

# MAQD

## Sewage pumps



### Specifications

MAQD series pumps designed for pumping fluids which contents large solids. They have large range of capacities range and are available with large range of powers.

Capacity range is 3 - 800 l/s

Discharge head range is 5 - 80 m

Power range is 3 kW 500 kW.

### Applications

- Domestic and industrial raw sewage water pumping
- Waste water handling plants
- In biological cleaning plants for pumping active sludge.
- Pumping of floating solids in settlement pools.
- Pumping waste water to active screens
- Pumping industrial and chemical waste water.
- Draining rain water
- All kinds of drainage and dewatering
- Pumping miscellaneous waters in industrial plants



### Fluid parameters:

- Unscreened sewage and other waste water types with high solids concentration Pumps are designed to tolerate large solids ( 30 - 200 mm diameter) without clogging.
- Water with sand content. Maximum grain size ( 20 - 30 mm). Liquid, sand ratio can be maximum % 6. For higher sand concentration preventive provisions must be taken against wear.
- Maximum allowed fluid temperature is 40°C
- Maximum allowed medium density is 1,2 gr/cm<sup>3</sup>, maximum allowed medium viscosity is 1,5 x 10<sup>-6</sup> m<sup>2</sup>/s. Measures must be taken to lower these values.

### Technical details

**SUBMERSIBLE ELECTRIC MOTOR:** 3 phase 380V power supply. Insulation class of motors is F. Protection class is IP 68. Upon request H class insulation is available so as different power supply options like different frequency or voltage (60 Hz).

**SHAFT SEALING:** Between motor and pumped fluid a high quality double mechanical seal is used, which operate in oil chamber. (Up to 11 kW single mechanical seal)

**BEARINGS:** Rotor is supported by means of two heavy duty ball bearings on upper and lower sides. These bearings are selected to support axial and radial loads. In MAQD-Y type the bearings operate in cooling oil as a result they do not overheat . In MAQD types bearings are grease lubricated.

**MOTOR OVER HEAT PROTECTION SYSTEM:** Stator windings are protected against over heat by 120 °C thermistors. Two thermistor contacts are connected to cable and must be connected to the thermistor relay.

**WATER LEAKAGE WARNING SYSTEM:** An electrode system is used which generates a warning signal in case of water leakage caused by worn out mechanical seal or any other reason. In order to have this system operational it must be connected to the STR-1 protection relay.

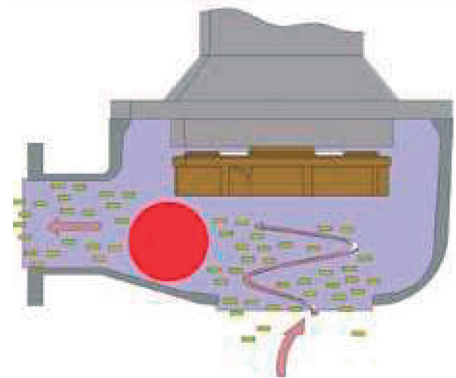
**CABLE CONNECTION:** H07RN-F type rubber coated cables with flexible cores used. They are durable against corrosiveness of sewage water. Pumps supplied with 10 m cable as standard. Do not transport pump by pulling the cable.

**VOLUTE CASING:** Volute casings are with concentric discharge and have large cross section. They are designed not to be clogged by the solid that can pass through impeller. In special applications Flush valve can be fitted to the pump. Pumps can be manufactured with different material types if requested by client or it is needed because of liquid properties.

## Material

| Pump component               | Material                     |
|------------------------------|------------------------------|
| Motor casing - volute casing | Cast iron GG-25 (EN-JL 1040) |
| Impeller                     | Cast iron GG-25 (EN-JL 1040) |
| Shaft                        | Stainless steel (1.4021)     |
| Bolts - Nuts                 | Stainless steel              |
| Mechanical seal              | SIC/SIC                      |
| Cable                        | H07RN-f                      |
| Coating : Primer             | Epoxy primer                 |
| Final coat                   | Coal tar epoxy paint over    |
| Inner surfaces               | Rapid primer                 |

**Vortex impeller operating schematics.**



**CAUTION:** If the submersible pump will be stored without operation for long time, it must be operated for short of time every 25-30 days. Submersible pumps manufactured according to CE directive.

