

# Vertical Multi-stage(Barrel) Pump Model VW



# *Superior Quality, High Performance*





## Advantages of HYUNDAI Vertical Multi-stage Pump

- Stability in capacity and shaft power enables continuous operation without overload or vibration in a wide operation ranges
- Double suction with reduced shaft dia., low peripheral speed at first stage impeller insures stable operation in limited suction conditions
- Superior quality and high performance
- No fear for surging and overload
- A variety of options to meet all customers' requirements in material and construction
- In-line suction and discharge nozzles simplify installation
- Optional suction nozzle position for flexibility
- High efficiency with minimum power consumption
- Corrosion resistance material and ensuring long term stable operation
- Low operating noise and vibration levels
- Compact sizes and requiring small installation spaces

## Applications

- Thermal or Nuclear power plant
  - \* Condensate extraction pump
  - \* Hot water pump
- Desalination plant
  - \* Brine recirculation pump
  - \* Brine blow down pump
  - \* Distillate pump
- Oil, refinery and petrochemical plant
  - \* Crude oil booster pump
  - \* Crude transfer pump
- Pipe line booster
- Production unloading
  - \* Injection secondary recovery
  - \* Especially in low temperature range and installation with low NPSH

# Construction

## Double suction(VWDXXX)

### Coupling

- Easy maintenance of packing or mechanical seal without disturbing driver
- Control of impeller location by adopting adjustable plate

### Stuffing box

- Designed to install either packing or mechanical seal
- An advanced combination of bearing, serrated sleeve and throttle bushing, and vents to suction which increase packing(or mechanical seal) and bearing life

### Shaft

- High stiffness and precision machining to ensure stable operation
- Renewable shaft sleeve or hardening the surface under the bearings to ensure long life

### Flanged column

- Rabbeted fits machined with flange ensure easy alignment
- Bearing retainer welded to the column simplify the construction

### Wearing ring

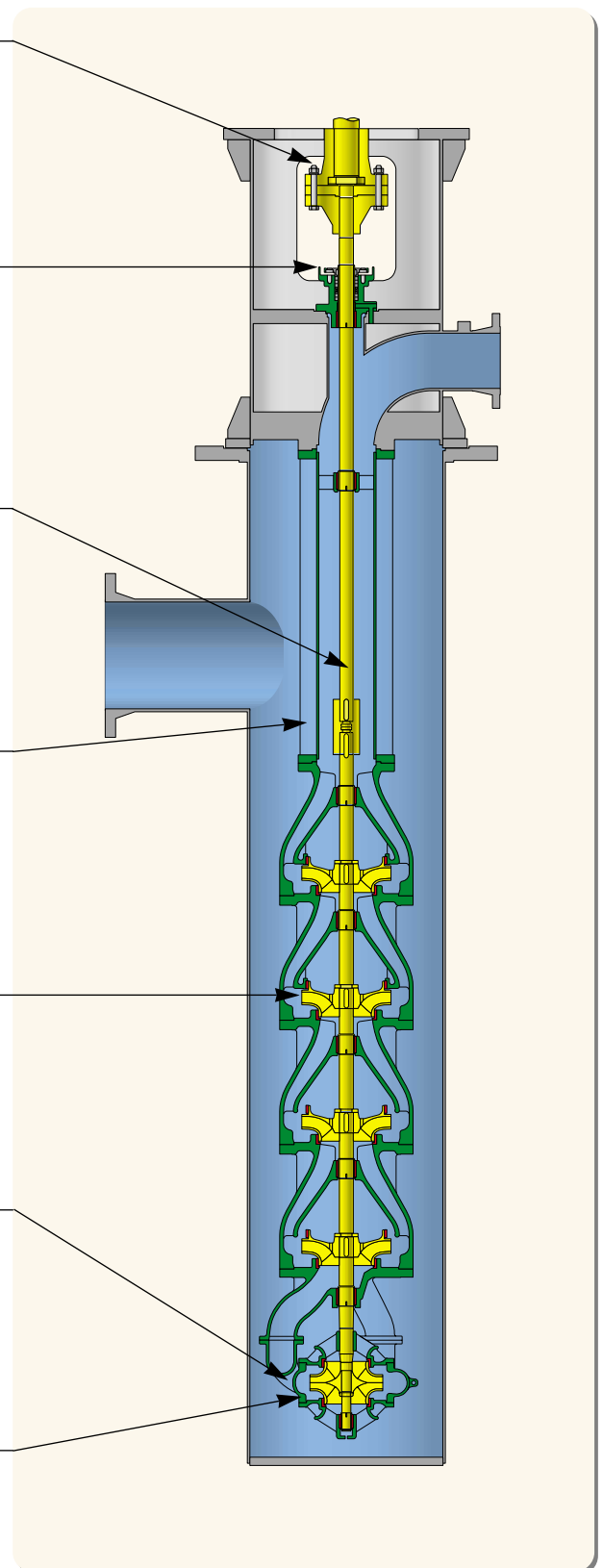
- Restrict leakage due to pressure to suction side of each impeller
- Hard facing of wear surface

