

# Metso

## Orion Series

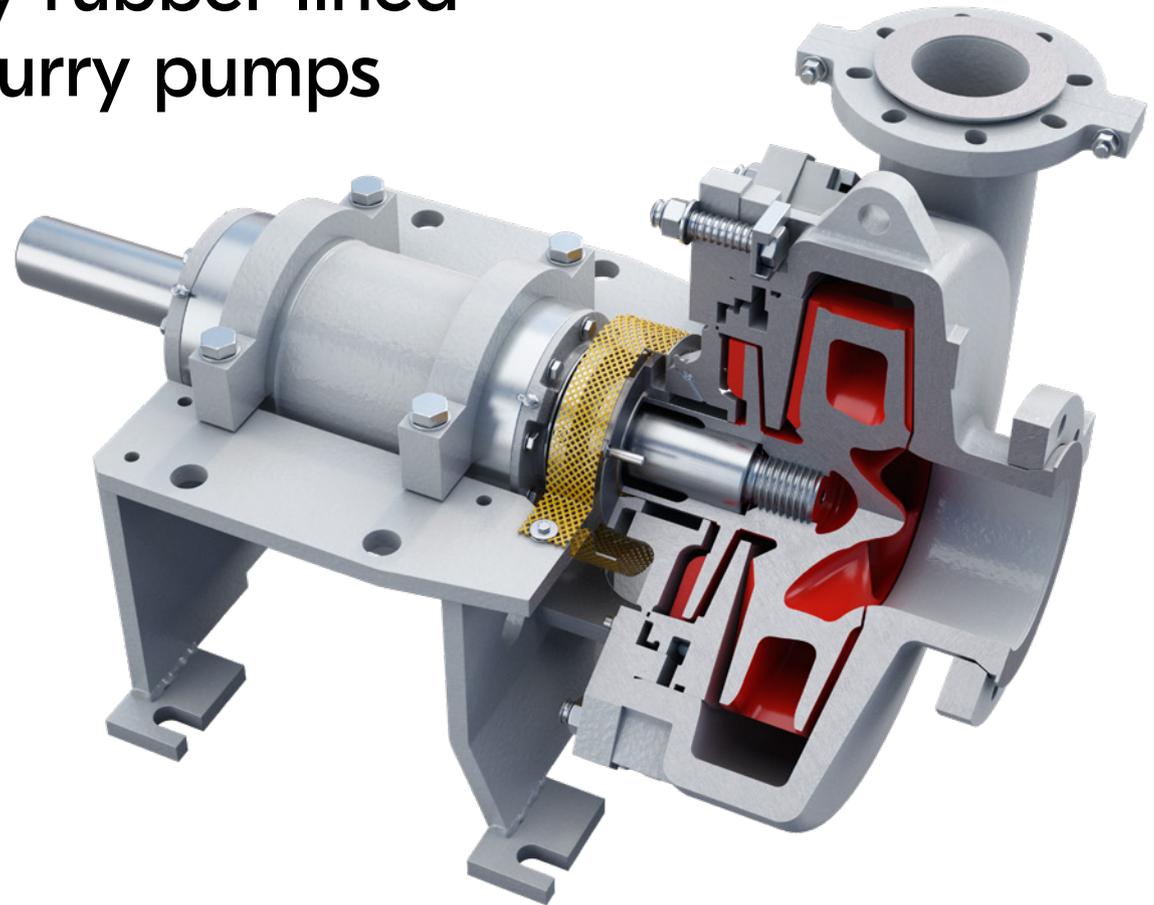
### Horizontal slurry pumps



Orion Series

# Heavy and mining duty rubber lined and metal horizontal slurry pumps

The Metso heavy (HM, HR) and mining (MR, MM) duty horizontal slurry pumps offer a wide range of world class rubber lined and hard metal slurry pumps for abrasive pumping applications.



