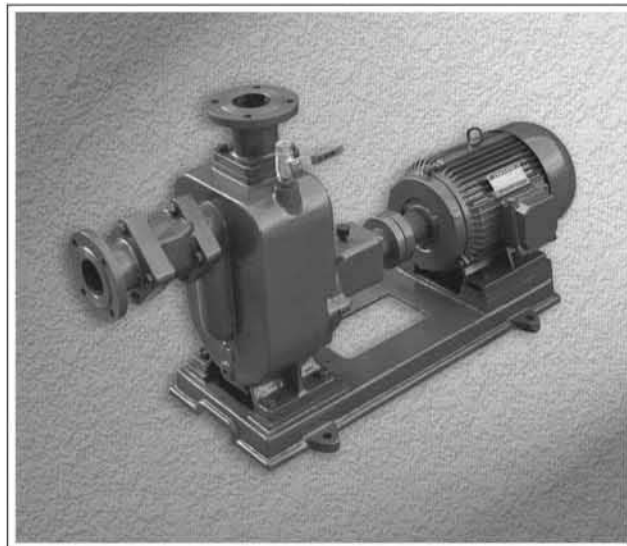


# Operation installation

## ZW Series Self-suction Type Non-clogging Sewage Pump



Please carefully read the operation instructions before use of the product.

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### GENERAL

A new style product successfully developed on the basis of the repeated research on the same know-how of both at home and abroad.

This pump integrates self-suction and non-clogging and uses axial-back flow outside-mixing type and, through the unique design of both pump casing and impeller gear, needs not to mount a foot valve and prime the leading water just like the common self-suction pure water pump and also can pump the liquid containing the solid of big grains and long fiber impurities.

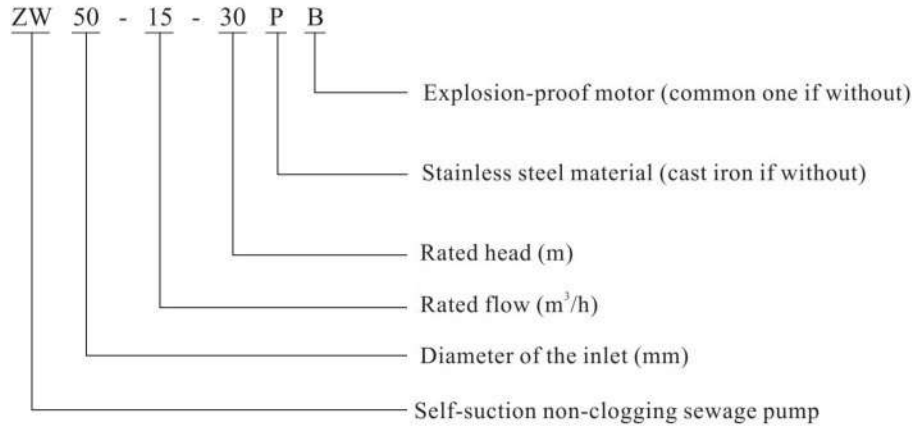
Compared with the same domestic products, this pump features a simple structure, good self-suction performance, strong sewage draining capacity, high efficiency, energy saving and easy use and repair, with every technical performance index of it ranking first nationally among the sewage pump series products and up to the world advanced level, and holds a wide applicable market and progressive future.

### RANGE OF APPLICATION

Suitable for the sewage project in the municipal works, river aquaculture, light industry, paper-making, textile, food, chemical industry, power industry etc. and as the most ideal impurity pump to pump fiber, pulpy, mixed and suspended chemical media.

For this pump, the ambient temperature  $\leq 50^{\circ}\text{C}$ , the medium temperature  $\leq 80^{\circ}\text{C}$ , which can be up to  $200^{\circ}\text{C}$  in case of a special requirement; as of the PH value of the media, cast iron 6.9, stainless steel 2.13; the medium gravity is not over  $1240\text{kg/m}^3$ ; the self-suction height is not over the set value 4.5-5.5m, the length of suck-in pipe  $\leq 10\text{m}$ ; as of the passing capacity, the suspended grains' diameter is 60% of the pump aperture and the long fiber is 5 times that of the pump aperture.