## Design

### MAQD (Cooling is by cooling jacket.)

Around the motor of the submersible pump a cooling jacket is fitted. Coolant liquid circulates within this jacket by an impeller inside the oil chamber. Liquid circulating in the jacket dissipates the heat regardless of installation type and cools the motor. Oil chamber behind the pump impeller cools the coolant fluid.

## Impeller design



**Single vane double angled non clogging impeller:** These impellers have large solid passages, high efficiencies and they do not strain motor power at low discharge head values.



**Double vane impeller:** In general they are used in large sized pumps. Rotational symmetry lets them operate without vibration and stable. They are with high efficiency and they do not strain motor with excessive load in case of low discharge head. Large channels between vanes allows pumping of solids.



**Vortex type impeller:** This type of impellers do not have closed channels. Impeller located deep inside the volute casing. Pumping action is generated by vortex created within the fluid by rotation of the impeller. With this geometry they can tolerate large solids than other impeller types more specifically they tolerate fibrous materials in the pumped liquid. Disadvantage of this impeller type is lower efficiencies  
Pump impellers statically and dynamically balanced according to ISO 1940 class 6.3



**P- Impeller:** Open type non clogging impeller operates with in close proximity suction piece.

# Installation

## 1) AUTOMATIC COUPLING ( DUCK FOOT BEND)

It is an economic and practical installation form for stationary systems .. The automatic coupling system consists of duck foot bend fixed on sump floor, guide rail (2 galvanized pipes fixed together) and fixing flange which is fitted to the pump. The automatic coupling set components and discharge piping have to be installed before sump get filled with the medium.

**Operating principle:** The fixing flange which is fitted to the pump slides through the guide rails and the pump is lowered to the sump by means of a chain. To take the pump out of the sump by pulling pump by chain is enough, no dismantling or bolt removal is required.

## 2) Dry Installation:

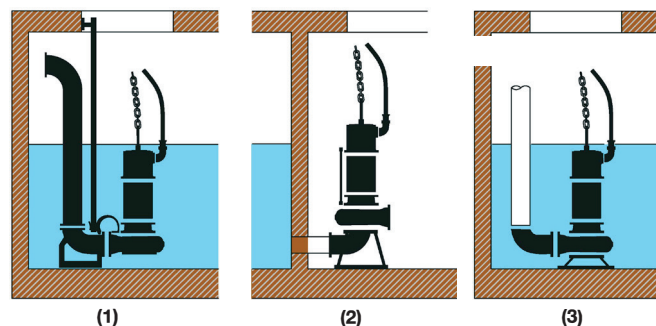
This installation form is for MAQD-CJ type pumps with cooling jacket Since these pumps can cool themselves they can operate out of water continuously. These pumps have advantages of dry operation which are maintenance and operational advantages and advantages of submerged operation which are less space requirement and handling tough operation conditions. Sump and pump are separated by a wall in dry installation. The pump room's floor is dry and maintenance and repair work can be done easily in pump room. Since pumps are fixed on concrete basement firmly operation is vibration free, and station is more reliable.

Pumps have suction bends. On the suction side of the pump there is one non return valve and 1 dismantling piece. A small drainage pump must be installed in the pump room for leakage water.

## 3) VERTICAL FREE STANDING HOSE CONNECTION

This installation form is suitable for pumps with smooth and flat floors. The pump must stay on the floor freely. The pump can be removed from the sump by pulling out by chain. Can be used for small pumps.

In all installation forms discharge lines must be fitted with, valve, non return valve, dismantling piece and expansion joint.