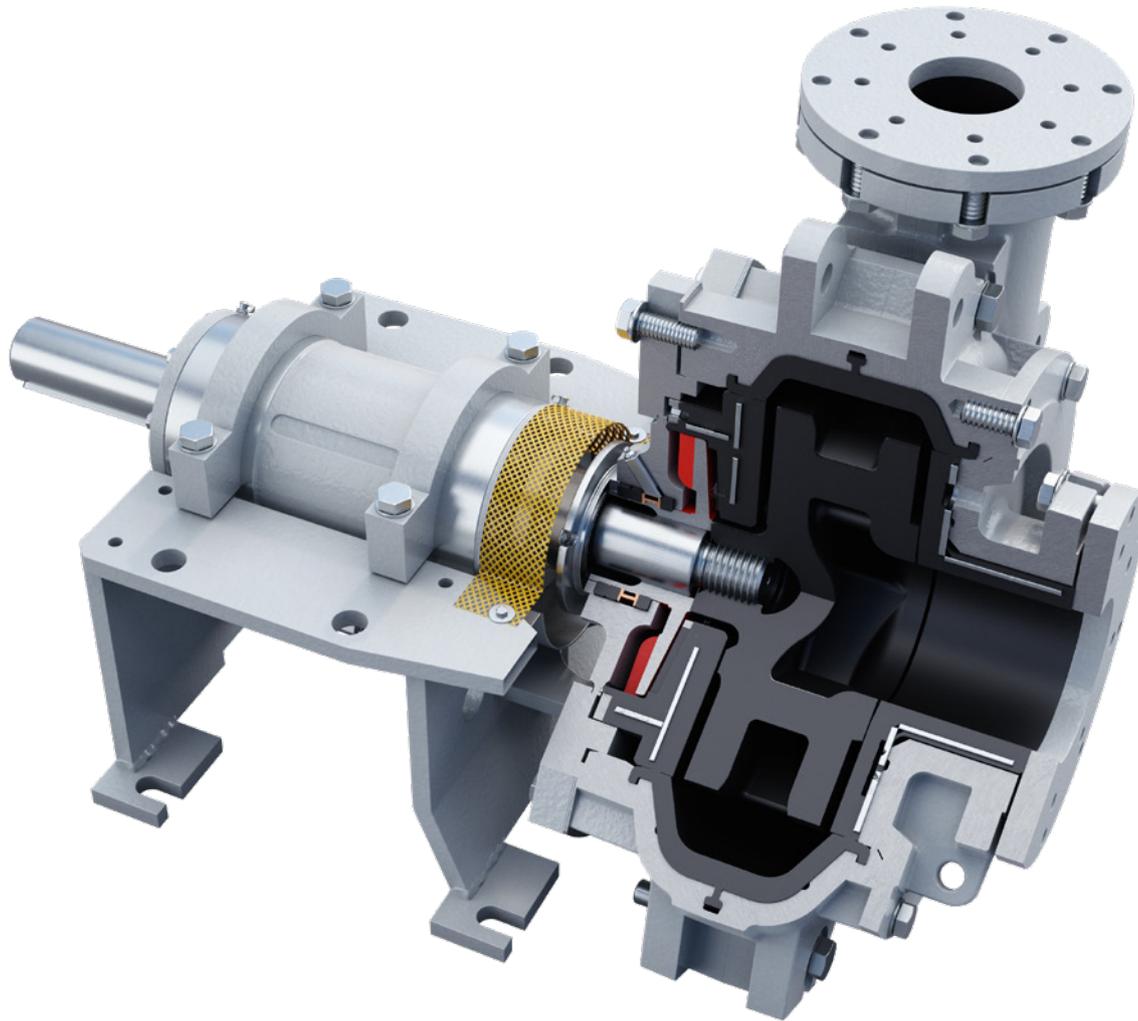
## Lowest total cost

Our focused product development combined with over 60 years of experience from thousands of applications has led to continuous improvements in our products. The benefits to customers are numerous but the most significant is the life time cost saving that will be achieved by using Orion horizontal slurry pumps.

## Reliability in operation

Specially developed features in our pumps provide trouble-free operation and a minimum downtime improving the cost effectiveness of the operation:

- Oversized high strength alloy steel shaft is carried in heavy duty grease lubricated bearings in a self-contained cartridge assembly
- Double seal arrangement provides positive seal of bearings against contamination
- Proven and reliable gland seal options to meet individual requirements, using expellers, flushed glands or mechanical seals
- Modular design and full interchangeability of parts minimizes stock levels
- Back pull out feature allows ease of inspection and maintenance
- Metso pumps and parts are manufactured under total quality management and all our production units are ISO certified.



## Typical applications

- Mining and mineral processing
- Hydrocyclone feed
- Mine refuse and tailings
- Industrial processing
- Coal and power plant ash
- Sand and gravel
- Mining duty abrasive slurries
- In-plant slurry transfer pumps
- Pulp & paper
- Lime slurry
- Alumina
- Fertilizer
- Acid Neutralization

## Long wear life

- Wear parts of highest quality hard metal, rubber and corrosion-resistant materials
- Robust design with extra thick sections at known points of wear
- Highest quality of wear resistant elastomers developed by Metso
- Interchangeability of hard metal and elastomer parts to provide the best solution for each individual application
- Optional special materials available on request
- Careful application at best efficiency point and selection of wear-resistant material give even wear and long life
- Optional wear clearance double adjustment feature increases wear life

## Low power consumption

- High efficiency hydraulic design ensures optimal power utilization
- Range optimization ensures operation close to the best efficiency point
- Use of fluid dynamic software to improve pump hydraulic efficiency
- 3-D computer design technology for development of hydraulic and mechanical components