## MODEL MEANING



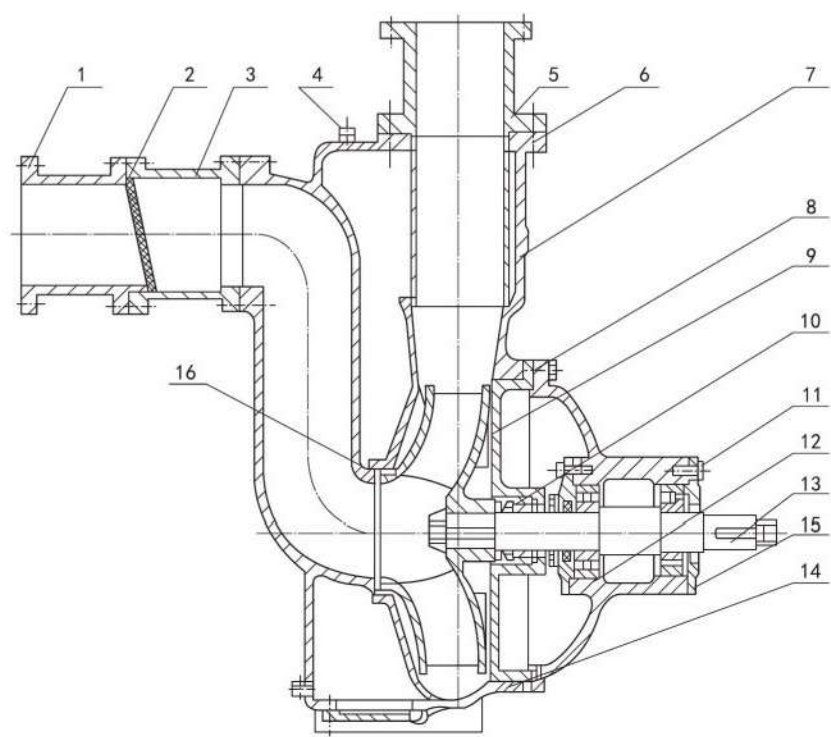
## ABOUT THE STRUCTURE

This pump consists of pump casing, impeller, rear cover, mechanical seal, shaft, bearing seat, inlet valve, air-liquid separating pipe, water filling valve, inlet and drain-out nipples etc.

A liquid storing cavity is set inside of the pump casing and connected to the working cavity through the back-flow hole on the upper and the cycling hole on the lower to form the axial-back flow outside mixing type system of the pump.

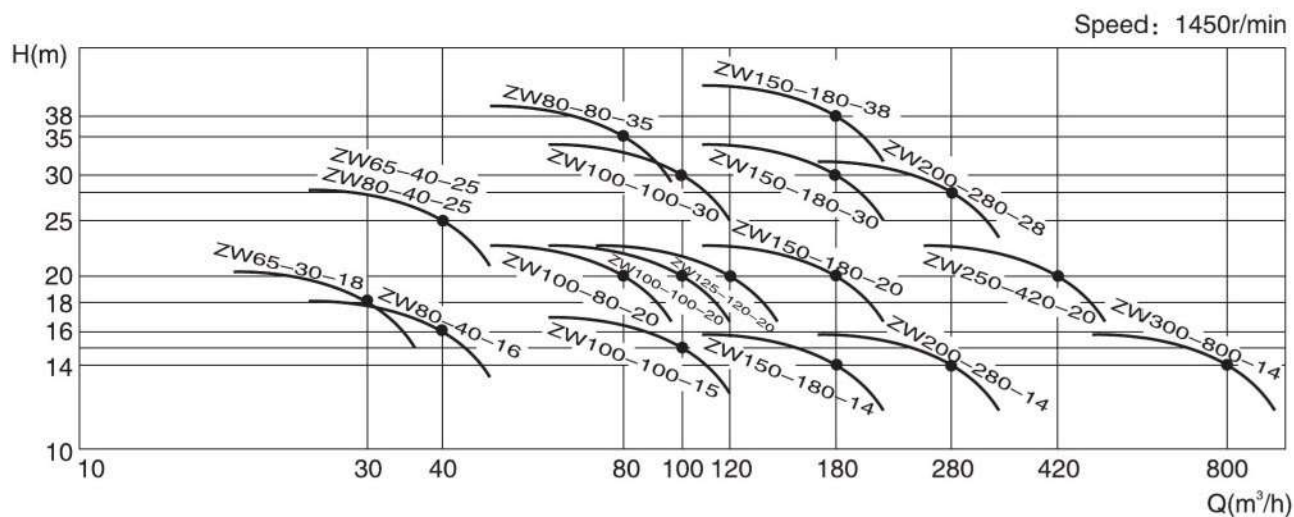
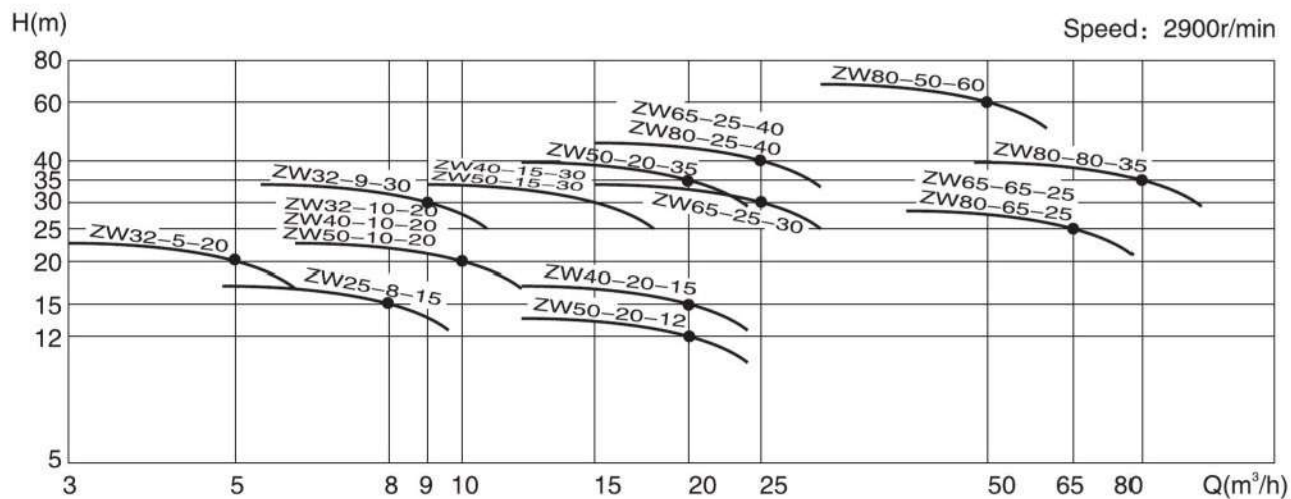
Liquid of a certain volume has been stored in the storing cavity after the pump stops working and, under the action of the impeller when the pump starts, is thrown out upwards with air and then flows back to the working cavity through the grids of the air-liquid separating pipe, the air is exhausted out of the pump to have a certain vacuum formed inside of the pump so as to get the self-suction action.

