli | Mini | Minex | Minette | Minor | Major | Master | Matador | Maxi | Magnum | Mega |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Inner seal** | | | | | | | | | | | | |
| Tungsten carbide - Tungsten carbide | | | | | | | | | • | • | • | • |
| Tungsten carbide - Aluminium oxide | | | | • | • | • | • | • | | | | |
| Carbon - Aluminium oxide | • | • | • | | | | | | | | | |
| **Outer seal** | | | | | | | | | | | | |
| Tungsten carbide - Tungsten carbide | | | | | | | | | | • | • | • |
| Silicon carbide - Silicon carbide | • | • | • | • | • | • | • | • | • | | | |
| **Casted parts** | | | | | | | | | | | | |
| Aluminium | • | • | • | • | • | • | • | • | • | • | • | |
| Cast iron | | | | | | | | | | | | • |
| **Stator housing** | | | | | | | | | | | | |
| Aluminium | • | • | • | • | • | • | • | • | • | • | • | |
| Cast iron | | | | | | | | | | | | • |
| **Outer casing** | | | | | | | | | | | | |
| Stainless steel | | | | • | • | • | • | • | • | • | • | |
| Aluminium | • | • | • | | | | | | | | | |
| Cast iron | | | | | | | | | | | | • |

*For further information, see data sheets. Specifications can be changed without notice.*

# Materials in drainage pumps

| Material | Micro | Milli | Mini | Minex | Minette | Minor | Major | Master | Matador | Maxi | Magnum | Mega |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Motor shaft** | | | | | | | | | | | | |
| Stainless steel | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| **Impeller** | | | | | | | | | | | | |
| Hard-Iron™ | | | | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Polyurethane | ● | ● | ● | | | | | | | | | |
| **Suction cover** | | | | | | | | | | | | |
| Hard-Iron™ | | | | | 3~ | ● | ● | ● | ● | | | |
| **Lower diffuser** | | | | | | | | | | | | |
| Nitrile rubber | | | | | | | | | | ○ | | ● |
| Polyurethane | ● | ● | ● | | | | | | | ● | ● | ○ |
| **Diffuser ring** | | | | | | | | | | | | |
| Nitrile rubber | | | | ● | ● | ● | ● | ● | ● | ○ | | ● |
| Polyurethane | ● | ● | ● | | | ○ | ○ | ○ | ○ | ● | ● | ○ |
| **Screws and nuts** | | | | | | | | | | | | |
| Stainless steel | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| **O-rings** | | | | | | | | | | | | |
| Nitrile rubber | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |

*For further information, see data sheets.*
*Specifications can be changed without notice.*

● *Standard* ○ *Option*

# Sludge pumps

Grindex sludge pumps are designed for professional use in tough applications like mines, construction sites, tunnel sites and other demanding industries.

**They are designed for:**

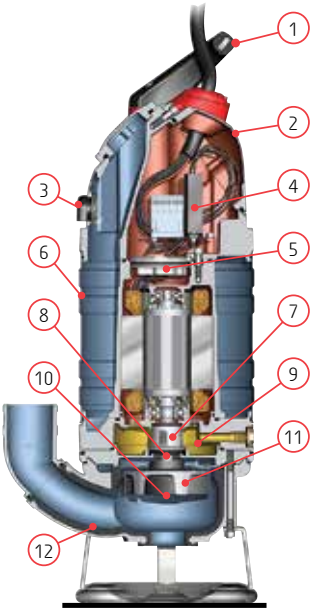
- Pumping water with high content of solids, up to the size of 80 mm.
- Pumping water which contains abrasive particles
- Pumping different types of mud and sludge
- Pumping light slurry

The pumps are designed for continuous, unattended operation. They have proven their reliability and dependable performance in demanding areas like building and construction, mining, tunnelling, quarries, industries, car washes and rental applications.

This page is a "target image" for the "Grindex Cutaway"-app with 3D and Augmented Reality functions

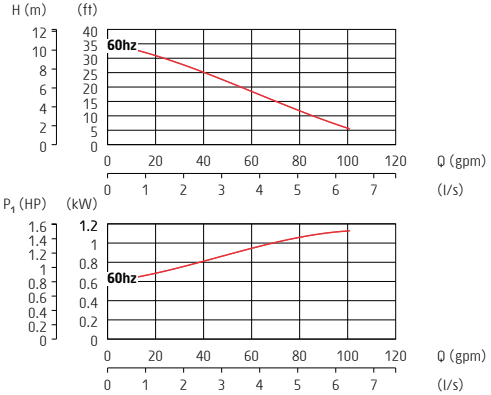
# FEATURES

Sludge Pumps




1. Ergonomic handle with a rubber grip on a metal frame
2. Inspection cover with large opening for easy access to junction box
3. Air valve cools the pump when no water is pumped
4. SMART motor protection including phase-failure guard, temperature guard and phase-sequence control eliminating the need for external start box
5. Enhanced terminal board with quick release terminal plate and sealing function
6. Durable outer jacket made from corrugated stainless steel
7. Easy service cartridge seal in rugged metal housing for improved heat transfer and longer pump life
8. Built-in particle repeller carries particles away from the seal for increased pump life
9. Simplified oil inspection and service, thanks to external plugs
10. Single adjustment screw for easy adjustment of the impeller and better performance
11. Hard-Iron™ impeller for maximum durability and performance
12. Heavy-duty polyurethane coating

# SOLID

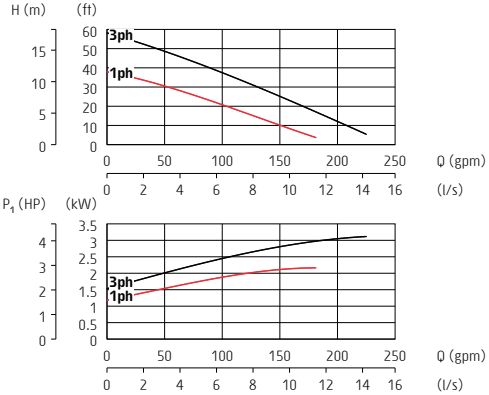




| Technical Data 60 Hz | Solid |
|---|---|
| Pump type | 8123.281 |
| Discharge connection | 2" |
| Rated power P2 | 1.1 HP (0.82 kW) |
| Max. power cons. P1 | 1.1 kW |
| Shaft speed | 3400 RPM |
| Rated current at 115V | 9.8 A |
| Rated current at 230V | 4.8 A |
| Solids passage | 1.5" (38 mm) |
| Max. height | 20" (510 mm) |
| Max. width | 10.4" (263 mm) |
| Weight | 37.5 lbs (17 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

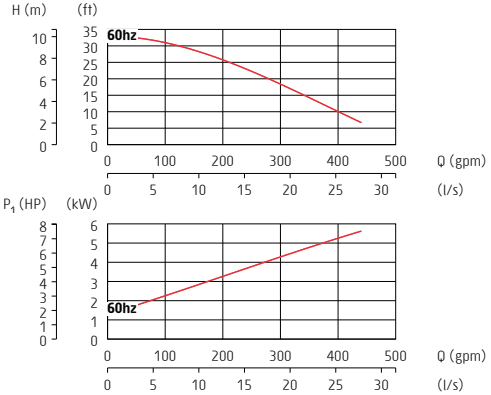
# SALVADOR

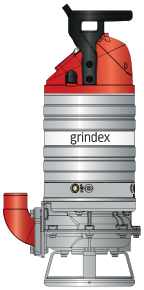




| Technical Data 60 Hz | Salvador 1-ph | Salvador 3-ph |
|---|---|---|
| Pump type | 8109.282 | 8109.282 |
| Discharge connection | 3" | 3" |
| Rated power P2 | 2.4 HP (1.8 kW) | 3.5 HP (2.6 kW) |
| Max. power cons. P1 | 2.2 kW | 3.1 kW |
| Shaft speed | 3405 RPM | 3410 RPM |
| Rated current at 230V | 9.9 A | 9.5 A |
| Rated current at 460V | - | 4.7 A * |
| Rated current at 575V | - | 3.5 A * |
| Solids passage | 2" (50 mm) | 2" (50 mm) |
| Max. height | 30.8" (782 mm) | 30.8" (782 mm) |
| Max. width | 14" (354 mm) | 14" (354 mm) |
| Weight | 73 lbs (33 kg) | 73 lbs (33 kg) |

** Also available in MSHA-approved design (curves and ratings may differ from above) - US only.*
*For further information, see data sheets. Specifications can be changed without notice.*

# SENIOR

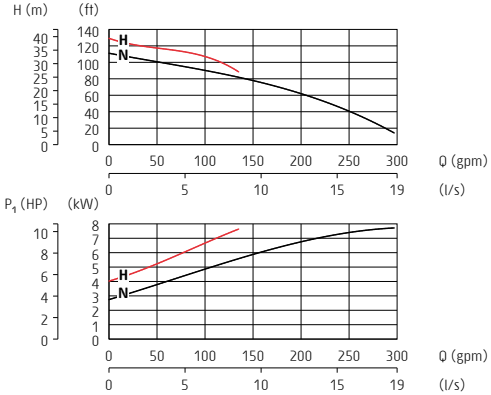



| Technical Data 60 Hz | Senior N |
|---|---|
| Pump type | 8110.281 |
| Discharge connection | 4" |
| Rated power P2 | 6.0 HP (4.5 kW) |
| Max. power cons. P1 | 5.7 kW |
| Shaft speed | 1700 RPM |
| Rated current at 230V | 17 A |
| Rated current at 460V | 8.6 A |
| Rated current at 575V | 6.9 A |
| Solids passage | 3.2" (80 mm) |
| Max. height | 34.1" (867 mm) |
| Max. width | 18.9" (480 mm) |
| Weight | 123 lbs (56 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# SANDY


| Technical Data 60 Hz | Sandy N | Sandy H |
|---|---|---|
| Pump type | 8111.281 | 8111.281 |
| Discharge connection | 3″ | 3″ |
| Rated power P2 | 8.9 HP (6.6 kW) | 8.9 HP (6.6 kW) |
| Max. power cons. P1 | 7.7 kW | 7.7 kW |
| Shaft speed | 3500 RPM | 3500 RPM |
| Rated current at 230V | 22 A | 22 A |
| Rated current at 460V | 11 A * | 11 A * |
| Rated current at 575V | 8.5 A * | 8.5 A * |
| Solids passage | 1.8″ (46 mm) | 1.3″ (32 mm) |
| Max. height | 34.1″ (867 mm) | 34.1 (867 mm) |
| Max. width | 18.1″ (460 mm) | 16.9″ (430 mm) |
| Weight | 123 (56 kg) | 123 (56 kg) |