**12 Optional design:**

Spherical roller bearing

Cylindrical roller bearing

**11 Taper roller bearings**

**10 Seals**

**9 Heavy duty shaft**

**8 Impeller wear clearance adjustment**

**1 Centrifugal seal arrangement**

**2 Even wear design**

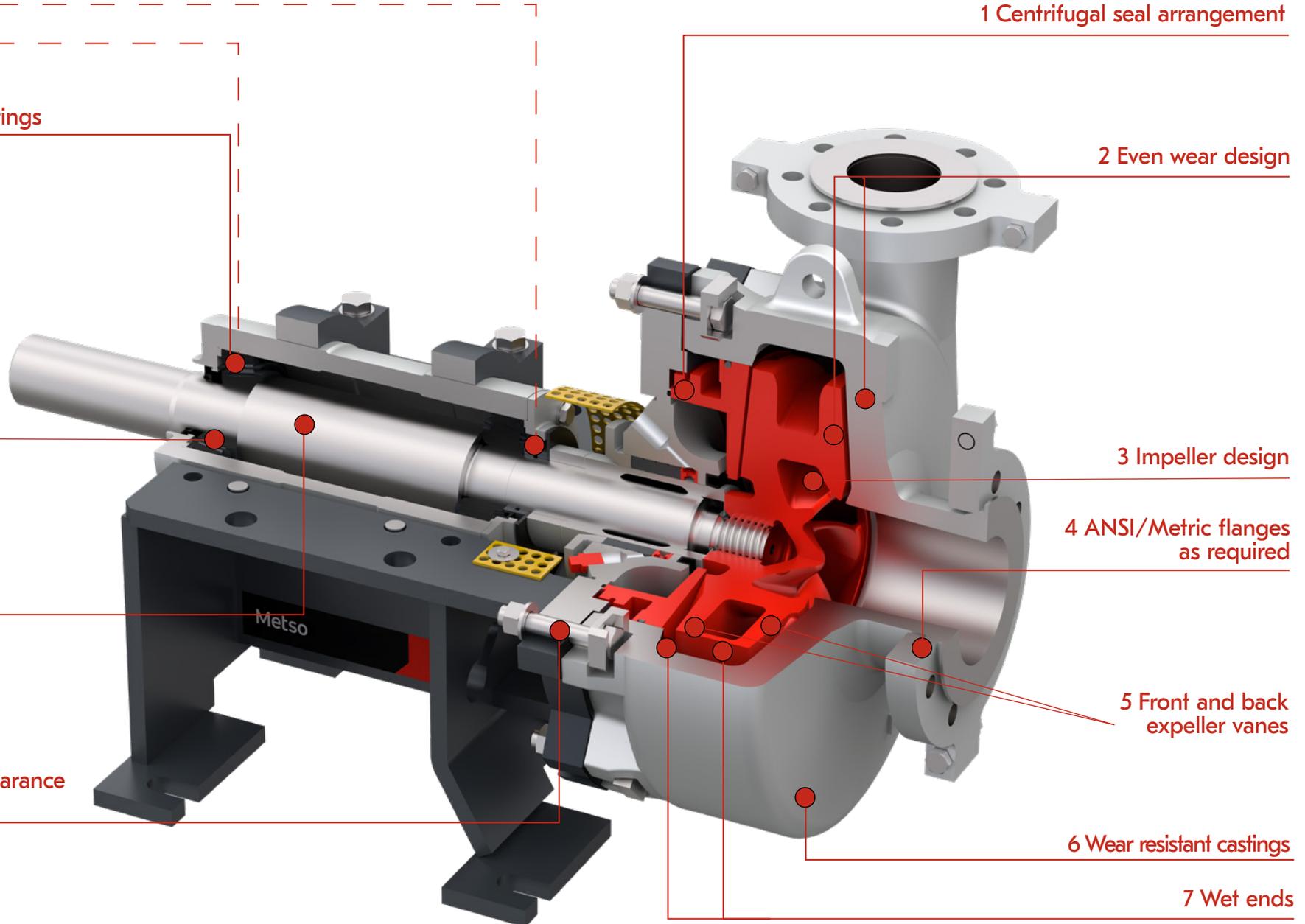
**3 Impeller design**

**4 ANSI/Metric flanges as required**

**5 Front and back expeller vanes**

**6 Wear resistant castings**

**7 Wet ends**



## 1 Centrifugal seal arrangement

The expeller generates a high head and works in conjunction with expelling back vanes of the impeller to provide a highly effective seal against positive inlet heads without gland leakage. Abrasion resistant materials ensure wear life equivalent to the pump. Three rings of grease-lubricating packing, seal the pump while stationary.