BRIEF DIAGRAM OF STRUCTURE



| No | Name               | No | Name                       | No | Name            | No | Name               |
|----|--------------------|----|----------------------------|----|-----------------|----|--------------------|
| 1  | Inlet nipple       | 5  | Outlet nipple              | 9  | Impeller        | 13 | Pump shaft         |
| 2  | Inlet flange       | 6  | Pump casing                | 10 | Mechanical seal | 14 | Bearing cover      |
| 3  | Inlet valve seat   | 7  | Air-liquid separating pipe | 11 | Water baffle    | 15 | Bottom cover-plate |
| 4  | Water filling bolt | 8  | Rear cover                 | 12 | Bearing seat    | 16 | Oral ring          |

# MODEL SPECTRUM

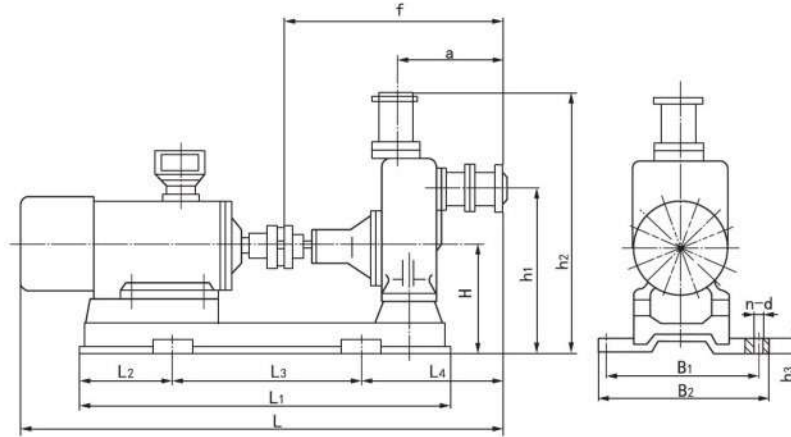


## ZW SERIES SELF-SUCTION TYPE NON-CLOGGING SEWAGE PUMP

### TABLE OF PERFORMANCE PARAMETERS

| Model        | Flow<br>(m <sup>3</sup> /h) | Head<br>(m) | Speed<br>(r/min) | Power<br>(kW) | Eff.<br>(%) | NPSHr<br>(m) | Self-suction<br>height (m) | Self-suction<br>time(min/5m) | Weight<br>(kg) |
|--------------|-----------------------------|-------------|------------------|---------------|-------------|--------------|----------------------------|------------------------------|----------------|
| ZW25-8-15    | 8                           | 15          | 2900             | 1.5           | 45          | 2.0          | 5.5                        | 3                            | 100            |
| ZW32-5-20    | 5                           | 20          | 2900             | 2.2           | 45          | 2.5          | 5.5                        | 3                            | 100            |
| ZW32-10-20   | 10                          | 20          | 2900             | 2.2           | 45          | 2.5          | 5.5                        | 3                            | 100            |
| ZW32-9-30    | 9                           | 30          | 2900             | 3             | 48          | 2.5          | 5.5                        | 3                            | 120            |
| ZW40-10-20   | 10                          | 20          | 2900             | 2.2           | 45          | 2.5          | 5.5                        | 3                            | 100            |
| ZW40-20-15   | 20                          | 15          | 2900             | 2.2           | 45          | 2.5          | 5.5                        | 3                            | 100            |
| ZW40-15-30   | 15                          | 30          | 2900             | 3             | 48          | 2.5          | 5.5                        | 3                            | 120            |
| ZW50-10-20   | 10                          | 20          | 2900             | 2.2           | 45          | 2.5          | 5.5                        | 3                            | 100            |
| ZW50-20-12   | 20                          | 12          | 2900             | 2.2           | 45          | 2.5          | 5.5                        | 3                            | 100            |
| ZW50-15-30   | 15                          | 30          | 2900             | 3             | 48          | 2.5          | 5.5                        | 3                            | 120            |
| ZW50-20-35   | 20                          | 35          | 2900             | 5.5           | 48          | 2.5          | 5.5                        | 3                            | 150            |
| ZW65-30-18   | 30                          | 18          | 1450             | 4             | 45          | 2.5          | 5.5                        | 3                            | 200            |
| ZW65-25-30   | 25                          | 30          | 2900             | 5.5           | 50          | 3.0          | 5.5                        | 3                            | 200            |
| ZW65-25-40   | 25                          | 40          | 2900             | 7.5           | 50          | 3.0          | 5.5                        | 2                            | 200            |
| ZW65-40-25   | 40                          | 25          | 2900             | 7.5           | 50          | 3.0          | 5.5                        | 2                            | 200            |
| ZW65-65-25   | 65                          | 25          | 2900             | 7.5           | 52          | 3.0          | 5.5                        | 2                            | 240            |
| ZW80-40-16   | 40                          | 16          | 1450             | 4             | 50          | 3.0          | 5.0                        | 3                            | 240            |
| ZW80-40-25   | 40                          | 25          | 2900             | 7.5           | 50          | 3.0          | 5.5                        | 2                            | 200            |
| ZW80-25-40   | 25                          | 40          | 2900             | 7.5           | 50          | 3.0          | 5.5                        | 2                            | 200            |
| ZW80-65-25   | 65                          | 25          | 2900             | 7.5           | 52          | 3.0          | 5.5                        | 2                            | 240            |
| ZW80-80-35   | 80                          | 35          | 2900             | 15            | 45          | 3.0          | 5.5                        | 3                            | 285            |
| ZW80-80-35   | 80                          | 35          | 1450             | 15            | 50          | 3.0          | 5.5                        | 2                            | 450            |
| ZW80-50-60   | 50                          | 60          | 2900             | 22            | 55          | 3.0          | 5.0                        | 3                            | 340            |
| ZW100-100-15 | 100                         | 15          | 1450             | 7.5           | 50          | 4.0          | 5.5                        | 3                            | 300            |
| ZW100-80-20  | 80                          | 20          | 1450             | 7.5           | 53          | 4.0          | 5.5                        | 3                            | 300            |
| ZW100-100-20 | 100                         | 20          | 1450             | 11            | 53          | 4.0          | 5.5                        | 3                            | 340            |
| ZW100-100-30 | 100                         | 30          | 2900             | 22            | 53          | 4.0          | 5.5                        | 2                            | 510            |
| ZW125-120-20 | 120                         | 20          | 1450             | 15            | 55          | 4.5          | 5.5                        | 2                            | 500            |
| ZW150-180-14 | 180                         | 14          | 1450             | 15            | 60          | 5.0          | 5.5                        | 3.5                          | 500            |
| ZW150-180-20 | 180                         | 20          | 1450             | 22            | 60          | 5.0          | 5.0                        | 3                            | 570            |
| ZW150-180-30 | 180                         | 30          | 1450             | 37            | 65          | 5.0          | 5.0                        | 3                            | 680            |
| ZW150-180-38 | 180                         | 38          | 1450             | 55            | 45          | 5.0          | 5.0                        | 3.5                          | 800            |
| ZW200-280-14 | 280                         | 14          | 1450             | 22            | 65          | 5.0          | 5.0                        | 3                            | 700            |
| ZW200-280-28 | 280                         | 28          | 1450             | 55            | 55          | 4.8          | 5.2                        | 3                            | 940            |
| ZW250-420-20 | 420                         | 20          | 1450             | 55            | 61          | 6.0          | 4.5                        | 2.5                          | 1150           |
| ZW300-800-14 | 800                         | 14          | 1450             | 55            | 65          | 6.0          | 4.5                        | 2.5                          | 1400           |