** Also available in MSHA-approved design (curves and ratings may differ from above) - US only.*
*For further information, see data sheets. Specifications can be changed without notice.*

# Materials in sludge pumps

| Material | Solid | Salvador | Senior | Sandy |
|---|---|---|---|---|
| **Inner seal** | | | | |
| Tungsten carbide - Aluminium oxide | | • | • | • |
| Carbon - Aluminium oxide | • | | | |
| **Outer seal** | | | | |
| Silicon carbide - Silicon carbide | • | • | • | • |
| **Stator housing** | | | | |
| Aluminium | • | • | • | • |
| **Outer casing** | | | | |
| Stainless steel | | • | • | • |
| Aluminium | • | | | |
| **Motor shaft** | | | | |
| Stainless steel | • | • | • | • |

*For further information, see data sheets. Specifications can be changed without notice.*

# Materials in sludge pumps

| Material | Solid | Salvador | Senior | Sandy |
|---|---|---|---|---|
| **Impeller** | | | | |
| Hard-Iron™ | | • | • | • |
| Polyurethane | • | | | |
| **Pump housing** | | | | |
| Polyurethane | • | | | |
| Aluminium with polyurethane lining | | • | • | • |
| **Screws and nuts** | | | | |
| Stainless steel | • | • | • | • |
| **O-rings** | | | | |
| Nitrile rubber | • | • | • | • |
| **Casted parts** | | | | |
| Aluminium | • | • | • | • |

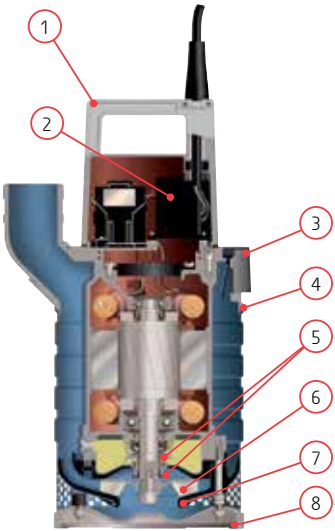
*For further information, see data sheets. Specifications can be changed without notice.*

# Drainage pumps made of stainless steel, INOX

These pumps are designed to meet the tough requirements from mines, construction sites, landfill sites and other applications that deal with corrosive water. One application is in mines where the water becomes caustic and destroys conventional pumps in matter of days. The pumps may also be used in applications where saltwater is pumped, like shipyards, fish farms, construction works in harbours and offshore projects. All INOX pumps can handle pH values from 2 - 10. They can also be equipped with zinc anodes for extra protection.

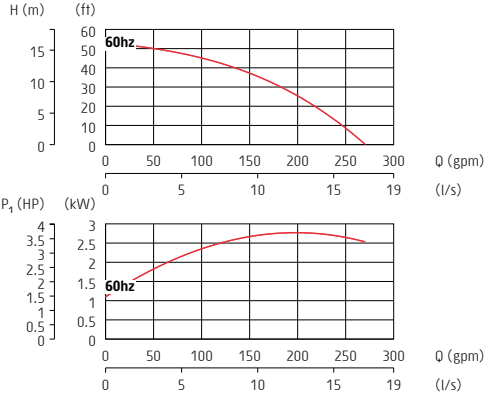
# FEATURES

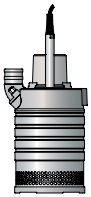
Inox Drainage Pumps




1. All steel parts are made of stainless steel
2. SMART motor protection including phase-failure guard, temperature guard, phase-sequence control and plug-&-play eliminating the need for external starter box
3. Air valve cools the pump when the pump is running dry
4. Durable outer casing made from corrugated stainless steel
5. Aquatite INOX - Double mechanical shaft seals with an oil compartment between the seals for longer pump life
6. Stainless steel impeller
7. Rubber lined adjustable diffusers to maintain optimum performance
8. Durable strainer in stainless steel with ergonomic grip

# MINETTE INOX

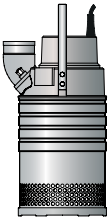


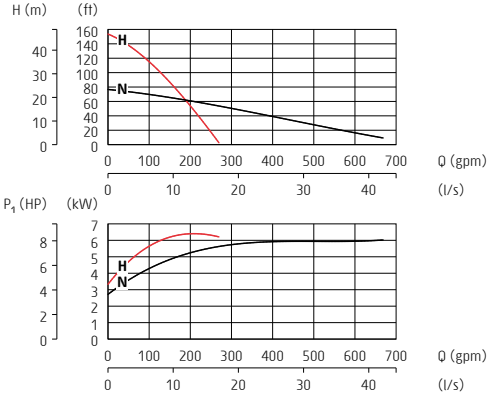



| Technical Data 60 Hz | Minette Inox N |
|---|---|
| Pump type | 8115.390 |
| Discharge connection | 3" |
| Rated power P2 | 3.1 HP (2.3 kW) |
| Max. power cons. P1 | 2.9 kW |
| Shaft speed | 3315 RPM |
| Rated current at 230V | 8.5 A |
| Rated current at 460V | 4.2 A |
| Rated current at 575V | 3.3 A |
| Solids passage | 0.30" (7.5 mm) |
| Max. height | 21" (535 mm) |
| Max. width | 9.5" (240 mm) |
| Weight | 97 lbs (44 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# MAJOR INOX

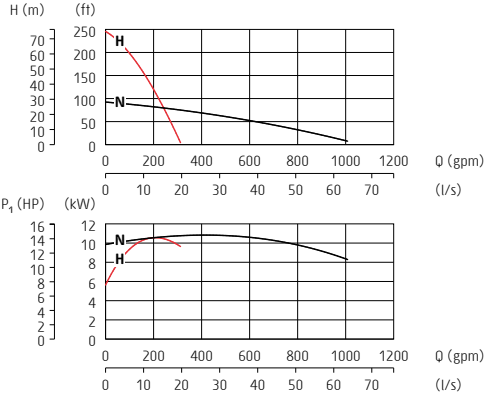


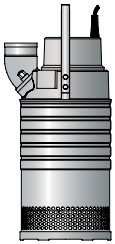



| Technical Data 60 Hz | Major Inox N | Major Inox H |
|---|---|---|
| Pump type | 8116.390 | 8116.390 |
| Discharge connection | 4" | 3" |
| Rated power P2 | 9 HP (6.7 kW) | 9 HP (6.7 kW) |
| Max. power cons. P1 | 7.6 kW | 7.6 kW |
| Shaft speed | 3455 RPM | 3455 RPM |
| Rated current at 230V | 21 A | 21 A |
| Rated current at 460V | 11 A | 11 A |
| Rated current at 575V | 8.6 A | 8.6 A |
| Solids passage | 0.35" (8.5 mm) | 0.35" (8.5 mm) |
| Max. height | 26.2" (665 mm) | 26.2" (665 mm) |
| Max. width | 13.1" (333 mm) | 13.1" (333 mm) |
| Weight | 144 lbs (65 kg) | 144 lbs (65 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# MASTER INOX

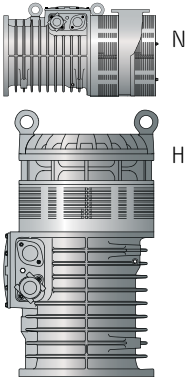


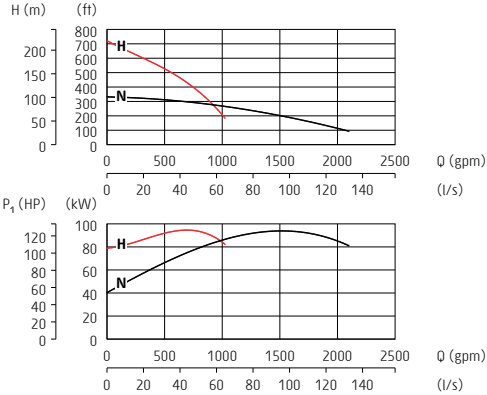



| Technical Data 60 Hz | Master Inox N | Master Inox H |
|---|---|---|
| Pump type | 8117.390 | 8117.390 |
| Discharge connection | 4" | 3" |
| Rated power P2 | 13 HP (9.7 kW) | 13 HP (9.7 kW) |
| Max. power cons. P1 | 11 kW | 11 kW |
| Shaft speed | 3455 RPM | 3455 RPM |
| Rated current at 230V | 30 A | 30 A |
| Rated current at 460V | 15 A | 15 A |
| Rated current at 575V | 12 A | 12 A |
| Solids passage | 0.35" (8.5 mm) | 0.35" (8.5 mm) |
| Max. height | 28.3" (720 mm) | 28.3" (720 mm) |
| Max. width | 13.1" (333 mm) | 13.1" (333 mm) |
| Weight | 171 lbs (77 kg) | 180 lbs (81 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# MEGA INOX




| Technical Data 50 Hz | Mega Inox N | Mega Inox H |
|---|---|---|
| Pump type | 8124.390 | 8124.390 |
| Discharge connection | 6" (DN150) | 4" (DN100) |
| Rated power P2 | 127 HP (95 kW) | 127 HP (95 kW) |
| Max. power cons. P1 | 100 kW | 100 kW |
| Shaft speed | 3560 RPM | 3560 RPM |
| Rated current at 460V | 135 A | 135 A |
| Rated current at 575V | 107 A | 107 A |
| Solids passage | 0.4" (10 mm) | 0.4" (10 mm) |
| Max. height | 30.3" (770 mm) | 49.2" (1250 mm) |
| Diameter | 24.4" (620 mm) | 24.4" (620 mm) |
| Max. width | 46.5" (1180 mm) | 27.6" (700 mm) |
| Weight | 2039 lbs (925 kg) | 2238 lbs (1015 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# Materials in drainage pumps made of stainless steel

| Material | Minette INOX | Major INOX | Master INOX | Mega INOX |
|---|---|---|---|---|
| **Inner seal** | | | | |
| Carbon - Silicon carbide | • | • | • | |
| Tungsten carbide - Tungsten carbide | | | | • |
| **Outer seal** | | | | |
| Silicon carbide - Silicon carbide | • | • | • | • |
| **Casted parts** | | | | |
| Stainless steel (EN 10283-1.14412-ASTM CF-8M) | • | • | • | • |
| **Outer casing** | | | | |
| Stainless steel (EN 10088-3-1.14436-AISI 316L) | • | • | • | • |