## Sealing in Automatic coupling

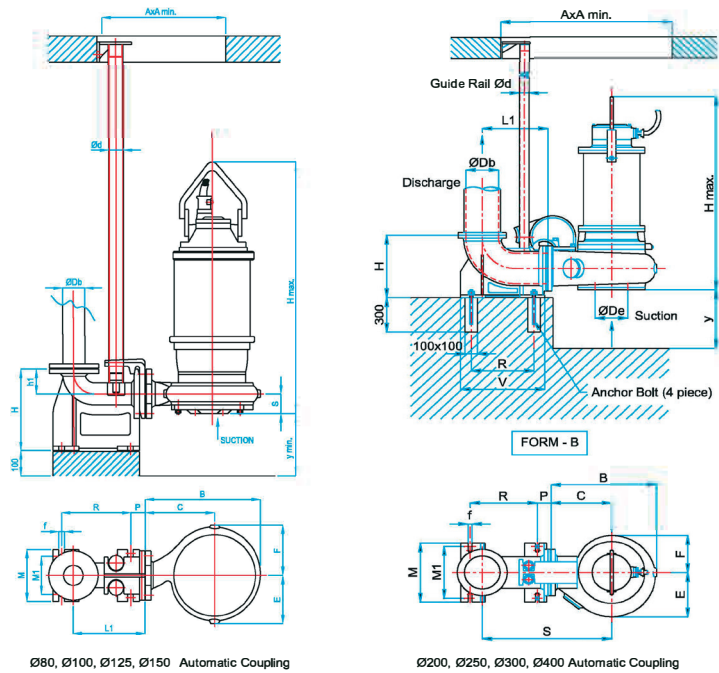
### a) Sealing with gasket

A gasket with special design is fitted between guide flange and pump flange. When the pump operates, pressure on discharge of the pump forces the gasket to expand on guide flange. 100 % sealing achieved with gasket. This is the sealing used as standard.

### b) Metal on Metal sealing

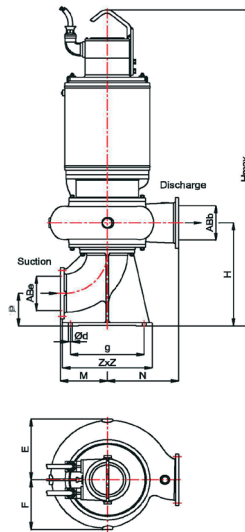
The sealing between pump discharge flange and duck foot bend flange achieved by a very smoothly machined pump flange surface and duck foot bend flange surface. This sealing used in special applications.