### First stage casing

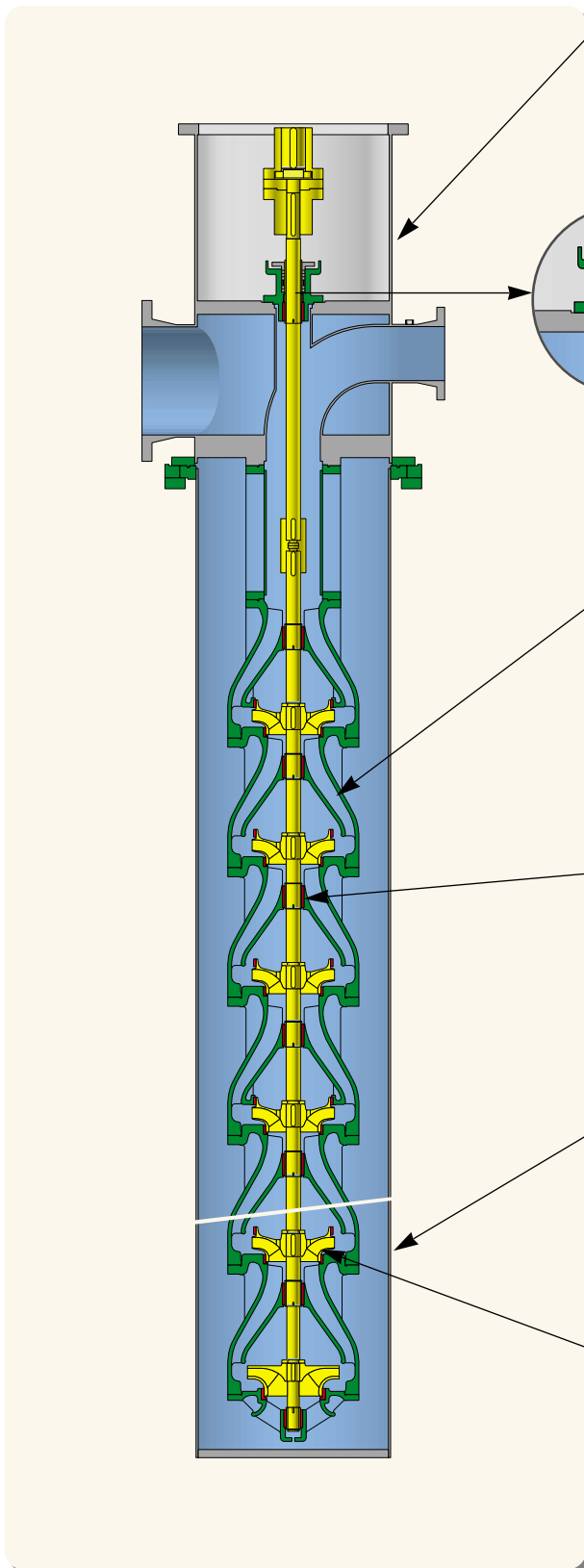
- Adoption of double suction impeller developed NSPH requirements, thus increase safety factor under limited suction conditions
- Single suction impeller also available

### Suction bell

- Incorporate the housing for a bearing
- Four split vanes minimize vortex formation and allow smooth approach of liquid into impeller eye



## Single suction(VWXXX)



### Discharge head

- Welded construction having sufficient rigidity and durability against heavy driver
- Casted construction also available
- In case of pump thrust force shall be shared by pump, thrust bearing housing will be provided on discharge head.