*For further information, see data sheets.*
*Specifications can be changed without notice.*

# Materials in drainage pumps made of stainless steel

| Material | Minette INOX | Major INOX | Master INOX | Mega INOX |
|---|---|---|---|---|
| **Motor shaft** | | | | |
| Stainless steel (EN 10088-3-1.14460-AISI 329) | • | • | • | • |
| **Impeller** | | | | |
| Stainless steel (EN 10283-1.14412-ASTM CF-8M) | • | • | • | • |
| **Screws and nuts** | | | | |
| Stainless steel (A4) | • | • | • | • |
| **O-rings** | | | | |
| Viton rubber | • | • | • | • |
| **Diffusers** | | | | |
| Nitrile rubber | • | • | • | • |

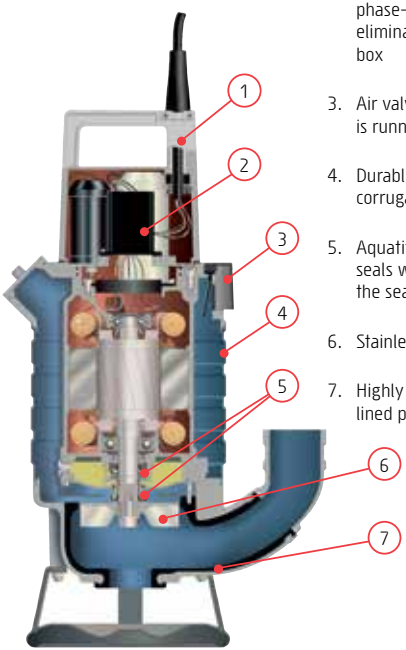
*For further information, see data sheets.*
*Specifications can be changed without notice.*

# Sludge pumps made of stainless steel, INOX

Our sludge pumps in stainless steel are used for pumping corrosive fluids with solids in harsh environment. The solids can be up to the size of 50 mm. These pumps are designed to meet the tough requirements from mines, construction sites, landfill sites and other applications that deal with corrosive water. One application is in mines where the water becomes caustic and destroys conventional pumps in matter of days. The pumps may also be used in applications where saltwater is pumped, like shipyards, fish farms, construction works in harbours and offshore projects. All INOX pumps can handle pH values from 2 - 10. They can also be equipped with zinc anodes for extra protection.

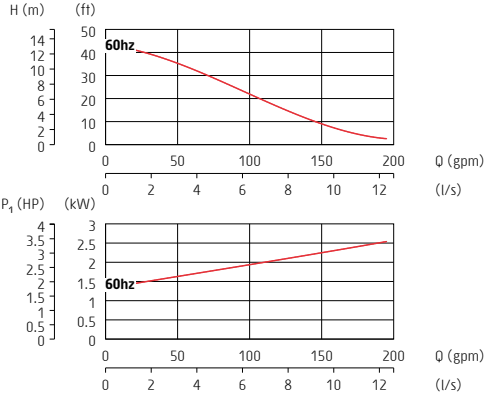
# FEATURES

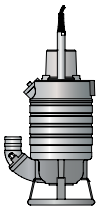
Inox Sludge Pumps




1. All steel parts are made of stainless steel
2. SMART motor protection including phase-failure guard, temperature guard, phase-sequence control and plug-&-play eliminating the need for external starter box
3. Air valve cools the pump when the pump is running dry
4. Durable outer casing made from corrugated stainless steel
5. Aquatite INOX - Double mechanical shaft seals with an oil compartment between the seals for longer pump life
6. Stainless steel impeller
7. Highly abrasive- and oil-resistant rubber lined pump housing

# SALVADOR INOX

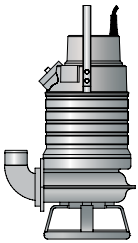


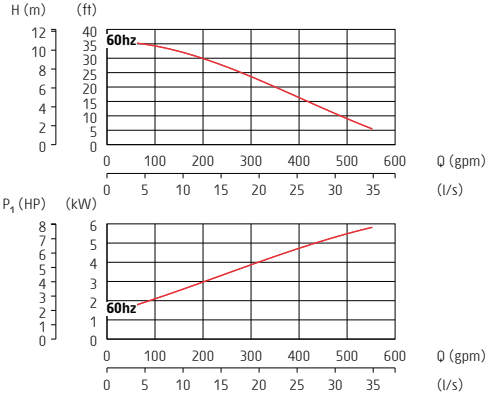



| Technical Data 60 Hz | Salvador Inox |
|---|---|
| Pump type | 8118.280 |
| Discharge connection | 3" |
| Rated power P2 | 3.1 HP (2.3 kW) |
| Max. power cons. P1 | 2.9 kW |
| Shaft speed | 3320 RPM |
| Rated current at 230V | 8.5 A |
| Rated current at 460V | 4.2 A |
| Rated current at 575V | 3.3 A |
| Solids passage | 2" (50 mm) |
| Max. height | 25.4" (645 mm) |
| Max. width | 14.8" (375 mm) |
| Weight | 104 lbs (47 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# SENIOR INOX

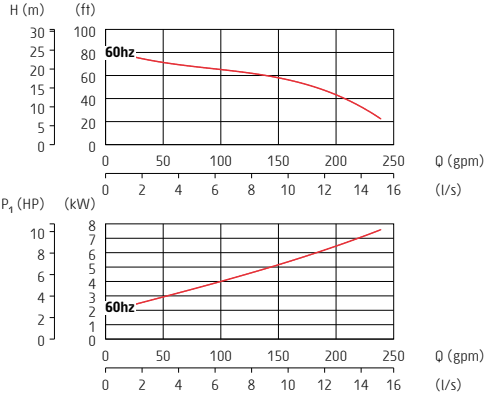


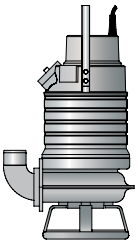



| Technical Data 60 Hz | Senior Inox |
|---|---|
| Pump type | 8119.280 |
| Discharge connection | 4" |
| Rated power P2 | 6.8 HP (5.1 kW) |
| Max. power cons. P1 | 6.2 kW |
| Shaft speed | 1675 RPM |
| Rated current at 230V | 18 A |
| Rated current at 460V | 9 A |
| Rated current at 575V | 7.3 A |
| Solids passage | 3.2" (80 mm) |
| Max. height | 29.7" (755 mm) |
| Max. width | 19" (480 mm) |
| Weight | 191 lbs (86 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# SANDY INOX



| Technical Data 60 Hz | Sandy Inox |
|---|---|
| Pump type | 8120.280 |
| Discharge connection | 3" |
| Rated power P2 | 9 HP (6.7 kW) |
| Max. power cons. P1 | 7.6 kW |
| Shaft speed | 3455 RPM |
| Rated current at 230V | 21 A |
| Rated current at 460V | 11 A |
| Rated current at 575V | 8.6 A |
| Solids passage | 1.8" (46 mm) |
| Max. height | 29.7" (755 mm) |
| Max. width | 19" (480 mm) |
| Weight | 191 lbs (86 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# Materials in sludge pumps made of stainless steel

| Material | Salvador INOX | Senior INOX | Sandy INOX |
|---|---|---|---|
| **Inner seal** | | | |
| Carbon - silicon carbide | • | • | • |
| **Outer seal** | | | |
| Silicon carbide - silicon carbide | • | • | • |
| **Casted parts** | | | |
| Stainless steel (EN 10283-1.14412-ASTM CF-8M) | • | • | • |
| **Outer casing** | | | |
| Stainless steel (EN 10088-3-1.14436-AISI 316L) | • | • | • |
| **Motor shaft** | | | |
| Stainless steel (EN 10088-3-1.14460-AISI 329) | • | • | • |
| **Impeller** | | | |
| Stainless steel (EN 10283-1.14412-ASTM CF-8M) | • | • | • |
| **Screws and nuts** | | | |
| Stainless steel (A4) | • | • | • |
| **O-rings** | | | |
| Viton rubber | • | • | • |
| **Pump housing** | | | |
| Nitrile rubber | • | • | • |

*For further information, see data sheets.*
*Specifications can be changed without notice.*

# Slurry pumps, BRAVO

Grindex slurry pumps are designed for use in quarries, mines, dredging, cleaning of settling ponds, other abrasive and other applications and industries that require pumps with very high durability. Each part of the BRAVO pump is designed for maximum endurance and reliability – an absolute must when pumping slurry. All BRAVO pumps can handle liquids with pH values from 5.5 up to 14.

The Bravo 400 to 900 are equipped with agitator beneath the pump intake to stir up settled material toward the pump intake. The Bravo 400 to 900 can also be fitted with an optional cooling jacket for use in dry pit applications.