# MAQD DUCK FOOT BEND DIMENSIONS TABLE



| Type             | Ød  | Suction | Discharge PN10 | C    | B    | E   | F   | S   | L1  | P   | R         | M1  | f       | Anchor bolt | V   | M    | H    | H1  | Ymin      | AxA min   | FORM |     |     |
|------------------|-----|---------|----------------|------|------|-----|-----|-----|-----|-----|-----------|-----|---------|-------------|-----|------|------|-----|-----------|-----------|------|-----|-----|
| MAQD 80/250      | 2"  | 80      | 80             | 280  | 475  | 175 | 150 | 65  | 234 | 64  | 220       | 140 | 23      | M20x250     | 290 | 210  | 285  | 140 | 180       | 725x725   | A    |     |     |
| MAQD 80/250V     |     | 125     |                | 280  | 490  | 220 | 190 | 85  |     |     |           |     |         |             |     |      | 285  | 140 | 180       |           |      |     |     |
| MAQD EFF 80/260  |     | 80      |                | 315  | 540  | 218 | 200 | 65  |     |     |           |     |         |             |     |      | 285  | 140 | 180       |           |      |     |     |
| MAQD 80-270V     |     | 125     |                | 340  | 585  | 255 | 235 | 85  |     |     |           |     |         |             |     |      | 352  | 250 | 265       | 140       | 180  |     |     |
| MAQD 80/315V     |     | 100     | 100            | 300  | 545  | 245 | 220 | 65  | 270 | 80  | 240       | 150 | 23      | M20x250     | 320 | 220  | 300  | 140 | 200       | 775x775   | A    |     |     |
| MAQD EFF 80/320  |     | 100     |                | 248  | 440  | 173 | 158 | 80  |     |     |           |     |         |             |     |      | 320  | 220 | 300       |           |      |     |     |
| MAQD 100/200     |     | 150     |                | 300  | 500  | 220 | 180 | 80  |     |     |           |     |         |             |     |      | 320  | 220 | 300       |           |      |     |     |
| MAQD 100/250 V   |     | 100     |                | 300  | 540  | 260 | 210 | 80  |     |     |           |     |         |             |     |      | 320  | 220 | 300       | 850x850   | A    |     |     |
| MAQD EFF 100/260 |     | 150     |                | 315  | 515  | 198 | 197 | 80  |     |     |           |     |         |             |     |      | 320  | 220 | 300       |           |      |     |     |
| MAQD 100/270 V   |     | 100     |                | 575  | 248  | 220 | 80  | 320 |     |     |           |     |         |             |     |      | 220  | 300 |           |           |      |     |     |
| MAQD 100/315 V   |     | 150     |                | 340  | 590  | 285 | 225 | 80  |     |     |           |     |         |             |     |      | 320  | 220 | 300       | 1000x1000 | A    |     |     |
| MAQD EFF 100/320 |     | 100     |                | 625  | 300  | 270 | 80  | 320 |     |     |           |     |         |             |     |      | 220  | 300 |           |           |      |     |     |
| MAQD 100/400     |     | 125     |                | 315  | 570  | 267 | 235 | 120 |     |     |           |     |         |             |     |      | 320  | 220 | 300       |           |      |     |     |
| MAQD 125/315 V   |     | 150     | 370            | 670  | 315  | 280 | 120 | 320 | 220 | 300 | 1000x1000 | B   |         |             |     |      |      |     |           |           |      |     |     |
| MAQD 125/400     |     | 150     | 150(125)       | 450  | 790  | 385 | 335 | 120 | 320 | 220 |           |     |         |             |     |      |      |     |           |           |      |     |     |
| MAQD EFF 125/500 |     | 150     | 380            | 635  | 280  | 240 | 130 | 320 | 220 | 300 |           |     |         |             |     |      |      |     |           |           |      |     |     |
| MAQD 150/315     |     | 200     | 150            | 400  | 650  | 280 | 220 | 130 | 396 | 96  | 380       | 240 | 28      | M24x250     | 480 | 330  | 390  | 200 | 175       | 1000x1000 | A    |     |     |
| MAQD EFF 150/315 |     |         |                | 400  | 700  | 325 | 300 | 130 |     |     |           |     |         |             |     |      | 320  | 220 |           |           |      | 300 |     |
| MAQD 150/400     |     |         |                | 500  | 840  | 365 | 305 | 130 |     |     |           |     |         |             |     |      | 320  | 220 |           |           |      | 300 |     |
| MAQD EFF 150/500 |     |         |                | 200  | 370  | 670 | 335 | 275 |     |     |           |     |         |             |     |      | 127  | 320 |           |           |      | 220 | 300 |