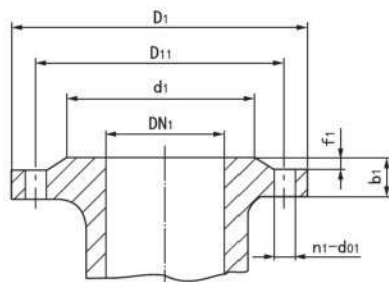
# DIAGRAM AND TABLE OF OUT-FORM AND INSTALLATION DIMENSIONS



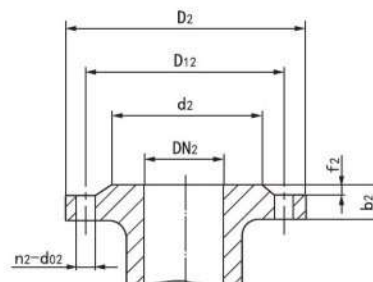
| Model        | L    | L <sub>1</sub> | L <sub>2</sub> | L <sub>3</sub> | L <sub>4</sub> | a    | f    | B <sub>1</sub> | B <sub>2</sub> | H   | h <sub>1</sub> | h <sub>2</sub> | h <sub>3</sub> | n × d    |
|--------------|------|----------------|----------------|----------------|----------------|------|------|----------------|----------------|-----|----------------|----------------|----------------|----------|
| ZW25-8-15    | 850  | 680            | 115            | 450            | 240            | 255  | 510  | 310            | 370            | 228 | 410            | 625            | 24             | 4 × φ 18 |
| ZW32-5-20    | 850  | 680            | 115            | 450            | 240            | 255  | 510  | 310            | 370            | 228 | 410            | 625            | 24             | 4 × φ 18 |
| ZW32-10-20   | 850  | 680            | 115            | 450            | 240            | 255  | 510  | 310            | 370            | 228 | 410            | 625            | 24             | 4 × φ 18 |
| ZW32-9-30    | 890  | 710            | 130            | 450            | 240            | 260  | 510  | 310            | 370            | 238 | 410            | 630            | 24             | 4 × φ 18 |
| ZW40-10-20   | 850  | 680            | 115            | 450            | 240            | 255  | 510  | 310            | 370            | 228 | 410            | 625            | 24             | 4 × φ 18 |
| ZW40-20-15   | 850  | 680            | 115            | 450            | 240            | 255  | 510  | 310            | 370            | 228 | 410            | 625            | 24             | 4 × φ 18 |
| ZW40-15-30   | 890  | 710            | 130            | 450            | 240            | 260  | 510  | 310            | 370            | 238 | 410            | 630            | 24             | 4 × φ 18 |
| ZW50-10-20   | 850  | 680            | 115            | 450            | 240            | 255  | 510  | 310            | 370            | 228 | 410            | 625            | 24             | 4 × φ 18 |
| ZW50-20-12   | 850  | 680            | 115            | 450            | 240            | 255  | 510  | 310            | 370            | 228 | 410            | 625            | 24             | 4 × φ 18 |
| ZW50-15-30   | 890  | 710            | 130            | 450            | 240            | 260  | 510  | 310            | 370            | 238 | 410            | 630            | 24             | 4 × φ 18 |
| ZW50-20-35   | 980  | 750            | 125            | 450            | 240            | 250  | 480  | 380            | 450            | 238 | 410            | 630            | 24             | 4 × φ 18 |
| ZW65-30-18   | 1040 | 760            | 135            | 500            | 340            | 350  | 650  | 380            | 450            | 265 | 485            | 760            | 25             | 4 × φ 18 |
| ZW65-25-30   | 1230 | 850            | 135            | 580            | 340            | 350  | 700  | 370            | 520            | 270 | 480            | 720            | 25             | 4 × φ 18 |
| ZW65-25-40   | 1230 | 850            | 135            | 580            | 340            | 350  | 700  | 370            | 520            | 270 | 480            | 720            | 25             | 4 × φ 18 |
| ZW65-40-25   | 1165 | 850            | 135            | 580            | 340            | 350  | 650  | 370            | 430            | 265 | 485            | 760            | 25             | 4 × φ 18 |
| ZW65-65-25   | 1300 | 940            | 150            | 640            | 350            | 350  | 700  | 430            | 485            | 270 | 480            | 720            | 25             | 4 × φ 18 |
| ZW80-40-16   | 1040 | 760            | 135            | 500            | 340            | 350  | 650  | 380            | 450            | 265 | 485            | 760            | 25             | 4 × φ 18 |