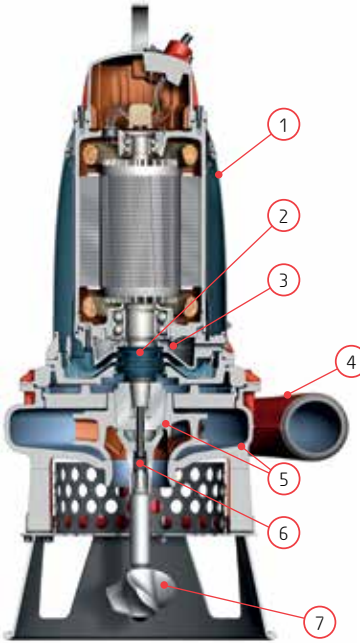
## Pumping slurry

Pumping fluids with high solids concentrations is more complicated than pumping water. To avoid sedimentation in the system you need to choose the right pump size and dimensions of hoses and pipes. The concentration of solids together with their size and shape may also affect pump performance and power requirements and therefore pump choice. Remember that settled solids might need external agitators, water jets or mixers to get them back in suspension and allow them to be pumped.

As each application requires its own calculation, we recommend you to contact your Grindex dealer for more information about slurry pumping.

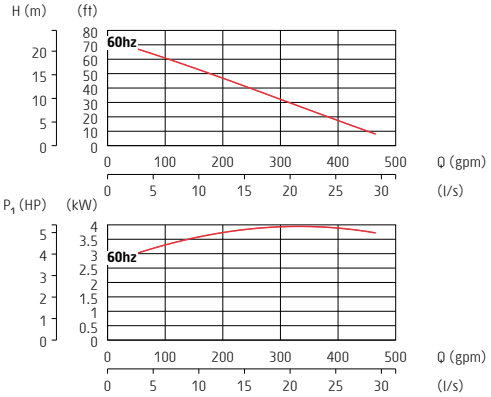
# FEATURES

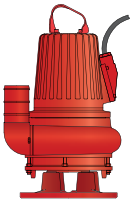
Slurry Pumps




1. Optional cooling jacket for use in dry pit applications
2. Ready to install cartridge seal
3. Leakage sensor
4. Large throughlet handles solids of varying sizes
5. Hard-Iron™ impeller and pump housing for maximum durability and performance
6. Single adjustment sleeve unit for easy adjustment of the impeller
7. Agitator stirs up sand, sludge and solids in suspension

# BRAVO 200

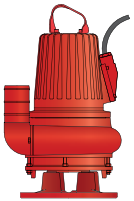


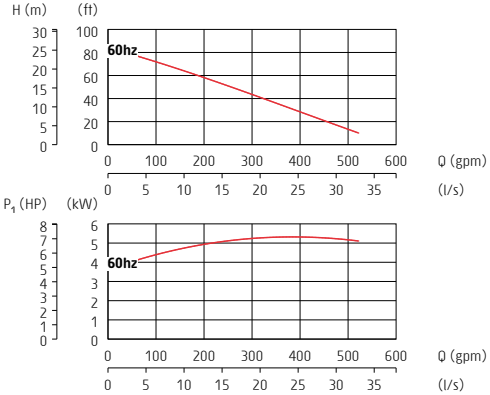



| Technical Data 60 Hz | Bravo 200 |
|---|---|
| Pump type | 8146.020 |
| Discharge connection | 4" |
| Rated power P2 | 7.5 HP (5.6 kW) |
| Max. power cons. P1 | 6.7 kW |
| Shaft speed | 1740 RPM |
| Rated current at 230V | 19 A |
| Rated current at 460V | 9.6 A |
| Rated current at 575V | 7.8 A |
| Solids passage | 2" (50 mm) |
| Max. height | 29.9" (760 mm) |
| Max. width | 18.1" (460 mm) |
| Weight | 346 lbs (157 kg) |

*Also available in EX (Explosion Proof) version.*
*For further information, see data sheets. Specifications can be changed without notice.*

# BRAVO 300

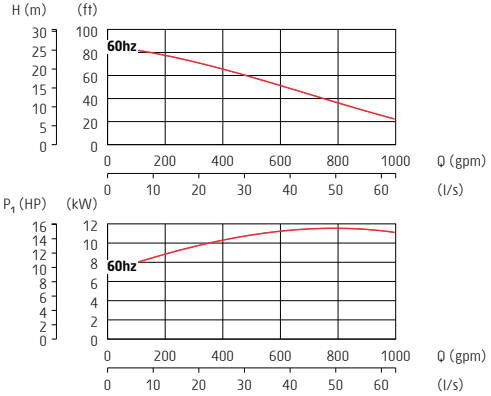





| Technical Data 60 Hz | Bravo 300 |
|---|---|
| Pump type | 8147.020 |
| Discharge connection | 4" |
| Rated power P2 | 10 HP (7.5 kW) |
| Max. power cons. P1 | 8.9 kW |
| Shaft speed | 1735 RPM |
| Rated current at 230V | 25 A |
| Rated current at 460V | 13 A |
| Rated current at 575V | 10 A |
| Solids passage | 2" (50 mm) |
| Max. height | 29.9" (760 mm) |
| Max. width | 18.1" (460 mm) |
| Weight | 346 lbs (157 kg) |

*Also available in EX (Explosion Proof) version.*
*For further information, see data sheets. Specifications can be changed without notice.*

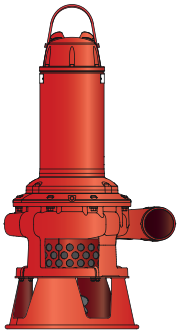
# BRAVO 400

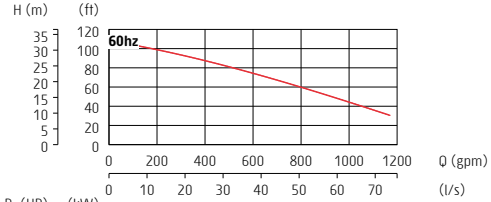


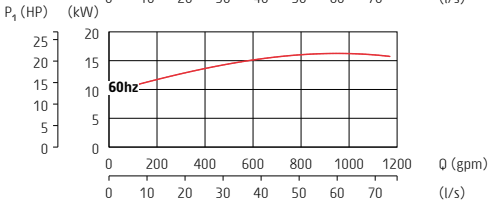

| Technical Data 60 Hz | Bravo 400 |
|---|---|
| Pump type | 8148.020 |
| Discharge connection | 4" |
| Rated power P2 | 20.1 HP (15 kW) |
| Max. power cons. P1 | 17 kW |
| Shaft speed | 1755 RPM |
| Rated current at 230V | 52 A |
| Rated current at 460V | 26 A |
| Rated current at 575V | 21 A |
| Solids passage | 1.2" (30 mm) |
| Max. height | 45.2" (1148 mm) |
| Max. width | 23.4" (595 mm) |
| Weight | 509 lbs (231 kg) |

*Also available in EX (Explosion Proof) version.*
*For further information, see data sheets. Specifications can be changed without notice.*

# BRAVO 500



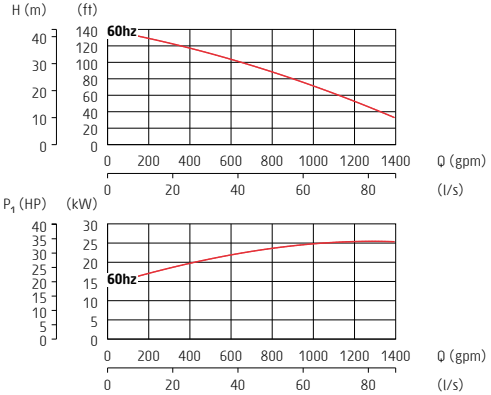


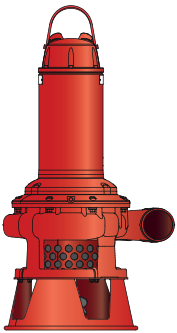




| Technical Data 60 Hz | Bravo 500 |
|---|---|
| Pump type | 8149.020 |
| Discharge connection | 4" |
| Rated power P2 | 30 HP (22 kW) |
| Max. power cons. P1 | 25 kW |
| Shaft speed | 1755 RPM |
| Rated current at 230V | 75 A |
| Rated current at 460V | 38 A |
| Rated current at 575V | 29 A |
| Solids passage | 1.6" (40 mm) |
| Max. height | 50.1" (1273 mm) |
| Max. width | 23.4" (595 mm) |
| Weight | 646 lbs (293 kg) |

*Also available in EX (Explosion Proof) version.*
*For further information, see data sheets. Specifications can be changed without notice.*

# BRAVO 600

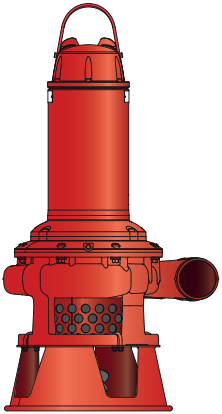


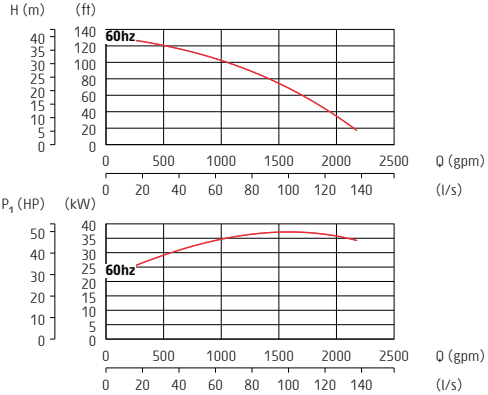



| Technical Data 60 Hz | Bravo 600 |
|---|---|
| Pump type | 8150.020 |
| Discharge connection | 4" |
| Rated power P2 | 33.5 HP (25 kW) |
| Max. power cons. P1 | 28 kW |
| Shaft speed | 1760 RPM |
| Rated current at 230V | 81 A |
| Rated current at 460V | 40 A |
| Rated current at 575V | 32 A |
| Solids passage | 1.6" (40 mm) |
| Max. height | 50.1" (1273 mm) |
| Max. width | 23.4" (595 mm) |
| Weight | 646 lbs (293 kg) |

*Also available in EX (Explosion Proof) version.*
*For further information, see data sheets. Specifications can be changed without notice.*