| MAQD 200/315N    |     | 250     | 200            | 500  | 880  | 395 | 290 | 200 | 442 | 112 | 420       | 300 | 28      | M24x250     | 540 | 400  | 450  | 200 | 220       | 1200x1200 | B    |     |     |
| MAQD 200/315F    |     |         |                | 200  | 530  | 895 | 375 | 355 |     |     |           |     |         |             |     |      | 180  | 320 |           |           |      | 220 | 300 |
| MAQD EFF 200/320 |     |         |                | 200  | 500  | 845 | 385 | 305 |     |     |           |     |         |             |     |      | 180  | 320 |           |           |      | 220 | 300 |
| MAQD 200/400F    |     |         |                | 250  | 560  | 980 | 425 | 355 |     |     |           |     |         |             |     |      | 200  | 320 |           |           |      | 220 | 300 |
| MAQD EFF 200/410 |     | 3"      | 250            | 560  | 980  | 425 | 355 | 200 | 542 | 107 | 532       | 375 | 36      | M33x300     | 682 | 500  | 665  | 665 | 350       | 1400x1400 | B    |     |     |
| MAQD EFF 200/500 | 200 |         |                | 440  | 760  | 355 | 290 | 180 |     |     |           |     |         |             |     |      | 320  | 220 |           |           |      | 300 |     |
| MAQD 250/315F    | 250 |         |                | 480  | 836  | 387 | 338 | 120 |     |     |           |     |         |             |     |      | 320  | 220 |           |           |      | 300 |     |
| MAQD 250/400N    | 300 |         |                | 800  | 100  | 445 | 330 | 120 |     |     |           |     |         |             |     |      | 320  | 220 |           |           |      | 300 |     |
| MAQD 250/400M    | 300 | 250     | 650            | 1176 | 555  | 485 | 130 | 604 | 129 | 575 | 426       | 36  | M33x300 | 775         | 565 | 618  | 618  | 400 | 1500x1500 | B         |      |     |     |
| MAQD 250/400F    |     |         | 300            | 750  | 1330 | 820 | 540 |     |     |     |           |     |         |             |     | 141  | 320  |     |           |           | 220  | 300 |     |
| MAQD EFF 250/420 |     |         | 350            | 600  | 1030 | 475 | 325 |     |     |     |           |     |         |             |     | 225  | 320  |     |           |           | 220  | 300 |     |
| MAQD 250/600     |     |         | 300            | 585  | 1060 | 525 | 430 |     |     |     |           |     |         |             |     | 225  | 320  |     |           |           | 220  | 300 |     |
| MAQD 250/700     | 400 | 300     | 600            | 1030 | 475  | 325 | 225 | 875 | 180 | 825 | 550       | 36  | M33x300 | 925         | 700 | 1245 | 1245 | 450 | 1500x1500 | B         |      |     |     |
| MAQD EFF 300/400 |     |         | 350            | 1310 | 580  | 400 | 400 |     |     |     |           |     |         |             |     | 320  | 220  |     |           |           | 300  |     |     |
| MAQD 300/500F    |     |         | 300            | 1380 | 640  | 475 | 475 |     |     |     |           |     |         |             |     | 255  | 320  |     |           |           | 220  | 300 |     |
| MAQD EFF 350/420 |     |         | 350            | 1385 | 640  | 490 | 490 |     |     |     |           |     |         |             |     | 255  | 320  |     |           |           | 220  | 300 |     |
| MAQD EFF 350/520 | 500 | 400     | 1090           | 820  | 478  | 478 | 255 | 875 | 180 | 825 | 550       | 36  | M33x300 | 925         | 700 | 1245 | 1245 | 550 | 1500x1500 | B         |      |     |     |
| MAQD EFF 350/630 |     |         | 400            | 1355 | 630  | 430 |     |     |     |     |           |     |         |             |     | 430  | 320  |     |           |           | 220  | 300 |     |
| MAQD 400/400F    |     |         | 500            | 700  | 1215 | 570 |     |     |     |     |           |     |         |             |     | 471  | 285  |     |           |           | 320  | 220 | 300 |
| MAQD EFF 400/500 |     |         | 500            | 100  | 1825 | 685 |     |     |     |     |           |     |         |             |     | 576  | 285  |     |           |           | 320  | 220 | 300 |
| MAQD 400/600F    | 500 | 100     | 1825           | 685  | 576  | 285 | 320 | 220 | 300 | 320 | 220       | 300 | 320     | 220         | 300 | 320  | 220  | 300 | 320       | 220       | 300  |     |     |
| MAQD 400/700     | 500 | 100     | 1825           | 685  | 576  | 285 | 320 | 220 | 300 | 320 | 220       | 300 | 320     | 220         | 300 | 320  | 220  | 300 | 320       | 220       | 300  |     |     |