### Balancing drum(Optional) at stuffing box

- Minimize axial thrust
- Consist of cylindrical drum, pressure control valve and piping to suction side of pump

### Casing

- Casing flanges rabbeted fit assure positive alignment and easy maintenance
- Each casing incorporates a housing to suit a bearing or throttle bushing

### Line shaft bearing

- Bearings have inherent self lubricating properties, last longer and more durable even in two phase liquid
- Various kinds of material(Carbon, Rubber, Bronze, etc.) available according to service conditions

### Barrel(Suction can)

- Made by carbon steel and qualified welding process
- Option : Epoxy lining or FRP materials

### Impeller

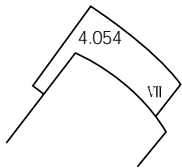
- All water passages are finished smoothly to achieve maximum hydraulic efficiency
- Dynamic balance for free vibration operations
- Positive lock on the shaft by key and collar
- Balance hole at last or inter-stage impeller to minimize axial thrust

# Selection Chart

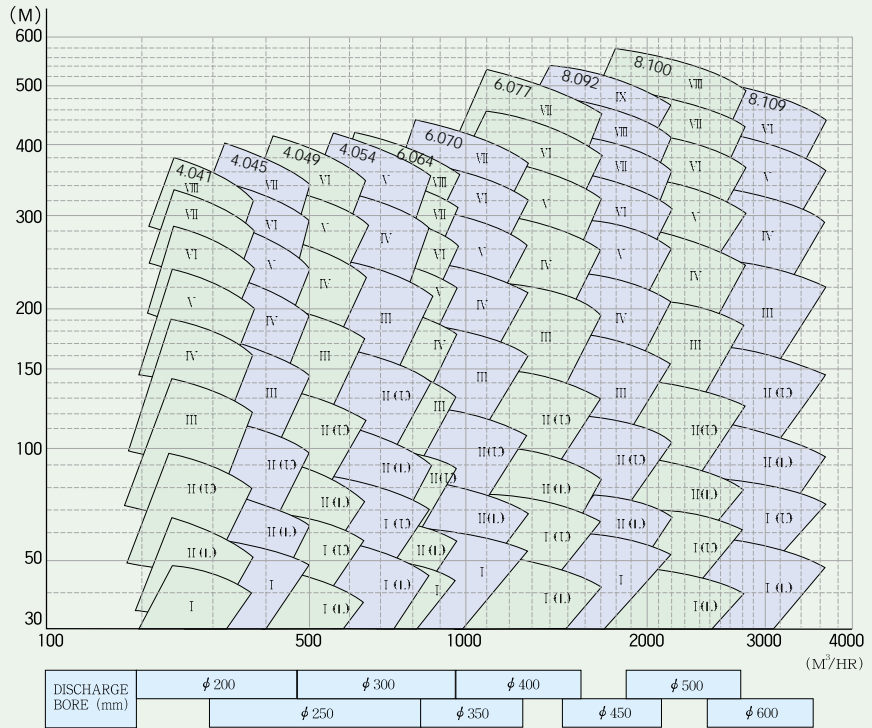
## 60Hz

VW  
(Single suction)

Symbol



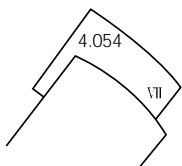
4 : POLES OF ELECTRIC MOTOR  
054 : BOWL SIZE  
VII : STAGES OF PUMP