| ZW80-40-25   | 1165 | 850            | 135            | 580            | 340            | 350  | 650  | 370            | 430            | 265 | 485            | 760            | 25             | 4 × φ 18 |
| ZW80-25-40   | 1230 | 850            | 135            | 580            | 340            | 350  | 700  | 370            | 520            | 270 | 480            | 720            | 25             | 4 × φ 18 |
| ZW80-65-25   | 1300 | 940            | 150            | 640            | 350            | 350  | 700  | 430            | 485            | 270 | 480            | 720            | 25             | 4 × φ 18 |
| ZW80-80-35   | 1300 | 1020           | 190            | 640            | 360            | 350  | 700  | 450            | 520            | 270 | 480            | 720            | 25             | 4 × φ 23 |
| ZW80-80-35   | 1365 | 1180           | 190            | 640            | 330            | 370  | 760  | 480            | 540            | 350 | 600            | 890            | 25             | 4 × φ 23 |
| ZW80-50-60   | 1360 | 1020           | 190            | 640            | 400            | 350  | 650  | 450            | 590            | 280 | 495            | 770            | 25             | 4 × φ 23 |
| ZW100-100-15 | 1230 | 920            | 140            | 630            | 375            | 400  | 730  | 450            | 510            | 330 | 630            | 920            | 28             | 4 × φ 23 |
| ZW100-80-20  | 1230 | 920            | 140            | 630            | 375            | 400  | 730  | 450            | 510            | 330 | 630            | 920            | 28             | 4 × φ 23 |
| ZW100-100-20 | 1320 | 1020           | 200            | 625            | 420            | 400  | 730  | 450            | 510            | 330 | 630            | 920            | 28             | 4 × φ 23 |
| ZW100-100-30 | 1650 | 1300           | 320            | 730            | 480            | 460  | 900  | 480            | 550            | 330 | 570            | 870            | 30             | 4 × φ 23 |
| ZW125-120-20 | 1600 | 1170           | 175            | 820            | 450            | 510  | 880  | 480            | 540            | 330 | 665            | 990            | 30             | 4 × φ 23 |
| ZW150-180-14 | 1600 | 1170           | 175            | 820            | 450            | 510  | 880  | 480            | 540            | 330 | 650            | 990            | 30             | 4 × φ 23 |
| ZW150-180-20 | 1580 | 1300           | 200            | 730            | 500            | 490  | 870  | 480            | 550            | 350 | 700            | 1030           | 30             | 4 × φ 23 |
| ZW150-180-30 | 1690 | 1370           | 235            | 800            | 500            | 490  | 870  | 520            | 600            | 350 | 700            | 1030           | 30             | 4 × φ 23 |
| ZW150-180-38 | 1920 | 1570           | 245            | 1080           | 400            | 490  | 870  | 580            | 660            | 350 | 700            | 1020           | 30             | 4 × φ 23 |
| ZW200-280-14 | 1920 | 1470           | 270            | 970            | 520            | 650  | 1090 | 520            | 565            | 350 | 700            | 1090           | 30             | 4 × φ 23 |
| ZW200-280-28 | 2020 | 1570           | 245            | 1080           | 500            | 650  | 1090 | 580            | 660            | 350 | 700            | 1090           | 30             | 4 × φ 23 |
| ZW250-420-20 | 2180 | 1600           | 325            | 950            | 720            | 800  | 1330 | 610            | 670            | 430 | 800            | 1200           | 30             | 4 × φ 23 |
| ZW300-800-14 | 2580 | 1880           | 300            | 1280           | 800            | 1030 | 1500 | 610            | 655            | 530 | 900            | 1350           | 30             | 4 × φ 23 |