# MAQD PUMP TYPE DIMENSIONS TABLE



| Type             | Suction | Discharge PN10 | E        | F    | H    | Hmax      | M         | N       | P       | ZxZ       | gXg       | Ød        | Anchor bolt |           |         |         |
|------------------|---------|----------------|----------|------|------|-----------|-----------|---------|---------|-----------|-----------|-----------|-------------|-----------|---------|---------|
| MAQD 80/250      | 80      | 80             | 175      | 150  | 408  | 980       | 190       | 280     | 150     | 350X350   | 250X250   | 23        | M20x250     |           |         |         |
| MAQD 80/250V     |         |                | 980      |      |      |           |           |         |         |           |           |           |             |           |         |         |
| MAQD EFF 80/260  | 125     |                | 220      | 190  | 528  | 1040      | 215       | 185     | 440X440 | 345X345   |           |           |             |           |         |         |
| MAQD 80-270V     | 80      |                | 218      | 200  | 410  | 1010      | 190       | 315     | 150     | 350X350   | 250X250   |           |             |           |         |         |
| MAQD 80/315V     |         |                | 255      | 235  | 418  | 1080      |           |         |         |           |           |           |             | 340       |         |         |
| MAQD EFF 80/320  | 125     |                | 245      | 220  | 528  | 1140      | 215       | 300     | 185     | 440X440   | 345X345   |           |             |           |         |         |
| MAQD 100/200     | 100     | 100            | 173      | 158  | 429  | 1080      | 195       | 246     | 190     | 390X390   | 295X295   | 28        | M24X250     |           |         |         |
| MAQD 100/250 V   |         |                | 220      | 180  | 429  | 1060      | 300       |         |         |           |           |           |             |           |         |         |
| MAQD EFF 100/260 | 150     |                | 260      | 210  | 613  | 1140      | 275       | 300     | 210     | 500X500   | 350X350   | 23        | M20X200     |           |         |         |
| MAQD 100/270 V   | 100     |                | 198      | 197  | 448  | 1040      | 195       | 315     | 190     | 390X390   | 295X295   | 28        | M24X250     |           |         |         |
| MAQD 100/315 V   |         |                | 248      | 220  | 468  | 1090      | 340       |         |         |           |           |           |             |           |         |         |
| MAQD EFF 100/320 | 150     |                | 365      | 225  | 603  | 1130      | 275       | 340     | 210     | 500X500   | 350X350   | 23        | M20X200     |           |         |         |
| MAQD 100/400     | 100     | 300            | 270      | 474  | 1300 | 195       | 315       | 190     | 390X390 | 295X295   | 28        | M24X250   |             |           |         |         |
| MAQD 125/315 V   | 125     | 267            | 235      | 512  | 1300 | 215       | 370       |         |         |           |           |           | 185         | 440X440   | 345X345 |         |
| MAQD 125/400     |         | 150            | 150(125) | 385  | 335  | 623       | 1555      | 450     | 210     | 500X500   | 350X350   | 28        | M24x250     |           |         |         |
| MAQD EFF 125/500 | 150     |                | 280      | 240  | 581  | 1280      | 380       |         |         |           |           |           |             |           |         |         |
| MAQD 150/315     |         |                | 280      | 220  | 643  | 1350      | 400       |         |         |           |           |           |             |           |         |         |
| MAQD EFF 150/315 |         |                | 325      | 300  | 574  | 1315      | 500       |         |         |           |           |           |             |           |         |         |
| MAQD 150/400     |         |                | 365      | 305  | 733  | 1385      | 370       |         |         |           |           |           |             |           |         |         |
| MAQD EFF 150/500 | 200     |                | 200      | 335  | 275  | 680       | 1300      | 325     | 370     | 225       | 600X600   | 500X500   | 30          | M27X300   |         |         |
| MAQD 200/315N    |         | 702            |          | 1335 | 500  |           |           |         |         |           |           |           |             |           |         |         |