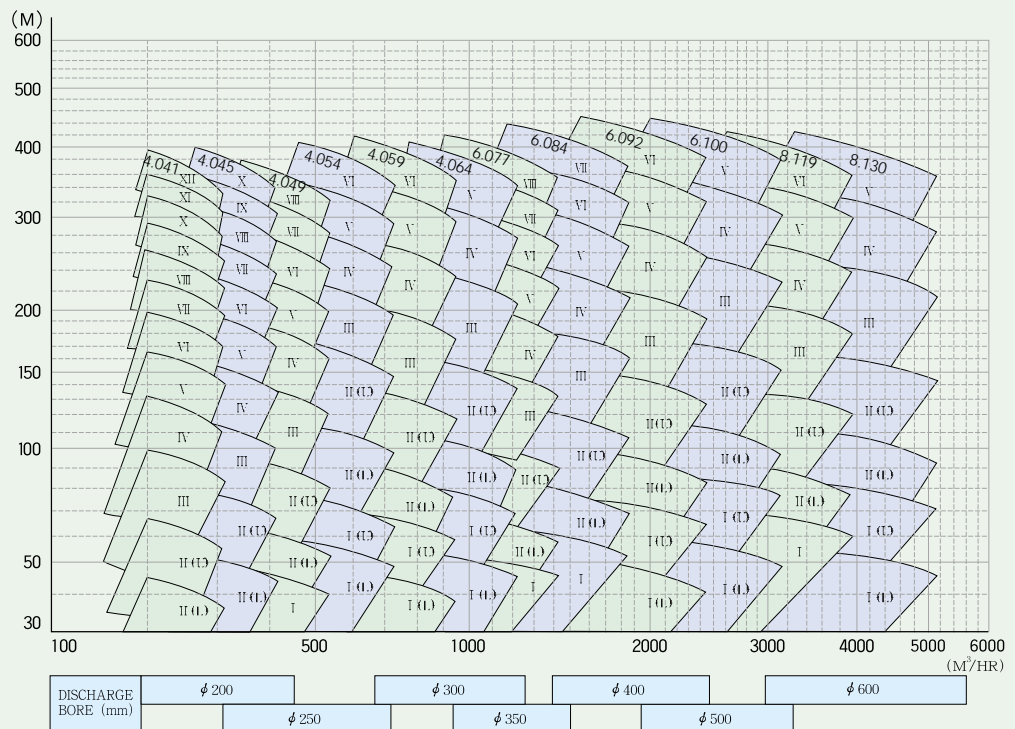
## 50Hz

VW  
(Single suction)

Symbol



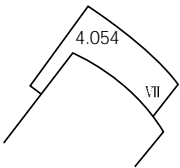
4 : POLES OF ELECTRIC MOTOR  
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VII : STAGES OF PUMP



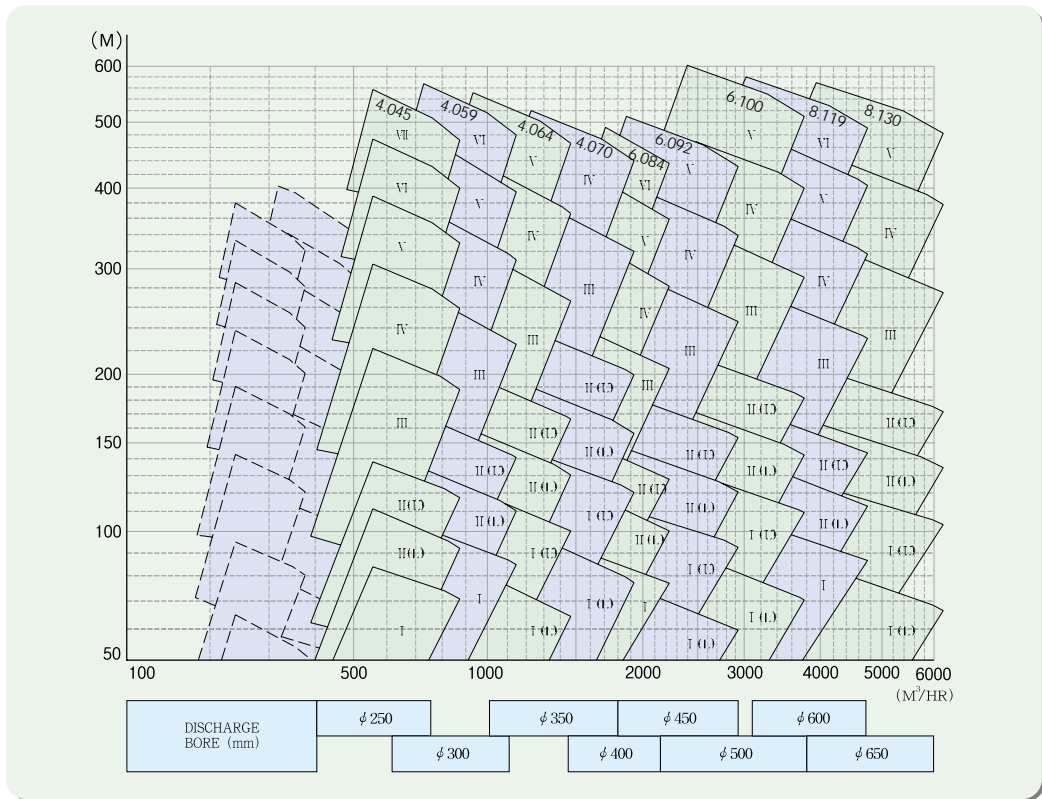
## 60Hz

VWD  
(Double suction)