# BRAVO 700

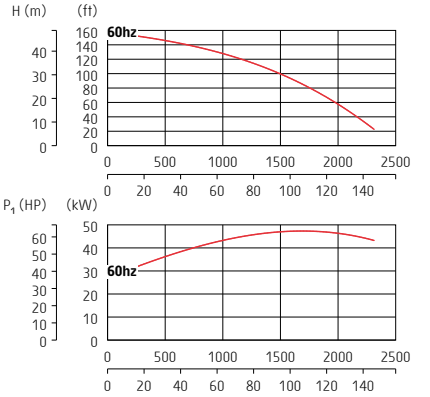


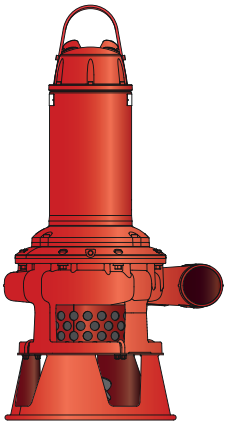



| Technical Data 60 Hz | Bravo 700 |
|---|---|
| Pump type | 8151.020 |
| Discharge connection | 6″ |
| Rated power P2 | 60.3 HP (45 kW) |
| Max. power cons. P1 | 49 kW |
| Shaft speed | 1775 RPM |
| Rated current at 230V | - |
| Rated current at 460V | 69 A |
| Rated current at 575V | 55 A |
| Solids passage | 1.4″ (36 mm) |
| Max. height | 65″ (1652 mm) |
| Max. width | 34.5″ (875 mm) |
| Weight | 1351 lbs (613 kg) |

*Also available in EX (Explosion Proof) version.*
*For further information, see data sheets. Specifications can be changed without notice.*

# BRAVO 800

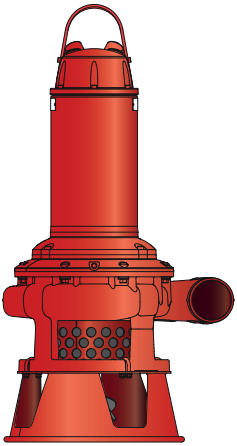


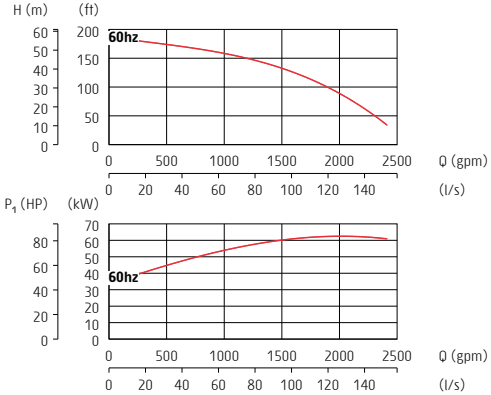



| Technical Data 60 Hz | Bravo 800 |
|---|---|
| Pump type | 8152.020 |
| Discharge connection | 6″ |
| Rated power P2 | 79.7 HP (52 kW) |
| Max. power cons. P1 | 56 kW |
| Shaft speed | 1775 RPM |
| Rated current at 230V | - |
| Rated current at 460V | 80 A |
| Rated current at 575V | 63 A |
| Solids passage | 1.4″ (36 mm) |
| Max. height | 65″ (1652 mm) |
| Max. width | 34.5″ (875 mm) |
| Weight | 1351 lbs (613 kg) |

*Also available in EX (Explosion Proof) version.*
*For further information, see data sheets. Specifications can be changed without notice.*

# BRAVO 900






| Technical Data 60 Hz | Bravo 900 |
|---|---|
| Pump type | 8153.020 |
| Discharge connection | 6″ |
| Rated power P2 | 104.5 HP (78 kW) |
| Max. power cons. P1 | 84 kW |
| Shaft speed | 1775 RPM |
| Rated current at 230V | - |
| Rated current at 460V | 125 A |
| Rated current at 575V | 101 A |
| Solids passage | 1.4″ (36 mm) |
| Max. height | 70″ (1779 mm) |
| Max. width | 34.5″ (875 mm) |
| Weight | 1863 lbs (845 kg) |

*Also available in EX (Explosion Proof) version.*
*For further information, see data sheets. Specifications can be changed without notice.*

# Materials in slurry pumps

| Material | Bravo 200 | Bravo 300 | Bravo 400 | Bravo 500 | Bravo 600 | Bravo 700 | Bravo 800 | Bravo 900 |
|---|---|---|---|---|---|---|---|---|
| **Inner seal** | | | | | | | | |
| Tungsten carbide - Aluminium oxide | ● | ● | | | | | | |
| Tungsten carbide - tungsten carbide | | | ● | ● | ● | ● | ● | ● |
| **Outer seal** | | | | | | | | |
| Tungsten carbide - tungsten carbide | ● | ● | ● | ● | ● | ● | ● | ● |
| **Drive unit** | | | | | | | | |
| Cast iron | ● | ● | ● | ● | ● | ● | ● | ● |
| **Suction cover** | | | | | | | | |
| Nitrile rubber | ● | ● | - | - | - | - | - | - |
| **Pumphousing** | | | | | | | | |
| Cast iron | ● | ● | - | - | - | - | - | - |
| Hard-Iron™ | - | - | ● | ● | ● | ● | ● | ● |
| **Discharge connection type** | | | | | | | | |
| Thread or hose connection | ● | ● | - | - | - | - | - | - |
| Victualic connection | - | - | ○ | ○ | ○ | ○ | ○ | ○ |

*For further information, see data sheets.*
*Specifications can be changed without notice.*

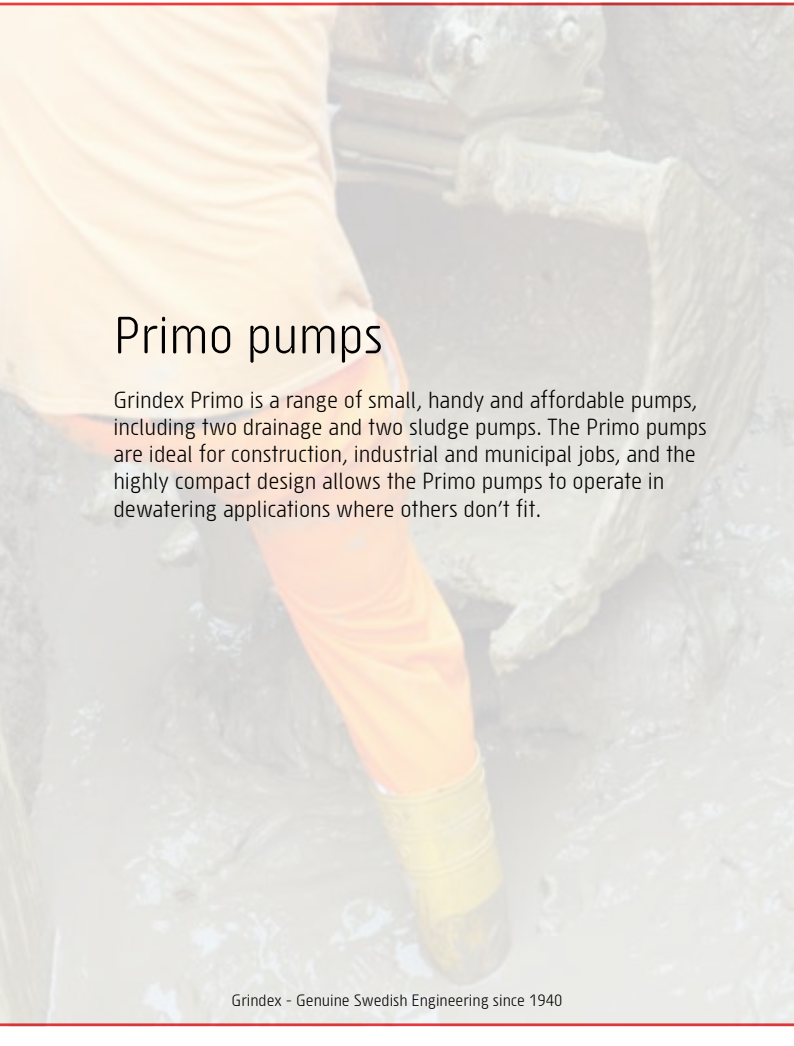
● *Standard* ○ *Option* - *Not available*

# Materials in slurry pumps

| Material | Bravo 200 | Bravo 300 | Bravo 400 | Bravo 500 | Bravo 600 | Bravo 700 | Bravo 800 | Bravo 900 |
|---|---|---|---|---|---|---|---|---|
| **Agitator** | | | | | | | | |
| Hard-Iron™ | - | - | ● | ● | ● | ● | ● | ● |
| **Impeller** | | | | | | | | |
| Hard-Iron™ | ● | ● | ● | ● | ● | ● | ● | ● |
| **Lifting handle** | | | | | | | | |
| Galvanised steel | ● | ● | - | - | - | - | - | - |
| Stainless steel | - | - | ● | ● | ● | ● | ● | ● |
| **Motor shaft** | | | | | | | | |
| Stainless steel | ● | ● | ● | ● | ● | ● | ● | ● |
| **Studs, screws and nuts** | | | | | | | | |
| Stainless steel | ● | ● | ● | ● | ● | ● | ● | ● |

*For further information, see data sheets.*
*Specifications can be changed without notice.*

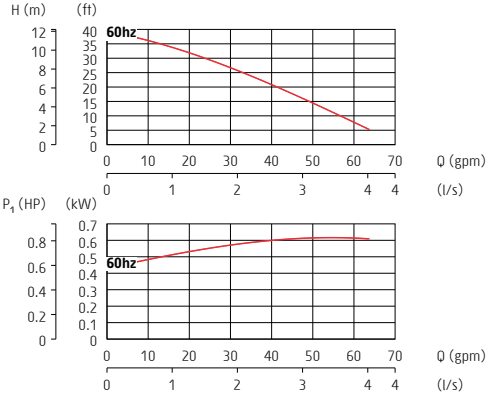
*● Standard ○ Option - Not available*



# Primo pumps

Grindex Primo is a range of small, handy and affordable pumps, including two drainage and two sludge pumps. The Primo pumps are ideal for construction, industrial and municipal jobs, and the highly compact design allows the Primo pumps to operate in dewatering applications where others don't fit.