## 2 Even wear design

Case and impeller are matched for minimum hydraulic turbulence for longer and more equally distributed impeller and case yielding longer wear life.

## 3 Impeller design

Radial or partial mixed flow main vanes reduce hydraulic shock losses at the suction eye. Large diameters and strategic mass distribution permit high head and high performance at slow speeds without the sacrifice of efficiency.

## 4 ANSI / Metric flanges as required

Suction and discharge flanges are split on all HM and MM pumps for optional flange configurations, ease of pipe connection and alignment. Rubber lined pumps have slotted flanges to allow most metric or ANSI flanges.

## 5 Front and back expeller vanes

Optional double adjustment feature permits the use of narrow expelling vanes greatly reducing internal re-circulation with minimal energy consumption.

## 6 Wear resistant castings

Strict metallurgical control and casting integrity with extra metal at known areas of severe wear.

## 7 Wet ends

Hard metal and rubber lined wet ends available.

## 8 Impeller wear clearance adjustment

Closing front impeller running clearances permits optimum continuous performance of the pump. All adjustments can be made on installed pumps without disassembly. The optional double adjustment frame allows both front and back clearance adjustment.

## 9 Heavy duty shaft

Designed for tough services. High power transmission design with reduced impeller overhang for minimum shaft deflection and a maximum pump life.

## 10 Seals

Double sealed with V-ring protected lip seal to ensure reliable operation.

## 11 Taper roller bearings

Heavy duty grease lubricated bearings in a sealed cartridge designed for maximum bearing life. Double bearing arrangements available.

## 12 Optional design:

Spherical roller bearing  
Cylindrical roller bearing

## Standard materials of construction

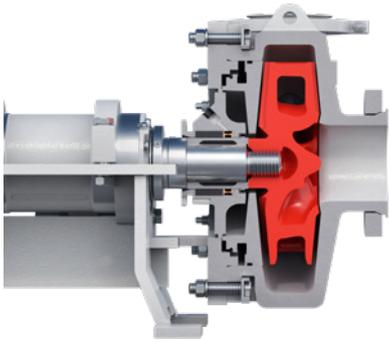
|                    |                               |                            |                             |                         |                                 |                             |                       |                  |
|--------------------|-------------------------------|----------------------------|-----------------------------|-------------------------|---------------------------------|-----------------------------|-----------------------|------------------|
| Metal<br>Standard  | Casing<br>High Chrome         | Impeller<br>High Chrome    | Back liner<br>High Chrome   | Expeller<br>High Chrome | Expeller ring<br>High Chrome    | Shaft sleeve<br>High Chrome | Shaft<br>Carbon steel | Seals<br>Nitrile |
| Rubber<br>Standard | Case liners<br>Natural rubber | Impeller<br>Natural rubber | Backliner<br>Natural rubber | Expeller<br>High Chrome | Expeller ring<br>Natural rubber | Shaft sleeve<br>High Chrome | Shaft<br>Carbon steel | Seals<br>Nitrile |

\* Consult factory for available options

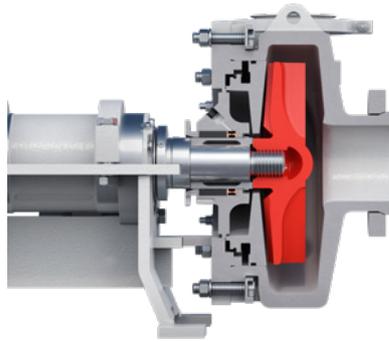
# Impeller options

Combined low flow / full flow stuffing box design can be built for either low or full flow options by changing the arrangement

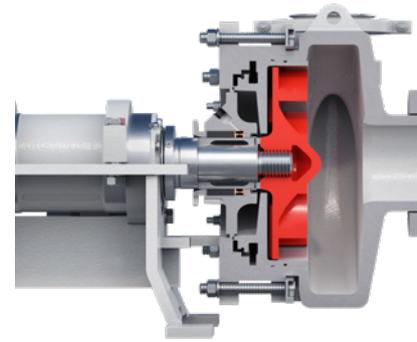
Standard closed impeller,  
HM pump:



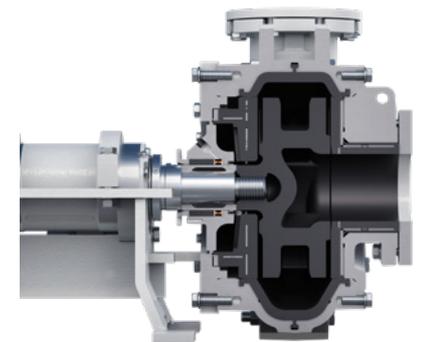
Induced flow (Vortex)  
impeller:



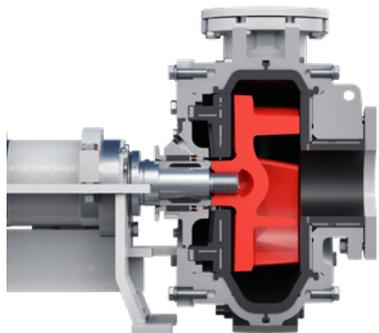
Fully recessed induced flow  
(Vortex) impeller:



Standard closed impeller,  
HR pump:

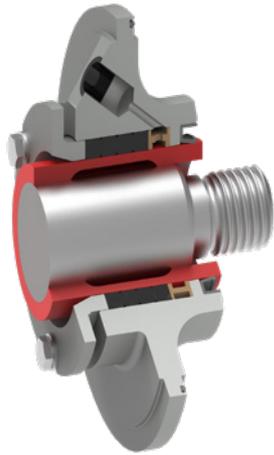


Open 3-vane impeller,  
HR pump:



MRE pump with drain plug:





### Full flow

Use for suction conditions not suitable for expeller sealing when product dilution is not important. Full flow provides the longest packing wearing life. The lantern ring is placed in the bottom of the stuffing box while the box is protected by a lip seal to avoid damage from temporary concentrate variations.



### Expeller shaft seal

Used for no product dilution against positive inlet head. The standard pump has a primary high performance hydrodynamic expeller dry seal which seals the shaft when the pump is running. A secondary, packed gland seal stops leakage when the pump is not running. The expeller is not used on flushed seal assemblies.



### Low flow

Use for suction conditions not suitable for expeller sealing when product dilution needs to be minimized. One ring of packing is placed in front of the lantern ring.



### Metso mechanical slurry seal

Used when stuffing box leakage is not acceptable or product dilution must be minimized. Options available for slurry classes 1 through 4.

# Motor arrangement options

Overhead mounted



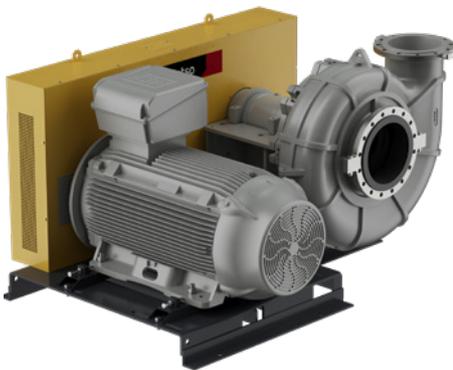
Reverse overhead mounted



Direct coupled



Side mounted



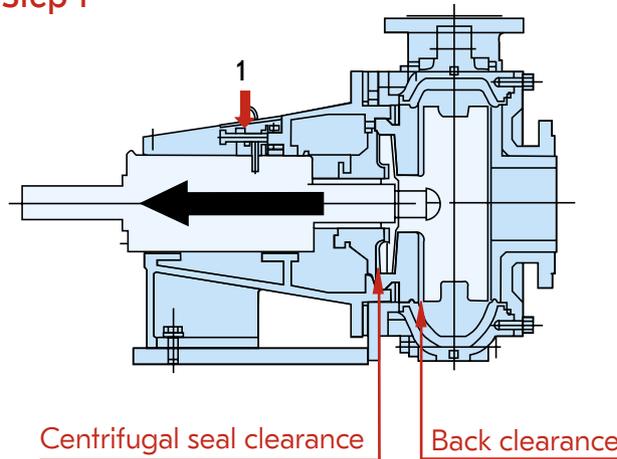
The Orion Series of pumps can also be supplied in a variety of specialty configurations:

- HP – High Pressure - same as HM with heavier duty case for higher pressure.
- HG – Heavy-duty Gravel -suction and discharge flanges are the same size and impeller has less vanes to pass larger material size.
- HT – Heavy-duty Tunneling - same as HM with special 90° elbow cast into the casing.
- HH – High Head - Larger diameter impeller for a given flange sizes.
- MRE - Including drain plug or casing.

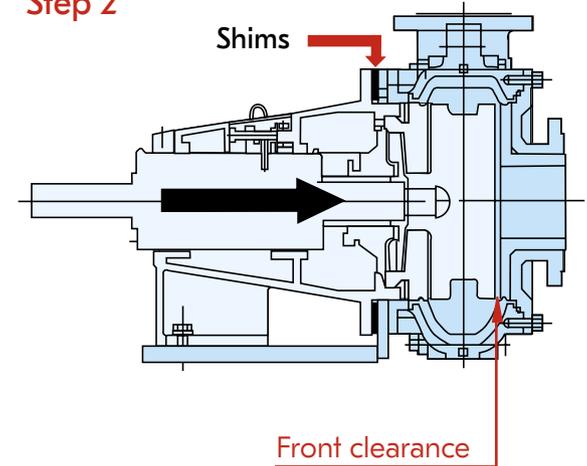
# Optional double adjustment features

The procedure of closing the back and front impeller clearances permits constant performance of the pump throughout the normal wear life of all components. This simple operation is illustrated in the two steps shown below and can be performed in minutes on site pump without

Step 1



Step 2



## Step 1. Adjust impeller back-side clearance

Impeller back clearance and centrifugal seal adjustment is achieved by adjusting the screw on the bearing cylinder housing. The bearing cylinder housing, shaft and impeller move back in order to close the impeller back clearance.