## ZW SERIES SELF-SUCTION TYPE NON-CLOGGING SEWAGE PUMP

### DIAGRAM AND TABLE OF FLANGE DIMENSION



the flange at suck-in port



The flange at drain-out port

| Model        | Dimension of the flange at suck-in port |     |     |     |    |    |        | Dimension of the flange at drain-out port |     |     |     |    |    |        |
|--------------|-----------------------------------------|-----|-----|-----|----|----|--------|-------------------------------------------|-----|-----|-----|----|----|--------|
|              | DN1                                     | D1  | D11 | d1  | b1 | f1 | n1-d01 | DN2                                       | D2  | d12 | d2  | b2 | f2 | n2-d02 |
| ZW25-8-15    | 25                                      | 100 | 75  | 60  | 14 | 2  | 4×φ14  | 25                                        | 100 | 75  | 60  | 14 | 2  | 4×φ14  |
| ZW32-5-20    | 32                                      | 120 | 90  | 70  | 14 | 2  | 4×φ14  | 32                                        | 120 | 90  | 70  | 14 | 2  | 4×φ14  |
| ZW32-10-20   | 32                                      | 120 | 90  | 70  | 14 | 2  | 4×φ14  | 32                                        | 120 | 90  | 70  | 14 | 2  | 4×φ14  |
| ZW32-9-30    | 32                                      | 120 | 90  | 70  | 14 | 2  | 4×φ14  | 32                                        | 120 | 90  | 70  | 14 | 2  | 4×φ14  |
| ZW40-10-20   | 40                                      | 130 | 100 | 80  | 14 | 2  | 4×φ14  | 32                                        | 120 | 90  | 70  | 14 | 2  | 4×φ14  |
| ZW40-20-15   | 40                                      | 130 | 100 | 80  | 14 | 2  | 4×φ14  | 32                                        | 120 | 90  | 70  | 14 | 2  | 4×φ14  |
| ZW40-15-30   | 40                                      | 130 | 100 | 80  | 14 | 2  | 4×φ14  | 32                                        | 120 | 90  | 70  | 14 | 2  | 4×φ14  |
| ZW50-10-20   | 50                                      | 140 | 110 | 90  | 14 | 2  | 4×φ14  | 40                                        | 130 | 100 | 80  | 14 | 2  | 4×φ14  |
| ZW50-20-12   | 50                                      | 140 | 110 | 90  | 14 | 2  | 4×φ14  | 40                                        | 130 | 100 | 80  | 14 | 2  | 4×φ14  |
| ZW50-15-30   | 50                                      | 140 | 110 | 90  | 14 | 2  | 4×φ14  | 40                                        | 130 | 100 | 80  | 14 | 2  | 4×φ14  |
| ZW50-20-35   | 50                                      | 140 | 110 | 90  | 14 | 2  | 4×φ14  | 40                                        | 130 | 100 | 80  | 14 | 2  | 4×φ14  |
| ZW65-30-18   | 65                                      | 160 | 130 | 110 | 14 | 2  | 4×φ14  | 65                                        | 160 | 130 | 110 | 14 | 2  | 4×φ14  |
| ZW65-25-30   | 65                                      | 160 | 130 | 110 | 14 | 2  | 4×φ14  | 65                                        | 160 | 130 | 110 | 14 | 2  | 4×φ14  |
| ZW65-25-40   | 65                                      | 160 | 130 | 110 | 14 | 2  | 4×φ14  | 65                                        | 160 | 130 | 110 | 14 | 2  | 4×φ14  |
| ZW65-40-25   | 65                                      | 160 | 130 | 110 | 14 | 2  | 4×φ14  | 65                                        | 160 | 130 | 110 | 14 | 2  | 4×φ14  |
| ZW65-65-25   | 65                                      | 160 | 130 | 110 | 14 | 2  | 4×φ14  | 65                                        | 160 | 130 | 110 | 14 | 2  | 4×φ14  |
| ZW80-40-16   | 80                                      | 190 | 150 | 125 | 15 | 2  | 4×φ18  | 65                                        | 160 | 130 | 110 | 14 | 2  | 4×φ14  |
| ZW80-40-25   | 80                                      | 190 | 150 | 125 | 15 | 2  | 4×φ18  | 65                                        | 160 | 130 | 110 | 14 | 2  | 4×φ14  |
| ZW80-25-40   | 80                                      | 190 | 150 | 125 | 15 | 2  | 4×φ18  | 65                                        | 160 | 130 | 110 | 14 | 2  | 4×φ14  |
| ZW80-65-25   | 80                                      | 190 | 150 | 125 | 15 | 2  | 4×φ18  | 65                                        | 160 | 130 | 110 | 14 | 2  | 4×φ14  |
| ZW80-80-35   | 80                                      | 190 | 150 | 125 | 15 | 2  | 4×φ18  | 65                                        | 160 | 130 | 110 | 14 | 2  | 4×φ14  |
| ZW80-80-35   | 80                                      | 190 | 150 | 125 | 15 | 2  | 4×φ18  | 65                                        | 160 | 130 | 110 | 14 | 2  | 4×φ14  |
| ZW80-50-60   | 80                                      | 190 | 150 | 125 | 15 | 2  | 4×φ18  | 65                                        | 160 | 130 | 110 | 14 | 2  | 4×φ14  |
| ZW100-100-15 | 100                                     | 210 | 170 | 145 | 15 | 3  | 4×φ18  | 80                                        | 190 | 150 | 125 | 15 | 2  | 4×φ18  |
| ZW100-80-20  | 100                                     | 210 | 170 | 145 | 15 | 3  | 4×φ18  | 80                                        | 190 | 150 | 125 | 15 | 2  | 4×φ18  |
| ZW100-100-20 | 100                                     | 210 | 170 | 145 | 15 | 3  | 4×φ18  | 80                                        | 190 | 150 | 125 | 15 | 2  | 4×φ18  |
| ZW100-100-30 | 100                                     | 210 | 170 | 145 | 15 | 3  | 4×φ18  | 80                                        | 190 | 150 | 125 | 15 | 2  | 4×φ18  |
| ZW125-120-20 | 125                                     | 240 | 200 | 175 | 20 | 3  | 8×φ18  | 125                                       | 240 | 200 | 175 | 20 | 3  | 8×φ18  |
| ZW150-180-14 | 150                                     | 265 | 225 | 200 | 20 | 3  | 8×φ18  | 125                                       | 240 | 200 | 175 | 20 | 3  | 8×φ18  |
| ZW150-180-20 | 150                                     | 265 | 225 | 200 | 20 | 3  | 8×φ18  | 125                                       | 240 | 200 | 175 | 20 | 3  | 8×φ18  |
| ZW150-180-30 | 150                                     | 265 | 225 | 200 | 20 | 3  | 8×φ18  | 125                                       | 240 | 200 | 175 | 20 | 3  | 8×φ18  |
| ZW150-180-38 | 150                                     | 265 | 225 | 200 | 20 | 3  | 8×φ18  | 125                                       | 240 | 200 | 175 | 20 | 3  | 8×φ18  |
| ZW200-280-14 | 200                                     | 320 | 280 | 255 | 22 | 3  | 8×φ18  | 150                                       | 265 | 225 | 200 | 20 | 3  | 8×φ18  |
| ZW200-280-28 | 200                                     | 320 | 280 | 255 | 22 | 3  | 8×φ18  | 150                                       | 265 | 225 | 200 | 20 | 3  | 8×φ18  |
| ZW250-420-20 | 250                                     | 375 | 335 | 310 | 24 | 3  | 12×φ18 | 200                                       | 320 | 280 | 255 | 22 | 3  | 8×φ18  |
| ZW300-800-14 | 300                                     | 435 | 395 | 362 | 24 | 4  | 12×φ23 | 250                                       | 375 | 335 | 310 | 24 | 3  | 12×φ18 |