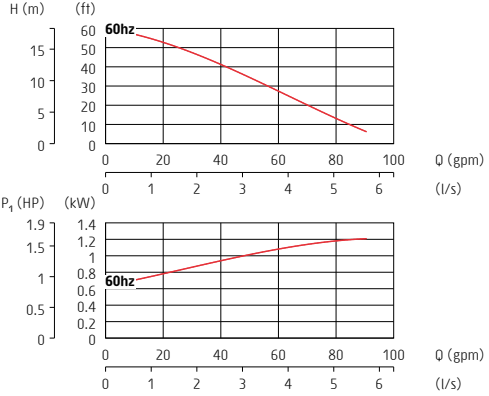
# PRIMO D4


| Technical Data 60 Hz | Primo D4 |
|---|---|
| Pump type | 5182310 (230V) / 5182410 (115V) |
| Discharge connection | 2" |
| Rated power P2 | 0.5 HP (0.4 kW) |
| Max. power cons. P1 | 0.67 kW |
| Shaft speed | 3400 RPM |
| Rated current at 115V | 5.8 A |
| Rated current at 230V | 3.2 A |
| Solids passage | 0.3" (7.5 mm) |
| Max. height | 13.4" (340 mm) |
| Max. width | 7.2" (183 mm) |
| Weight | 20 lbs (9 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# PRIMO D8

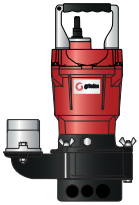


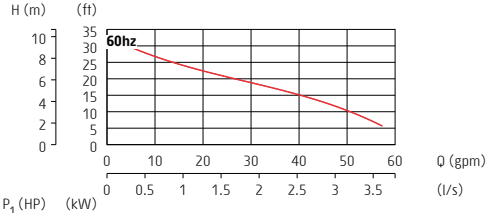


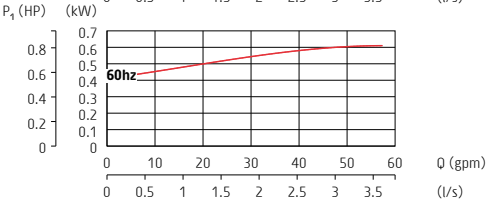
| Technical Data 60 Hz | Primo D8 |
|---|---|
| Pump type | 5182330 (230V) / 5182430 (115V) |
| Discharge connection | 2" |
| Rated power P2 | 1.0 HP (0.75 kW) |
| Max. power cons. P1 | 1.19 kW |
| Shaft speed | 3400 RPM |
| Rated current at 115V | 10.3 A |
| Rated current at 230V | 5.1 A |
| Solids passage | 0.3" (7.5 mm) |
| Max. height | 15.1" (384 mm) |
| Max. width | 7.2" (183 mm) |
| Weight | 29 lbs (13 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# PRIMO S4



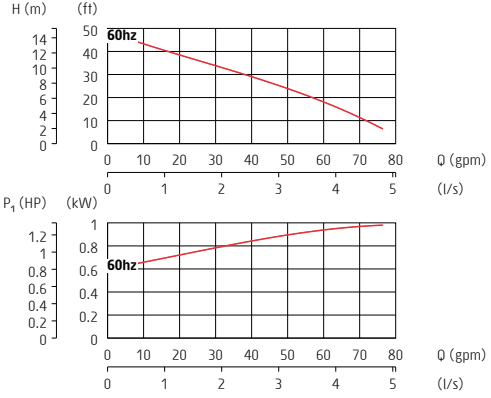


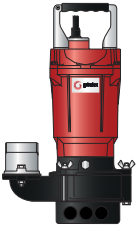




| Technical Data 60 Hz | Primo S4 |
|---|---|
| Pump type | 5182320 (230V) / 5182420 (115V) |
| Discharge connection | 2" |
| Rated power P2 | 0.5 HP (0.4 kW) |
| Max. power cons. P1 | 0.67 kW |
| Shaft speed | 3400 RPM |
| Rated current at 115V | 5.8 A |
| Rated current at 230V | 3.2 A |
| Solids passage | 1" (25 mm) |
| Max. height | 14.7" (373 mm) |
| Max. width | 9.5" (241 mm) |
| Weight | 22 lbs (10 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# PRIMO S8



| Technical Data 60 Hz | Primo S8 |
|---|---|
| Pump type | 5182340 (230V) / 5182440 (115V) |
| Discharge connection | 2" |
| Rated power P2 | 1.0 HP (0.75 kW) |
| Max. power cons. P1 | 1.19 kW |
| Shaft speed | 3400 RPM |
| Rated current at 115V | 10.3 A |
| Rated current at 230V | 5.1 A |
| Solids passage | 1" (25 mm) |
| Max. height | 16.4" (416 mm) |
| Max. width | 9.5" (241 mm) |
| Weight | 29 lbs (13 kg) |

*For further information, see data sheets. Specifications can be changed without notice.*

# Materials in Primo pumps

| Material | Primo D4 | Primo D8 | Primo S4 | Primo S8 |
|---|---|---|---|---|
| **Inner seal** | | | | |
| Silicon carbide - Silicon carbide | ● | ● | ● | ● |
| **Outer seal** | | | | |
| Silicon carbide - Silicon carbide | ● | ● | ● | ● |
| **Pump top** | | | | |
| Aluminium | ● | ● | ● | ● |
| **Outer casing** | | | | |
| Steel | ● | ● | - | - |
| **Stator housing** | | | | |
| Aluminium | ● | ● | ● | ● |
| **Motor shaft** | | | | |
| Stainless steel | ● | ● | ● | ● |
| **Impeller** | | | | |
| Cast iron | - | - | ● | ● |
| Polyurethane | ● | ● | - | - |
| **Diffuser** | | | | |
| Cast iron | ● | ● | ● | ● |
| **Screws and nuts** | | | | |
| Stainless steel | ● | ● | ● | ● |

*For further information, see data sheets.*
*Specifications can be changed without notice.*

# Accessories

Some applications require the use of additional devices. Here is a list of Grindex accessories and what pump they can be used with.

- ● Available
- ○ Not an optimal choice
- x Not available
- □ Together with external starter
- ( ) Letter in parentheses refer to pump model

| | Zinc anodes | Low suction collar | Float switch | Tandem connection | Pump raft |
|---|---|---|---|---|---|
| **Drainage pumps** | | | | | |
| Micro | x | ● | ● | x | ● |
| Milli | x | x | ○ | x | ○ |
| Mini | x | ● | ● | x | ● |
| Minex | ● | ● | ● | x | ● |
| Minette | ● | ● | ● | x | ● |
| Minor | ● | ● | ● | ● | ● |
| Major | ● | ● | ● | ● | ● |
| Master | ● | x | ● | ● | ● |
| Matador | ● | x | ● | ● | ● |
| Maxi | ● | x | □ | ● | ● |
| Magnum | ● | x | □ | ● (H) | ● |
| Mega | ● | x | □ | x | ● |
| **Sludge pumps** | | | | | |
| Solid | x | x | ● | x | ○ |
| Salvador | ● | x | ● | x | ○ |
| Senior | ● | x | ● | x | ○ |
| Sandy | ● | x | ● | x | ○ |

*For further information, see data sheets. Specifications can be changed without notice.*

# Accessories

| | Zinc anodes | Low suction collar | Float switch | Tandem connection | Pump raft |
|---|---|---|---|---|---|
| **Drainage pumps made of stainless steel** | | | | | |
| Minette Inox | ● | ● | □ | x | ○ |
| Major Inox | ● | ● | □ | x | ○ |
| Master Inox | ● | ● | □ | x | ○ |
| Mega Inox | ● | x | □ | x | ● |
| **Sludge pumps made of stainless steel** | | | | | |
| Salvador Inox | ● | x | □ | x | ○ |
| Senior Inox | ● | x | □ | x | ○ |
| Sandy Inox | ● | x | □ | x | ○ |
| **Slurry pumps** | | | | | |
| Bravo 200 | ● | x | □ | x | ● |
| Bravo 300 | ● | x | □ | x | ● |
| Bravo 400 | ● | x | □ | x | ● |
| Bravo 500 | ● | x | □ | x | ● |
| Bravo 600 | ● | x | □ | x | ● |
| Bravo 700 | ● | x | □ | x | ● |
| Bravo 800 | ● | x | □ | x | ● |
| Bravo 900 | ● | x | □ | x | ● |
| **Primo pumps** | | | | | |
| Primo D4 | x | x | ●* | x | ● |
| Primo D8 | x | x | ●* | x | ● |
| Primo S4 | x | x | ●* | x | ● |
| Primo S8 | x | x | ●* | x | ● |

** Limited availability, please check with your local dealer.*
*For further information, see data sheets. Specifications can be changed without notice.*

# Grindex Pump School

**The school consists of technical articles, intended to help pump users with common matters in pumping with submersible pumps.**

## Part 1: Choosing the right pump type for the job

A drainage pump is the most commonly used pump type at construction sites. It is used for pumping water with less abrasive solids, like clay. Sand and solids in suspension can also be pumped, up to the size of the strainer holes (normally 0.3-0.5" or 7-12 mm). As sand is quite abrasive to the pump, it must not be too concentrated.

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Sludge pumps are suitable for pumping water with solids, as well as for pumping sludge. The solids can be up to the size of the pump inlet diameter (normally 1.3-3.1" or 32-80 mm).

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Pumps made of stainless steel are often used in copper mines, gold mines and other applications with corrosive fluids. An aluminium pump can handle water with pH values from 5-8, while a stainless steel pump can cope with pH values from 2-10.