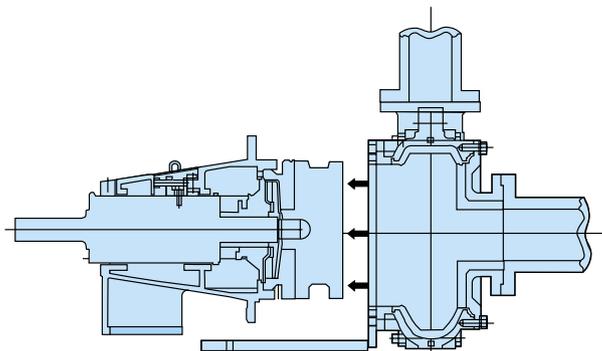
Double adjustment can also be made on low flow, full flow and mechanical seal arrangements.

## Step 2. Adjust impeller front-side clearance

Impeller front clearance is made by removal of casing half-shims and retightening casing bolts. This also acts as a visual wear indicator. The entire power frame moves forward to close the impeller front clearance.

Once all the shims are removed, the pump can still be operated as a single adjust build.

# Back and front pull-out design

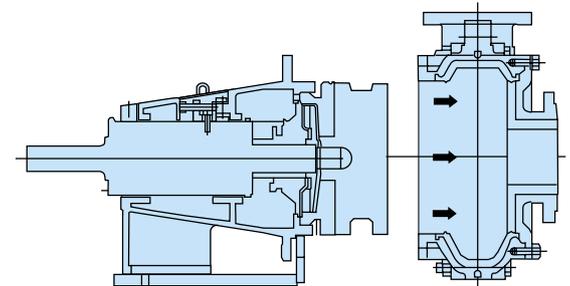


## Back pull-out design

For normal routine inspection or repair, the bearing frame and rotating element can be removed as a unit. Impeller, piping and gland seal component renewal can be carried out rapidly.

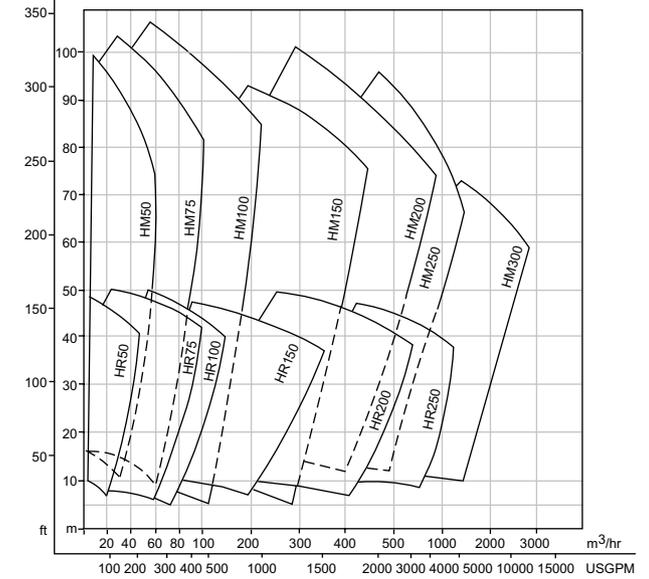
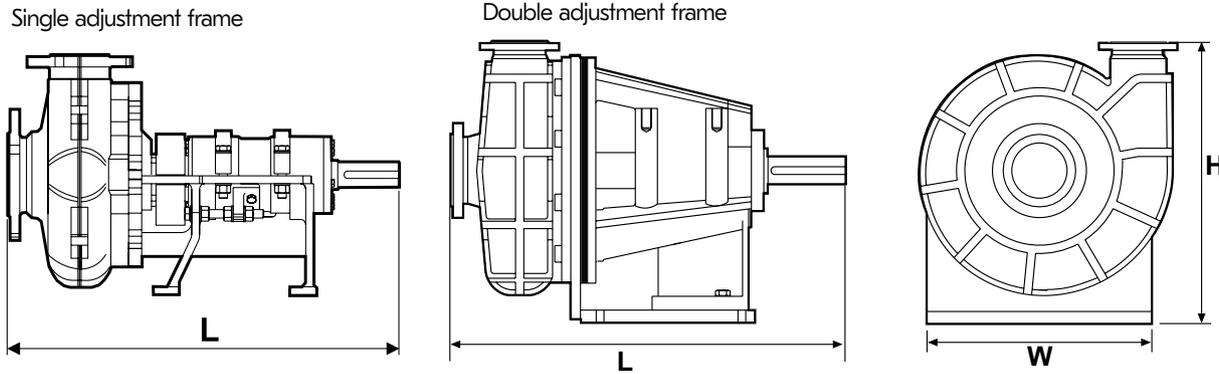
## Front pull-out design

For casing only renewal, or if back pull-out is not convenient, the front pull-out feature can be used after pipe work removal.