Symbol



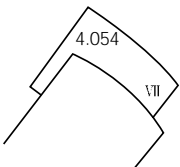
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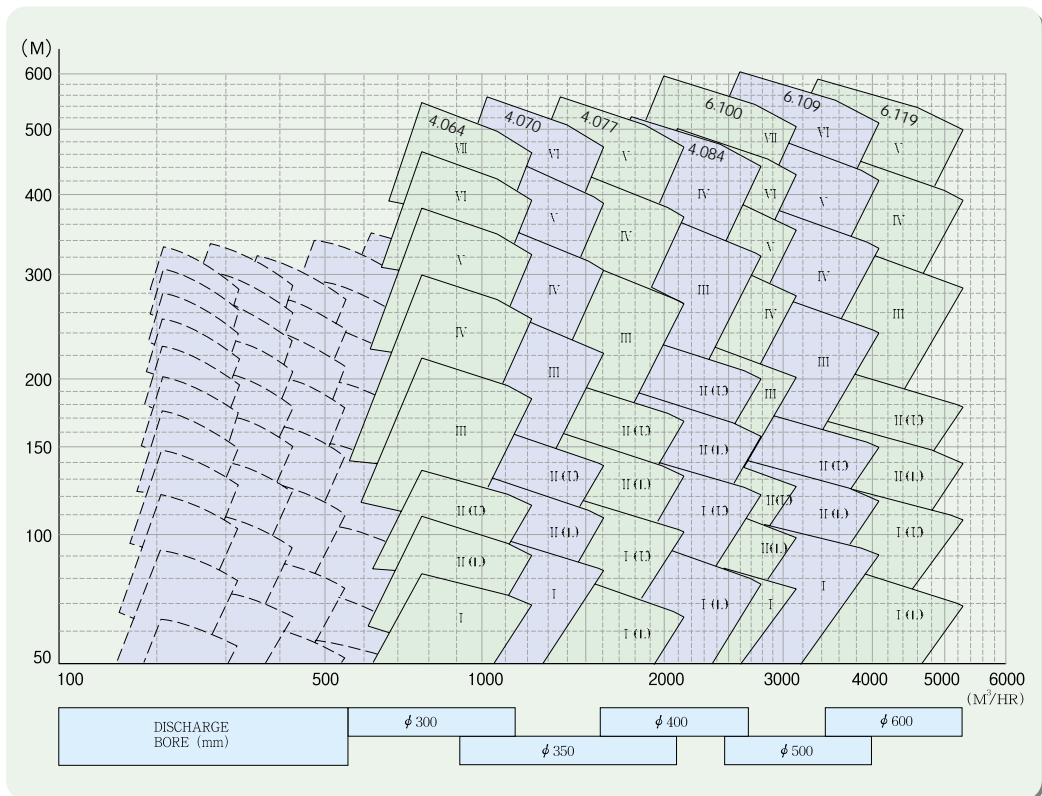
## 50Hz

VWD  
(Double suction)

Symbol



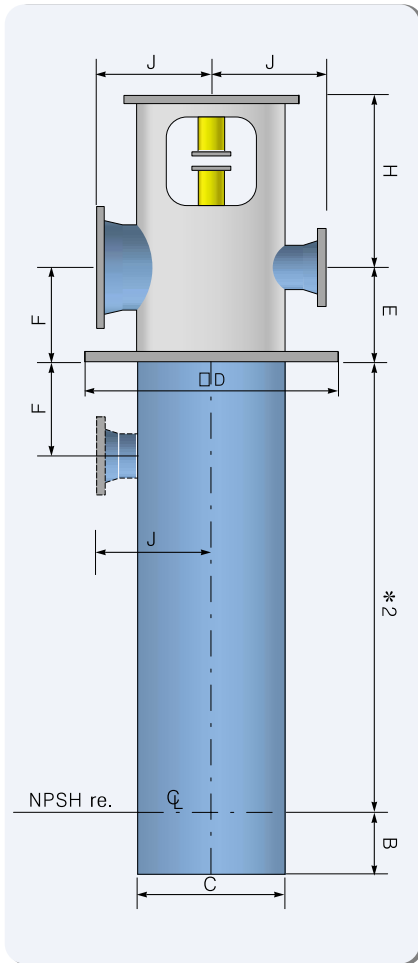
4 : POLES OF  
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054 : BOWL SIZE  
VII : STAGES OF PUMP