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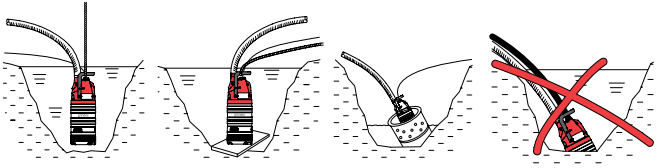
Slurry pumps are designed to handle abrasive solids in suspension, like sand, gravel and concrete, in high concentration. They are also frequently used to move sand in suspension, i.e. at a dredging operation. To cope with the abrasives, the hydraulic parts of a slurry pump are often made of a very hard metal alloy. For improved performance, bigger slurry pumps can be equipped with agitator.

**Plug and pump**
An electrical submersible pump is easy to use, just plug it in and pump. Several small pumps, placed where the need is for the moment, can pump the water to a dedicated collecting pit through long hoses. As the smaller pumps only weights 22-55 lbs (10-25 kg), you can carry the pump with you as the works moves to different spots at the site.


In the collection pit, a bigger pump is installed and pumps the water away from the site. By connecting hoses from several pumps to the pit, you can easily dewater a large area with just a few pumps.

## Part 2: Pump arrangement

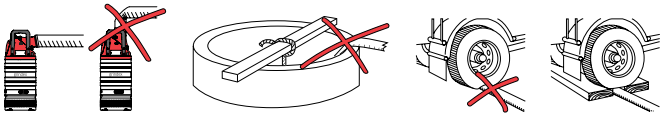
Despite the simplicity, there are a few details to consider for optimizing the pumping:



Arrange the pump so it doesn't burrow itself into sand or clay. This is a common problem at construction sites. It can be avoided quite simple by placing the pump on a bed of coarse gravel or a plank. The pump can also be hung freely by a rope or chain, or put into a cut-down and perforated oil drum.

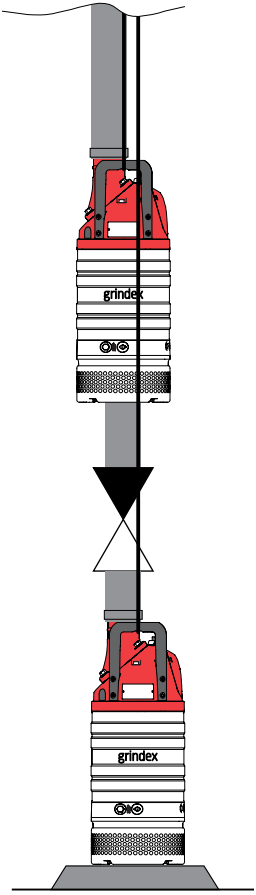
**Avoid sharp bend on the hose**

As sharp bends, kinks and pinching of the hose are reducing the capacity of the pump, a lot is won by avoiding those circumstances. Turning the pumps discharge connection so the hose doesn't begin with at kink is easily arranged; it can be fitted vertical or horizontal on almost all Grindex pumps.



**Tandem connection**
In order to achieve higher pumping heads, two or more drainage pumps can be connected in series. For this purpose, a series connecting flange is available as an accessory. It is important that the hoses are equipped with check valves, preventing the pumps from suffering from wear when the water runs back from high heads uncontrolled if a power failure should occur.

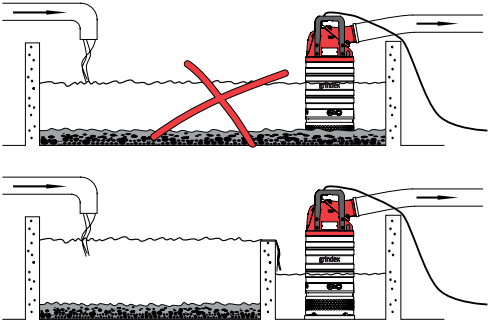
**Long distance pumping**
Tandem connection of pumps can also be used when the water needs to be pumped a longer distance. A simple arrangement can be pumping the water to a dedicated collection pit. The pit should be equipped with another pump, passing the water on. This technique can also be used for dewatering a greater area with several pumps spread out, pumping the water to a collection pit. The pit is then equipped with a greater pump, that pumps the water away from the site.



## Part 3: Sedimentation

The pumped water is often containing solids that cause wear to pumps, valves and other dewatering equipment. This problem is very common in mines and tunnel construction sites. When pumping water that contains solids (like drill cuttings and sand), there is a risk of sedimentation in the system. A typical symptom is pipes and/or hoses that get filled with sediment, resulting in capacity losses. When the amount of solids increases, there is also an increase of wear on the pump.

One way to prevent this is by using sedimentation tanks where the drill cuttings may settle while the rest of the water is pumped away. The tank needs to be as close to the source as possible, ensuring that the solids are pumped as short distance as possible where the solids can settle in peace. To ensure the efficiency of the sedimentation tank, it needs to have as big surface area as possible. The more solids present in the water, the more care should be taken in the design of the sedimentation system.



**For applications where solids can not be avoided, there are recommendations for the velocity of the medium in the discharge line:**

| Mixture | Min. velocity in discharge line |
|---|---|
| 1. Water + coarse gravel | 13.1ft/s (4 m/s) |
| 2. Water + gravel | 11.5 ft/s (3 m/s) |
| 3. Water + sand | |
| Sand particles < 0.1 mm (0.004 in) | 8.2 ft/s (1.5 m/s) |
| Sand particles < 0.6 mm (0.024 in) | 4.9 ft/s (2.5 m/s) |

# Limitations for Grindex pumps

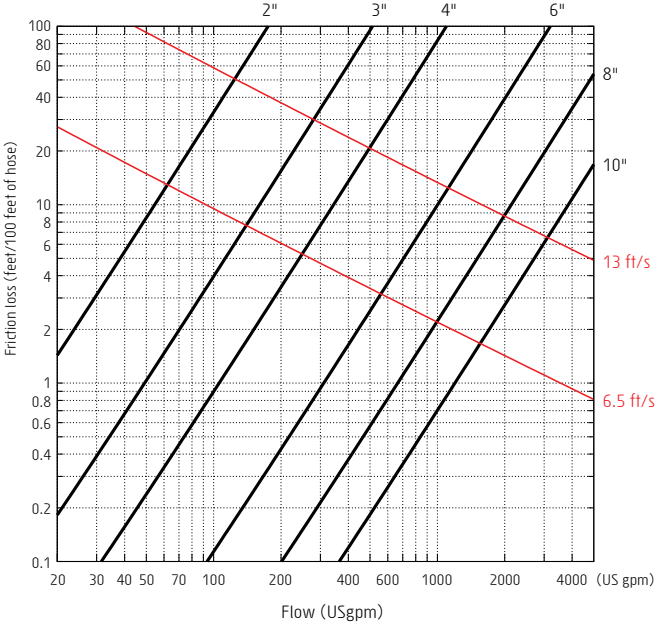
| Limitations | Drainage pumps | Sludge pumps |
|---|---|---|
| **Max. submersion depth (IP68)** | 66 ft (20 m), except:<br>Micro, Milli & Mini: 33 ft (10 m)<br>Mega: 246 ft (75 m) | 66 ft (20 m), except:<br>Solid: 33 ft (10 m) |
| **Max. liquid temperature**<br>*Option: 70°C version** | 104°F (40°C)<br>*158°F (70°C)* | 104°F (40°C)<br>- |
| **Max. liquid density** | 68 lbs/ft$^3$ (1100 kg/m$^3$) | 68 lbs/ft$^3$ (1100 kg/m$^3$) |
| **pH of the liquid** | 5-8 ( except Mega: 6-13) | 5-8 |

| Limitations | Stainless steel pumps | Slurry pumps |
|---|---|---|
| **Max. submersion depth (IP68)** | 66 ft (20 m) | 66 ft (20 m) |
| **Max. liquid temperature** | 104°F (40°C) | 104°F (40°C) |
| **Max. liquid density** | 68 lbs/ft$^3$ (1100 kg/m$^3$) | 80-106 lbs/ft$^3$<br>(1300-1700 kg/m$^3$) |
| **pH of the liquid** | 2-10 | 5.5 - 14 |

** Option: 70°C version - Drainage pumps:*
***Minex, Minette, Minor, Major, Master & Matador***

# Chart for calculating friction losses in hoses

All pump capacities are measured for clean water, directly at the discharge outlet. When connecting a hose you need to consider the friction losses that come from the size and length of the hose. The chart below shows this.



# Formulas for calculating friction losses in hoses and tubes

## The chart on page 73 was created using the following formulas:

| Friction loss (meters) | Velocity (m/s) | Reynolds number | Friction factor (Swamee & Jain formula) |
|---|---|---|---|
| $H_{friction} = \frac{1000 \times f \times L \times v^2}{2 \times g \times D}$ | $V = \frac{1274 \times Q}{D^2}$ | $Re = \frac{v \times D}{1000 \times \mu}$ | $f = \frac{0.25}{\left[{}^{10}log\left(\frac{\varepsilon}{3.7 \times D} + \frac{5.74}{Re^{0.9}}\right)\right]^2}$ |
| **f** = friction factor<br>**L** = length (m)<br>**v** = avg. velocity<br>**g** = 9.81 m/s$^2$<br>**D** = pipe ∅ (mm) | **Q** = flow (l/s)<br>**D** = pipe ∅ (mm) | **v** = velocity<br>**D** = pipe ∅ (mm)<br>**μ** = viscosity = 1.161 x 10$^{-6}$ m$^2$/s = 1 cSt | **ε** = roughness factor (mm)<br>**D** = pipe ∅ (mm)<br>**Re** = Reynolds number |

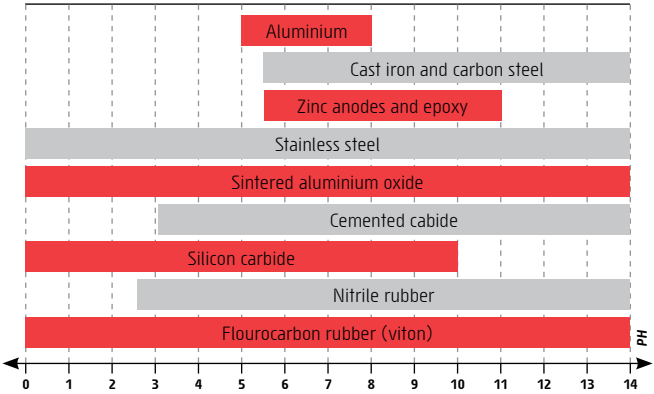
## Friction factor

| Material | Cast iron | Stainless | PVC | HDPE | Concrete | Hose |
|---|---|---|---|---|---|---|
| ε new (mm) | 0.25 | 0.10 | 0.05 | 0.05 | 0.50 | 0.25 |
| ε used (mm) | 1.00 | 0.25 | 0.25 | 0.25 | 3.00 | 1.00 |