# Selection of pump size for the heavy duty rubber lined and hard metal slurry pumps

## Pump dimensions



| Model    | Connection dimensions |        |        |        | General dimensions |        |      |        |      |        | Total weight*     |      | Total weight*     |      |
|----------|-----------------------|--------|--------|--------|--------------------|--------|------|--------|------|--------|-------------------|------|-------------------|------|
|          | Inlet                 |        | Outlet |        | H                  |        | L    |        | W    |        | Double adjustment |      | Single adjustment |      |
|          | mm                    | inches | mm     | inches | mm                 | inches | mm   | inches | mm   | inches | kg                | lbs  | kg                | lbs  |
| HM50 •   | 50                    | 2      | 32     | 1,5    | 433                | 17     | 713  | 28     | 360  | 14     | 160               | 353  | 136               | 300  |
| HM75 •   | 75                    | 3      | 50     | 2      | 438                | 17     | 734  | 29     | 360  | 14     | 200               | 441  | 161               | 355  |
| HM100 •  | 100                   | 4      | 75     | 3      | 505                | 20     | 880  | 35     | 424  | 17     | 320               | 705  | 250               | 551  |
| HM150 •  | 150                   | 6      | 100    | 4      | 630                | 25     | 1025 | 40     | 545  | 21     | 550               | 1213 | 440               | 970  |
| HM200    | 200                   | 8      | 150    | 6      | 855                | 34     | 1258 | 50     | 686  | 27     | 1220              | 2690 | 1010              | 2227 |
| HM250 •  | 250                   | 10     | 200    | 8      | 1030               | 41     | 1463 | 58     | 830  | 33     | 2040              | 4497 | 1660              | 3660 |
| HM300    | 300                   | 12     | 250    | 10     | 1150               | 45     | 1591 | 63     | 1000 | 39     | 2850              | 6283 | 1900              | 4189 |
| HR50     | 50                    | 2      | 32     | 1,5    | 428                | 17     | 709  | 28     | 360  | 14     | 180               | 397  | 126               | 278  |
| HR75 ••  | 75                    | 3      | 50     | 2      | 463                | 18     | 729  | 29     | 360  | 14     | 220               | 485  | 145               | 320  |
| HR100 •• | 100                   | 4      | 75     | 3      | 555                | 22     | 913  | 36     | 424  | 17     | 330               | 728  | 270               | 595  |
| HR150 •• | 150                   | 6      | 100    | 4      | 713                | 28     | 1097 | 43     | 545  | 21     | 630               | 1389 | 510               | 1124 |
| HR200 •• | 200                   | 8      | 150    | 6      | 965                | 38     | 1295 | 51     | 686  | 27     | 1250              | 2756 | 1065              | 2348 |
| HR250    | 250                   | 10     | 200    | 8      | 1125               | 44     | 1550 | 61     | 830  | 33     | 2110              | 4652 | 1715              | 3781 |

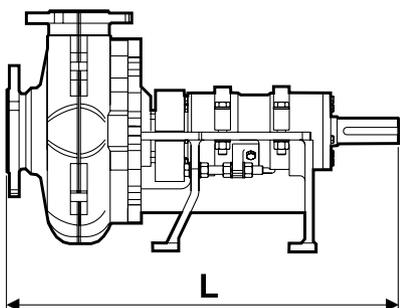
\* Bare shaft pump weight

• These pumps are available with fully recessed induced vortex impeller. •• These pumps are available with O3 3 vane open impellers.