## PUMP INSTALLATION

1. With the shafts of both pump and motor linked in actuation, pay attention to the concentricity between the pump shaft and the motor's output; and carefully mount and calibrate the pump as which will leave a bigger affection to the running stability and duration of it.

2. Fasten the nut on the pump's clutch, or the impeller may be made easily movable to cause a mechanical failure.

3. Have the pump inlet higher than the central line of the pump shaft so as to have a certain volume of liquid kept inside of the pump to get a better self-suction capacity and prevent the mechanical seal from drying friction.

4. Cautions for the installation of the suck-in pipeline:

A. The installation height of the suck-in port shall not be higher than the self-suction height and shall be lower than the lowest stored water level in the water pool as can as possible, the suck-in pipe shall be as short as possible and mount less elbows so as to shorten the self-suction time and raise the self-suction function.

B. The valve, flange etc. inside of the suck-in pipeline shall be prevented from air or liquid leaking, that means no air-leaking is allowed inside of it.

C. Get both suck-in and vomiting pipelines a stand of their own and do not let the pump bearing any pipeline.

5. During installation of the pump, make the static grounding resistance of it and the pipeline up to the set requirement.

6. Calibrate the installation space and the concentricity between the clutches of both pump and motor, with the allowed deviation of the concentricity at 0.1mm, and put a copper or iron sheet under the foot to adjust the height difference between the shafts of both pump and motor.

7. Take a final check after the unit actually runs for 3-4h and it is deemed for the installation to have been well done if non-bad condition. Check the bearing temperature during trial, which shall not be over 70° C.

8. If the pump can not be made to successfully exhaust during the self-suction process with a single-way valve mounted on the pump's outlet pipeline, connect a small exhausting pipe and valve at the pump outlet.

## USE OF THE PUMP

### Preparations and checks prior to starting

1. According to the running states, this series self-suction pumps are lubricated with quality calcium-based grease and 10# engine oil separately. For those lubricated with grease, fill grease into the bearing box in a periodic time and, for those with engine oil, fill it fully when the oil level is insufficient.

2. Check if the stored liquid inside of the pump casing is above the upper edge of the impeller and, if not, prime liquid directly from the filling port on the casing. Do not start the pump in case of an insufficient stored liquid, or the pump would not work normally and the mechanical seal would be easily damaged.

3. Check if the moving parts of the pump are jammed or collided; if the foot on the pump bottom and the nuts on the joints are loose; check the concentricity or the parallelism between the shafts of both pump and motor; check if there is air-leaking with the inlet pipeline and settle it if any; open the valve on the suck-in pipeline and slightly open (not fully) the outlet control valve.

### Start and operation

1. Pay attention to the pump shaft to see if it moves in the correct direction when to start the self-suction pump; and if there is abnormal sounds and vibration when it moves.

2. Pay attention to the readings on both pressure gauge and vacuum meter, when the indications of which get stable after a periodic time fluctuation after the pump is started, that means liquid has been primed into the pump and the pump gets into the normal liquid transportation. Before the pump gets into the normal liquid transportation, e.g. during the self-suction process, pay special attention to the temperature rise of the liquid and stop the pump to check the cause if this process is too long and the temperature is so caused too high.