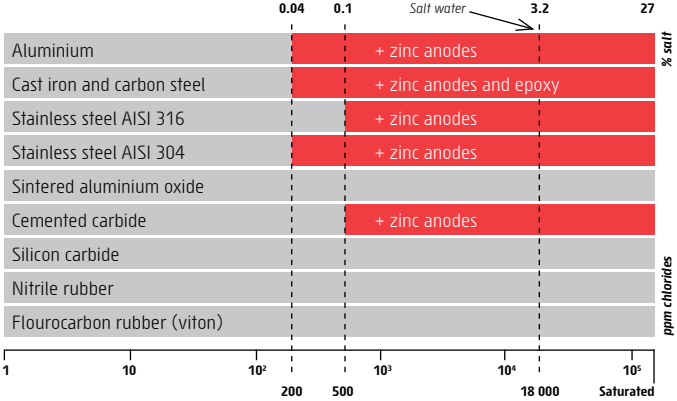
## Sludge/slurry solids concentration

| By volume ($C_v$) | By mass/weight ($C_m$) | Mixture |
|---|---|---|
| $C_v = \frac{V_{solids}}{V_{solids + water}}$ | $C_m = \frac{m_{solids}}{m_{solids + water}}$ | $\frac{SV_{mixture}}{SV_{solids}} = \frac{C_v}{C_m}$ |
| $\mathbf{V_{solids}}$ = volume of solids<br>$\mathbf{V_{solids+water}}$ = total sludge volume | $\mathbf{m_{solids}}$ = mass of solids<br>$\mathbf{m_{solids+water}}$ = total sludge mass | **SV** = Specific weight |

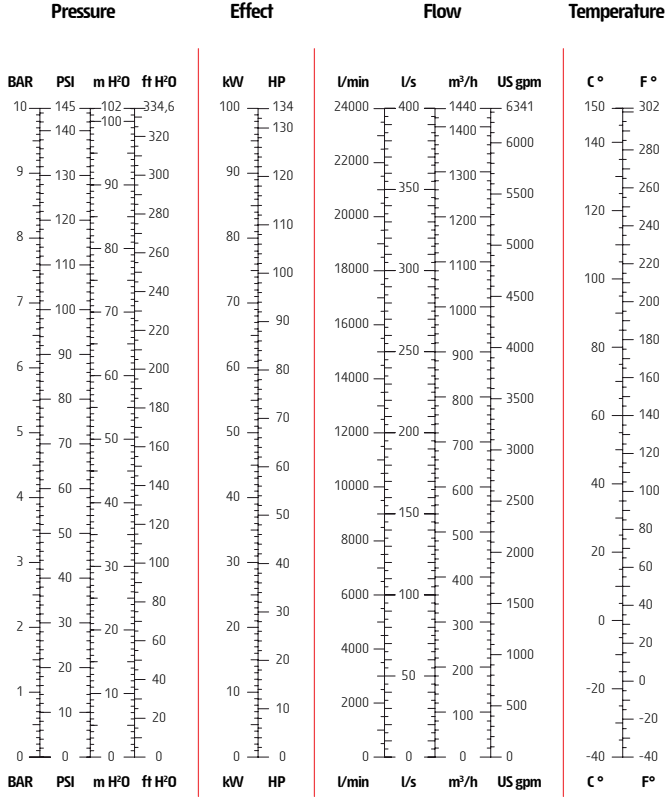
# pH tables




# Salt tables



# Translation charts



# Recommended generator sizes

## Voltages 3~460 V, 60 Hz

| Pump model | Max. power consumption | Rated current | Permissible cable length** | Delayed fuse | Generator set |
|---|---|---|---|---|---|
| Minex | 1.8 kW | 2.6 A | 980 ft | 10 A | 5 kVA |
| Minette | 3.1 kW | 4.7 A | 650 ft | 10 A | 8 kVA |
| Minor N H | 5.2 kW | 7.1 A | 490 ft | 20 A | 15 kVA |
| Major N H | 7.7 kW | 11.0 A | 490 ft | 20 A | 20 kVA |
| Master N H SH | 12.8 kW | 18.0 A | 490 ft | 30 A | 35*/40 kVA |
| Matador N H | 22.0 kW | 31.0 A | 290 ft | 50 A | 60*/70 kVA |
| Maxi H Lite | 32.0 kW | 44.0 A | 360 ft | 63 A | 55*770 kVA |
| Maxi N H | 48.0 kW | 65.0 A | 360 ft | 100 A | 120*/150 kVA |
| Maxi L | 42.0 kW | 64.0 A | 390 ft | 100 A | 110*/130 kVA |
| Magnum | 75.0 kW | 107 A | 360 ft | 125 A | 200*/250 kVA |
| Mega | 110 kW | 148 A | 520 ft | 170 A | 275*/350 kVA |
| Minette Inox | 2.9 kW | 4.2 A | 820 ft | 10 A | 8 kVA |
| Major Inox | 7.6 kW | 11 A | 490 ft | 20 A | 20 kVA |
| Master Inox | 11.0 kW | 15 A | 590 ft | 20 A | 30 kVA |
| Salvador | 3.1 kW | 4.7 A | 980 ft | 10 A | 8 kVA |
| Senior | 5.7 kW | 8.6 A | 650 ft | 20 A | 15 kVA |
| Sandy | 7.7 kW | 11.0 A | 490 ft | 20 A | 20 kVA |
| Salvador Inox | 2.9 kW | 4.2 A | 820 ft | 10 A | 8 kVA |
| Senior Inox | 6.2 kW | 9.0 A | 650 ft | 20 A | 16 kVA |
| Sandy Inox | 7.6 kW | 11 A | 490 ft | 20 A | 20 kVA |

**Y/D start  **Valid for standard cable sizes*

# Recommended generator sizes

## Voltages 1~230 V, 60 Hz

| Pump model | Max. power consumption | Rated current | Permissible cable length* | Delayed fuse | Generator set |
|---|---|---|---|---|---|
| Micro/Milli | 0.65 kW | 2.9 A | 160 ft | 10 A | 3 KVA |
| Mini | 1.1 kW | 4.8 A | 160 ft | 10 A | 4 KVA |
| Minex Lite | 1.3 kW | 5.6 A | 230 ft | 10 A | 4 KVA |
| Minex | 1.8 kW | 8.2 A | 160 ft | 20 A | 5 KVA |
| Minette | 2.2 kW | 9.9 A | 230 ft | 20 A | 6 KVA |
| Solid | 1.1 kW | 4.8 A | 160 ft | 10 A | 4 KVA |
| Salvador | 2.2 kW | 9.9 A | 230 ft | 20 A | 6 KVA |

**Valid for standard cable sizes*

### Note

- In general, delayed fuse shall be dimensioned by rated current x 1.75
- The above given kVA values are meant as guidelines to simplify the choice of generator size.

Regarding size of generator set, each different type has different characteristic; therefore it is always recommended to consult the manufacturer of generator to find out if the actual generator is capable of operating the pump.

Make sure that the cable is sized to allow a voltage drop of max. 5% of the nominal voltage.

## Bolt Tightening Torque values

All screws and nuts must be lubricated to achieve correct tightening torque. Screws that are screwed into stainless steel must have the threads coated with suitable lubricants to prevent seizing.

### Table 1: Stainless steel, A2 and A4, torque Nm (ft-lbs): Screws and nuts

| Property class | M4 | M5 | M6 | M8 | M10 | M12 | M16 | M20 | M24 | M30 |
|---|---|---|---|---|---|---|---|---|---|---|
| 50 | 1.0 (0.74) | 2.0 (1.5) | 3.0 (2.2) | 8.0 (5.9) | 15 (11) | 27 (20) | 65 (48) | 127 (93.7) | 220 (162) | 434 (320) |
| 70, 80 | 2.7 (2) | 5.4 (4) | 9.0 (6.6) | 22 (16) | 44 (32) | 76 (56) | 187 (138) | 364 (268) | 629 (464) | 1240 (915) |
| 100 | 4.1 (3) | 8.1 (6) | 14 (10) | 34 (25) | 66 (49) | 115 (84.8) | 248 (183) | 481 (355) | - | - |

### Table 2: Steel, torque Nm (ft-lbs): Screws and nuts.

| Property class | M4 | M5 | M6 | M8 | M10 | M12 | M16 | M20 | M24 | M30 |
|---|---|---|---|---|---|---|---|---|---|---|
| 8.8 | 2.9 (2.1) | 5.7 (4.2) | 9.8 (7.2) | 24 (18) | 47 (35) | 81 (60) | 194 (143) | 385 (285) | 665 (490) | 1310 (966) |
| 10.9 | 4.0 (2.9) | 8.1 (6) | 14 (10) | 33 (24) | 65 (48) | 114 (84) | 277 (204) | 541 (399) | 935 (689) | 1840 (1357) |
| 12.9 | 4.9 (3.6) | 9.7 (7.2) | 17 (13) | 40 (30) | 79 (58) | 136 (100) | 333 (245) | 649 (480) | 1120 825) | 2210 (1630) |

## Hexagon screws with countersunk heads

For hexagon socket head screws with countersunk head, maximum torque for all property classes must be 80% of the values for property class 8.8 above.

grindex

9005393 US 60Hz. 2017.04

See "Grindex Cutaway", our Augmented Reality interactive 3D app for looking inside a Grindex submersible drainage pump.
Get the app at App Store or Play Store, and use the target image on page 5 in this handbook to see the 3D pump. It's free of course.

GET IT ON Google Play

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