| MAQD 200/315F    | 395     | 290            |          | 804  | 1390 | 350       | 500       | 250     | 650X650 |           |           |           |             |           |         |         |
| MAQD EFF 200/320 | 375     | 355            |          | 724  | 1715 | 375       | 530       | 225     | 600X600 |           |           |           |             |           |         |         |
| MAQD 200/400F    | 250     | 385            |          | 305  | 784  | 1910      | 500       |         |         |           |           |           |             |           |         |         |
| MAQD EFF 200/410 |         | 425            |          | 355  | 804  | 2700      | 350       | 560     | 250     | 650X650   |           |           |             |           |         |         |
| MAQD EFF 200/500 | 250     | 250            | 355      | 290  | 784  | 1750      | 440       | 225     | 600X600 | 600X600   | 500X500   | 30        | M27X300     |           |         |         |
| MAQD 250/315F    |         |                | 387      | 336  | 764  | 2050      | 350       |         |         |           |           |           |             | 480       | 250     | 650X650 |
| MAQD 250/400N    | 200     |                | 250      | 857  | 2080 | 380       | 285       | 730X730 | 600X600 |           |           |           |             |           |         |         |
| MAQD 250/400M    |         |                |          | 445  | 330  | 814       | 2100      | 350     | 600     | 250       |           |           |             | 650X650   | 500X500 |         |
| MAQD 250/400F    | 300     |                | 250      | 555  | 485  | 767       | 2210      | 650     | 285     | 730X730   |           |           |             | 600X600   | 30      | M27X300 |
| MAQD EFF 250/420 |         |                |          | 620  | 540  | 990       | 2830      | 380     |         |           |           |           |             |           |         |         |
| MAQD 250/700     | 300     | 300            | 475      | 325  | 959  | 2100      | 445       | 600     | 330     | 850X850   | 700X700   | 36        | M33X300     |           |         |         |
| MAQD EFF 300/400 | 525     |                | 430      | 900  | 2170 | 380       | 585       | 285     | 730X730 | 600X600   |           |           |             |           |         |         |
| MAQD 300/500F    | 560     |                | 400      | 979  | 2300 | 445       | 330       | 850X850 | 700X700 |           |           |           |             |           |         |         |
| MAQD EFF 350/420 | 640     |                | 475      | 1154 | 3255 | 510       |           |         |         | 800       | 380       |           |             | 1000X1000 | 800X800 |         |
| MAQD 350/520     | 400     | 400            | 490      | 1189 | 3285 |           | 635       | 700     | 470     |           |           | 1200X1200 | 1000X1000   |           |         |         |
| MAQD EFF 350/630 |         |                | 620      | 476  | 1132 | 3235      |           |         |         |           |           |           |             |           |         |         |
| MAQD 400/400F    | 500     |                | 630      | 430  | 1404 | 3940      | 960       | 1000    | 470     | 1850X1850 | 1650X1650 |           |             |           |         |         |
| MAQD EFF 400/500 |         |                | 570      | 471  | 1536 | 4050      |           |         |         |           |           |           |             |           |         |         |
| MAQD 400/600F    |         |                | 500      | 685  | 576  | 1454      | -         |         |         |           |           |           |             |           |         |         |
| MAQD 400/700     |         |                |          | 747  | 600  | 1850      | 3900      |         |         |           |           |           |             |           |         |         |
| MAQD 500/600     | 600     | 500            | 785      | 1850 | 960  | 1850X1850 | 1650X1650 |         |         |           |           |           |             |           |         |         |
| MAQD 500/630B    |         |                |          |      |      |           |           |         |         |           |           |           |             |           |         |         |

1) Dimensions (mm) subject to change without prior notice!