# Outline Dimension

## Outline Dimension of Pump

unit : mm



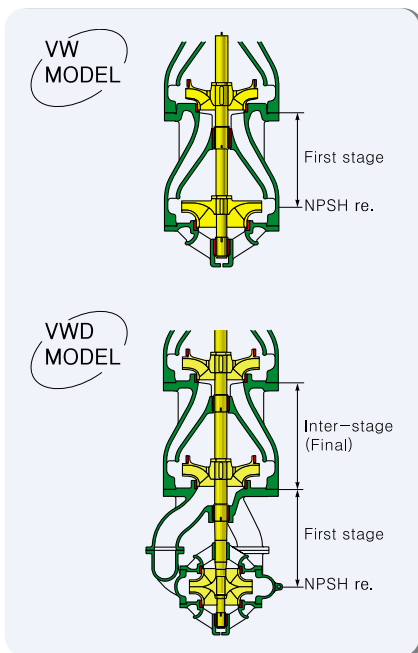
Bowl Size	Suction X Discharge	Can Sizes						E	F	*1 H	J	
		VWD			VW						VWD	VW
		B	C	D	B	C	□D					
041	300 X 200	267	656	820	180	521	656	392	353	689	451	390
045	300 X 200	293	720	900	198	571	720	430	387	756	495	428
	350 X 250	293	720	900	198	571	720	430	387	756	495	428
049	350 X 250	319	784	980	216	622	784	468	421	823	539	466
	400 X 300	319	784	980	216	622	784	468	421	823	539	466
054	400 X 250	351	864	1080	238	686	864	516	464	907	594	513
	450 X 300	351	864	1080	238	686	864	516	464	907	594	513
059	500 X 300	384	944	1180	260	749	944	563	507	991	649	561
064	550 X 300	416	1024	1280	282	813	1024	611	550	1075	704	608
	600 X 350	416	1024	1280	282	813	1024	611	550	1075	704	608
070	600 X 350	455	1120	1400	308	889	1120	669	602	1176	770	665
	650 X 400	455	1120	1400	308	889	1120	669	602	1176	770	665
077	700 X 350	500	1232	1540	339	978	1232	735	662	1294	847	732
	750 X 400	500	1232	1540	339	978	1232	735	662	1294	847	732
084	750 X 400	546	1344	1680	370	1067	1344	802	722	1411	924	798
	800 X 450	546	1344	1680	370	1067	1344	802	722	1411	924	798
092	750 X 400	598	1472	1840	405	1168	1472	879	791	1546	1012	874
	800 X 450	598	1472	1840	405	1168	1472	879	791	1546	1012	874
100	850 X 500	650	1600	2000	440	1270	1600	955	860	1680	1100	950
	900 X 500	650	1600	2000	440	1270	1600	955	860	1680	1100	950
109	900 X 500	709	1744	2180	480	1384	1744	1041	937	1831	1200	1036
	950 X 600	709	1744	2180	480	1384	1744	1041	937	1831	1200	1036
119	1000 X 500	774	1904	2380	524	1511	1904	1136	1023	2000	1310	1131
	1100 X 600	774	1904	2380	524	1511	1904	1136	1023	2000	1310	1131
130	1100 X 600	845	2080	2600	572	1651	2080	1242	1118	2184	1430	1235
	1200 X 650	845	2080	2600	572	1651	2080	1242	1118	2184	1430	1235

(\*1) Without spacer coupling

(\*2) Can length shall be determined based on pump stage and/or the NPSH.

## Outline Dimension of Bowl

unit : mm



Bowl Size	Bowl Length			
	First Stage		Inter-Stage	Final Stage
	VW	VWD		
041	363	351	439	472
045	398	385	482	518
049	434	419	524	564
054	478	462	578	621
059	522	505	631	679
064	566	547	685	736
070	620	600	749	805
077	681	658	824	886
084	743	718	899	966
092	814	787	984	1058
100	885	855	1070	1150
109	965	932	1166	1254
119	1053	1018	1273	1369
130	1151	1120	1391	1495