3. Temporarily stop the pump in case of a difficult self-suction caused due to too high liquid temperature and make it lower by means of the back flow into the pump of the liquid in the vomiting pipeline or supplementing liquid directly from the filling port on the pump casing, then start the pump again.

### USE OF THE PUMP

4. It is possible for an air erosion to occur with the pump that causes a severe vibration and noise during the work of the pump and the air erosion occurs with two causes: one is too quick flow rate in the inlet pipe and the other is too high suction travel. For the former, adjust the outlet control valve, raise the reading on the pressure gauge and remove it in case of block-up in the inlet pipeline; for the latter, properly lower the pump's installation height.

5. When the pump is stopped because of something during work and started again, slightly (not fully) open the outlet control valve. This is benefit for the air to be exhausted on-time from the vomiting port during the self-suction process and also ensures the pump is started with a lighter load. Meanwhile, pay attention to checking if there is a leak from the pipeline system.

#### Stop

1. First close the valve on the vomiting pipeline.
2. Have the pump stopped running.
3. In cold seasons, drain out the liquid stored inside of the pump casing and the water inside of the bearing's cooling chamber completely to prevent any parts from being frozen to crack.

### MAINTENANCE, DISASSEMBLY AND ASSEMBLY OF THE PUMP

This pump features a simple and reliable structure, durability and is generally unnecessary to be disassembled often for maintenance if working normally. Troubleshoot it in case of a failure.

#### Cautions at maintenance

When the rolling bearing and both front and rear seal rings are worn out to a certain degree after a long time running of the pump, replace them; the mechanical seal does not need to be removed for a check provided that no liquid leak with it while does when there is a serious leak from the leaking port on the lower side of the bearing. Take care of the mechanical seal during disassembly and assembly, clean the fitted face, properly keep the mirrors of both static and dynamic rings and do not knock on them and get them collided, as the cause for the leaking of it is mainly at the burrs on the frictional pair mirrors. To repair it, grind the mirrors to have it recovered. Another cause for the mechanical seal to leak is the "O" -type rubber seal ring (or buffering gasket) improperly mounted or deformed or aged, then adjust or replace it.

#### Pump disassembly and assembly sequences

- A. Remove the motor or take out the clutch.
- B. Remove the bearing assembly, check the radial space between the impeller and the front oral ring and check if the impeller nut is loose.
- C. Screw out the impeller nut, pull out the impeller and check the radial space between the impeller and the rear seal ring.
- D. Loosen the fixing screw on the mechanical seal, pull out the dynamic ring and check the fitting state between the end-faces of both static and dynamic rings and the sealing state of the "O" -type seal ring (or the buffering gasket).
- E. Screw out the fixing nut on the clutch and pull out the clutch.
- F. Remove the end cover on the bearing to remove both pump shaft and bearing.
- G. Take reversed sequences for assembly.

## FAILURES CAUSES AND TROUBLESHOOTING

| Failure                              | Possible causes                                                                                                                                                                                                                                                                                                                                                                     | Troubleshooting                                                                                                                                                                                                                                                                             |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1、No water out of pump               | <ul style="list-style-type: none"> <li>a、No or insufficient liquid stored inside of pump casing</li> <li>b、Air leaks from suck-in pipeline</li> <li>c、Too slow speed</li> <li>d、Too high suction travel or too long suck-in pipeline</li> <li>e、Too severe leakage from mechanical seal</li> <li>f、Air inside of suck-in pipeline unable to be exhausted from the outlet</li> </ul> | <ul style="list-style-type: none"> <li>a、Fill sufficient liquid</li> <li>b、Check and settle the air leak</li> <li>c、Adjust the speed</li> <li>d、Lower suction travel or shorten suck-in pipeline</li> <li>e、Repair or replace it</li> <li>f、Open the outlet valve to let air out</li> </ul> |
| 2、Bigger noise and vibration         | <ul style="list-style-type: none"> <li>a、Foot unstable</li> <li>b、Pump shaft bent</li> <li>c、Steam erosion</li> <li>d、Bearing seriously worn out</li> <li>e、Impurities exist inside of inlet pipeline</li> <li>f、Shafts of both pump and motor is not concentric</li> </ul>                                                                                                         | <ul style="list-style-type: none"> <li>a、Solidify it</li> <li>b、Replace or correct it</li> <li>c、Adjust working conditions</li> <li>d、Replace it</li> <li>e、Get rid of impurities</li> <li>f、Adjust them to be concentric</li> </ul>                                                        |
| 3、Insufficient water-out quantity    | <ul style="list-style-type: none"> <li>a、Impurities get into suck-in pipe or impeller gear blocked up</li> <li>b、Too slow speed</li> <li>c、Impeller or impeller seal seriously worn out</li> </ul>                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>a、Get rid of impurities</li> <li>b、Adjust the speed to the rated one</li> <li>c、Replace oral ring</li> </ul>                                                                                                                                         |
| 4、Too big consumption of shaft power | <ul style="list-style-type: none"> <li>a、Too heavy flow</li> <li>b、Too quick speed</li> <li>c、Pump shaft bent or impeller jammed or collided</li> <li>d、The gear inside of the pump blocked-up or jammed</li> </ul>                                                                                                                                                                 | <ul style="list-style-type: none"> <li>a、Raise the outlet pressure</li> <li>b、Properly lower it</li> <li>c、Replace or correct</li> <li>d、Get rid of blocking matters</li> </ul>                                                                                                             |