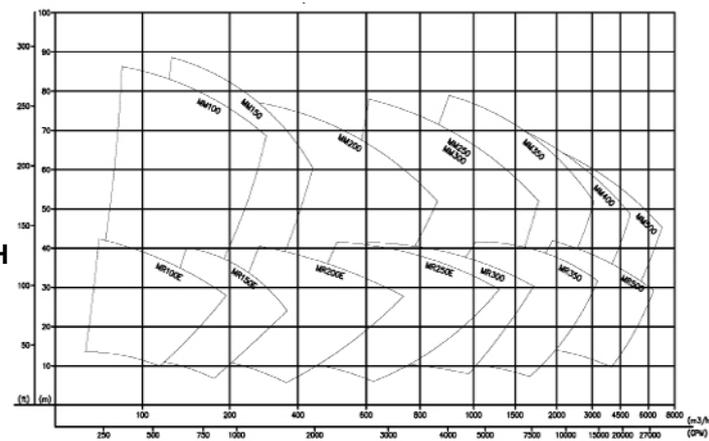
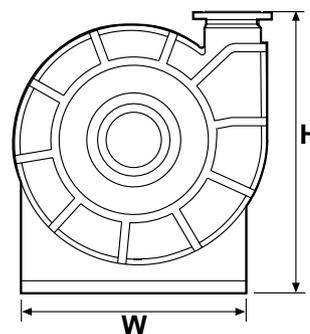
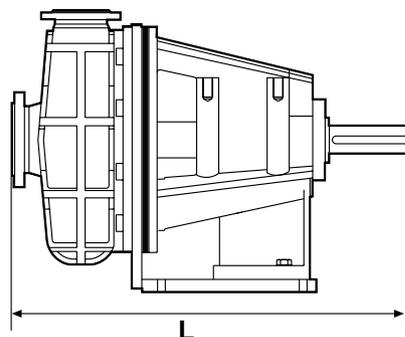
# Selection of pump size for the mining duty rubber lined and hard metal slurry pumps

## Pump dimensions

Single adjustment frame



Double adjustment frame



| Model   | Connection dimensions |        |        |        | General dimensions |        |       |        |       |        | Total weight*     |       | Total weight*     |        |
|---------|-----------------------|--------|--------|--------|--------------------|--------|-------|--------|-------|--------|-------------------|-------|-------------------|--------|
|         | Inlet                 |        | Outlet |        | H                  |        | L     |        | W     |        | Double adjustment |       | Single adjustment |        |
|         | mm                    | inches | mm     | inches | mm                 | inches | mm    | inches | mm    | inches | kg                | lbs   | kg                | lbs    |
| MM100 • | 100                   | 4      | 75     | 3      | 454                | 18     | 730   | 29     | 360   | 14     | 230               | 507   | 170               | 375    |
| MM150 • | 150                   | 6      | 100    | 4      | 527                | 21     | 889   | 35     | 424   | 17     | 370               | 816   | 275               | 606    |
| MM200 • | 200                   | 8      | 150    | 6      | 710                | 28     | 1 073 | 42     | 545   | 21     | 650               | 1 433 | 525               | 1 157  |
| MM250   | 250                   | 10     | 200    | 8      | 885                | 35     | 1 245 | 49     | 686   | 27     | 1 350             | 2 976 | 1 095             | 2 414  |
| MM300 • | 300                   | 12     | 250    | 10     | 1 055              | 42     | 1 483 | 58     | 830   | 33     | 2 150             | 4 740 | 1 775             | 3 913  |
| MM350 • | 350                   | 14     | 300    | 12     | 1 080              | 43     | 1 527 | 60     | 830   | 33     | 2 300             | 5 071 | 1 960             | 4 321  |
| MM400   | 400                   | 16     | 350    | 14     | 1 250              | 49     | 1 620 | 64     | 1 000 | 39     | 3 000             | 6 614 | 2105              | 4 641  |
| MM500   | 500                   | 20     | 450    | 18     | 1 726              | 68     | 2 180 | 86     | 1 110 | 44     | —                 | —     | 5 980             | 13 184 |
| MR100E  | 100                   | 4      | 75     | 3      | 471                | 18,5   | 759   | 30     | 340   | 13     | —                 | —     | 150               | 330    |
| MR150E  | 150                   | 6      | 100    | 4      | 522                | 20,5   | 937   | 37     | 424   | 17     | —                 | —     | 265               | 584    |
| MR200E  | 200                   | 8      | 150    | 6      | 703                | 27,5   | 1108  | 43,5   | 530   | 21     | —                 | —     | 520               | 1146   |
| MR250E  | 250                   | 10     | 200    | 8      | 896                | 35     | 1326  | 52     | 686   | 27     | —                 | —     | 925               | 2039   |
| MR300   | 300                   | 12     | 250    | 10     | 1 035              | 41     | 1 506 | 59     | 830   | 33     | 2 450             | 5 401 | 1 520             | 3 351  |
| MR350   | 350                   | 14     | 300    | 12     | 1 257              | 49     | 1 665 | 66     | 1 000 | 39     | —                 | —     | 1 600             | 5 732  |
| MR500   | 489                   | 20     | 438    | 18     | 2064               | 81     | 2689  | 106    | 1204  | 47     | —                 | —     | 8030              | 17 703 |

\* Bare shaft pump weight

• These pumps are available with fully recessed induced vortex impeller.