# Type VW

## Material of Construction

Applications	Power Plant	Desalination Plant	Fresh Water Pump	Liquefied Gas
Parts	Material			
<b>Bowl Assembly</b>				
Casing	1	14	1	18
Bolting	2	11	2	11
Impeller	8	14	1	1
Collar	3	12	3	12
Bearing	Carbon	Rubber	Bronze/Carbon	Carbon
Pump Shaft	17	13	6, 9	6, 9
<b>Column Assembly</b>				
Pipe	4	15	4	1
Flange	5	16	5	1
Bolt	2	11	2	11
Lineshaft	17	13	6, 9	6, 9
Coupling	17	13	7	7
Bearing	Carbon	Rubber	Bronze/Carbon	Carbon
Bearing Retainer	4, 5	14	4, 5	1
Sleeve	10	12	10	10
<b>Discharge Head</b>				
Fab. Steel Head	4, 5	15	4, 5	1
Stuffing Box	1	14	1	1
Bearing	Carbon	Rubber	Bronze/Carbon	Carbon
Coupling-Flanged	17	17	17	7
Bolt	2	11	2	11
Upper Shaft	17	13	6, 9	6, 9
<b>Suction Can</b>				
Pipe	4, 5	FRP or 15	4, 5	4, 5
Top Flange	5	FRP or 16	5	5

## Material Specification

No.	Material	K.S.	J.I.S.	ASTM
1	Cast Iron	D4301 GC 300	G5501 FC 300	A48 CL.45
2	Steel (1)	D3755 SNB 7	G4107 SNB 7	A193 B 7
3	Steel (2)	D3517 STKM 13A	G3445 STKM 13A	A519 Gr 1020
4	Steel (3)	D3562 SPPS 38	G3454 STPG 370	A53 Gr A
5	Steel (4)	D3503 SS 41	G3101 SS 400	A36
6	Steel (5)	D4116 SFB 4	G3201 SF 440	A108 Gr 1045
7	Steel (6)	D4116 SFB 5	G3201 SF 490	A108 Gr 1050
8	304 S.S.	D4103 SSC 13A	G5121 SCS 13A	A743 CF8
9	304 S.S. (1)	D3576 STS 304TP	G3459 SUS 304TP	A269 GR 304
10	403 S.S.	D4103 SSC 1	G5121 SCS 1	A743 CA15
11	316 S.S. (1)	D3535 STS 316	G4303 SUS 316	A193 Gr B8MC11
12	316 S.S. (2)	D3576 STS 316TP	G3459 SUS 316TP	A269 Gr 316
13	316 S.S. (3)	D3535 STS 316	G4303 SUS 316	A276 Gr 316
14	316 S.S. (4)	D4103 SSC 14A	G5121 SCS 14A	A743 Gr CF8M
15	316 S.S. (5)	D3577 STS 316LTB	G3463 SUS 316LTB	A312 Gr 316L
16	316 S.S. (6)	D3699 STS 316	G4307 SUS 316L	A580 Gr 316L
17	410 S.S.	D3697 STS 410	G4303 SUS 410	A276 Gr 410
18	Carbon Steel	D4106 SCW 410	G5102 SCW 410	A216 Gr WCA

## General Information

### 1. Liquids

Liquids which can be pumped by VW pump shall be Water, Sea water, Crude Oil Petroleum products, Chemical and others. This pump is not normally used for slurries, liquids containing stringy materials(Reeds, Fiber, etc.)

### 2. Capacity and pressure

The capacity range extends up to 6,000m<sup>3</sup>/hour size up to 650mm(26") and maximum discharge head is 600m of water column. Also, according to the purchaser's(or owner's) specification(or request), the larger capacity & head may be applied to.

### 3. Pump speed limitations

Pump speed beyond our selection chart is also possible based on engineering.

### 4. Pump configurations

These types of pumps are available to two different basic constructions with or without suction can based on the conditions of available NPSH and system condition.

## When Making Inquiries

### We need the following information when making inquiries:

- Capacity, total head, NPSHav. based on floor level, and liquid property
- Position of suction flange(Above floor or bellow floor)
- Shaft sealing methods(Gland packing or mechanical seal)
- Standards of Suction and Discharge flanges(JIS, ANSI, MSS, ...)
- Materials of liquid contacting section, etc.
- Driver requirements:  
Power source(Cycle, Phase & Voltage, etc) for Electric motor, Engine, Fluid coupling, etc.



Condensate Pump for Yonggwang Nuclear Power Plant, Unit 5 & 6(1,000 MW X 2), Korea

**motralec**

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