

Torishima Pump Global Network



East Asia

Torishima Pump Mfg. Co., Ltd. ● ●
1-1-6 Miyuki-cho, Torizuka-cho, Osaka 569-0890 Japan
Tel: +81-73-693-2308 / Fax: +81-73-693-2328

Kyushu Torishima Co., Ltd. ●
5607-13, Ohya-Kawachi, Wakagi-cho, Takachi-cho, Saga 843-0181 Japan
Tel: +81-954-26-3081 / Fax: +81-954-26-3080

Torishima Pump Mfg. Co., Ltd.
Korea Liaison Office
4F, EC Bldg., Seosa-dong 506-4, Gangnam-gu, Seoul, 135-887, Republic of Korea
Tel: +82-2-3442-0200 / Fax: +82-2-3442-0242

Torishima Pump (Tianjin) Co., Ltd. ● ●
No.9 Gaoshan Road, Wujiao Development Zone, Tianjin, P.R. China 301700
Tel: +86-22-59695501 / Fax: +86-22-59695508

Torishima Pump Mfg. Co., Ltd.
Beijing Office
Rm707, Building 1, KUNSHA CENTER, No.16 Xinyuanli, Chaoyang District, Beijing, P.R. China 100027
Tel: +86-10-64882881 / Fax: +86-10-64882880

Torishima (Hong Kong) Ltd.
Unit A, 2/F, Tower A, Billion Centre, 1 Wang Kwong Road, Kowloon Bay, Kowloon, Hong Kong
Tel: +852-2795-1838 / Fax: +852-2794-3260

South East Asia

Torishima (Hong Kong) Ltd.
Vietnam Office
No.76 Suoi Thi Kuan Street, Hai Ba Trung District, Hanoi, Socialist Republic of Vietnam
Tel: +84-4-943-7382 / Fax: +84-4-943-7676

Torishima Pump Mfg. Co., Ltd.
Singapore Office
69 Sun Quee Road East, #02-14-4, Westhub, Singapore 100710
Tel: +65-6779-0123 / Fax: +65-6779-0900

Torishima Service Solutions Asia Pte Ltd. ●
48, Sun Quee Road East, #02-142, Enterprise Hub, Singapore 100786
TEL: +65-6933-8772 / FAX: +65-6933-8777

PT. Torishima Guna Engineering ●
PT. Torishima Guna Indonesia ●
Jalan Raya Sunar Timur No.1 Pulogadung Industrial Estate, PO Box 1180, Jakarta, Indonesia
Tel: +62-21-480-3963 / Fax: +62-21-490-3937

PT. Geteka Fourindo ●
Jl. Pulo Ayang Kav. AAD Pulogadung Industrial Estate, PO Box 1160 JAY, Jakarta 13011 Indonesia
Tel: +62-21-480-3963 / Fax: +62-21-490-3937

South Asia

Torishima Pumps India Pvt. Ltd.
Tower B 1106, Millennium Tower, Sector 27, Gurgaon-122002, Haryana, India
Tel: +91-124-4729502 / Fax: +91-124-4729502

Torishima Pumps India Pvt. Ltd. Service Division ●
Plot No.27 B, Canal, Hoskote NACB Industrial Area, Chikkahalli Village, Kalyana Hosi, Hoskote Taluk, Bangalore-562114, Karnataka, India

Oceania

Torishima Australia Pty Ltd
643-645 Glenhurst Road, Caulfield South VIC 3162 Australia
Tel: +61-3-9623-7988

Middle East

Torishima Service Solutions FZCO ●
Plot of Land 17012801, Techno Park, Jebel Ali, PO Box 37903 Dubai, U.A.E.
Tel: +971-4-880-7341 / Fax: +971-4-880-7254

Torishima Pump Mfg. Co., Ltd. Middle East Office
Office No.901, Delta Tower, Delta Street, Al Nahyan Camp Area, PO Box 12967, Abu Dhabi, U.A.E.
Tel: +971-2-674-3880 / Fax: +971-2-674-3881

Torishima Pump Mfg. Co., Ltd. Qatar Project Office
Office No. 11, 1st Floor, West Cover Centre, Seiwah Road Al Sadd, RWA, PO Box 37027 Doha, Qatar
Tel: +974-4450-6610 / Fax: +974-4450-6618

Torishima Pump Mfg. Co., Ltd. Saudi Arabia Office
PO Box 12241-6208, 3202 Al Amir Mohammed Bin Abdulaziz Street (Tahera Street), Al Olaya, Kingdom of Saudi Arabia
Tel: +966-1-1280-1282

Europe

Torishima Europe Ltd.
Sunnyvale Works, Garthwaite Rd, Costridge, Scotland ML3 2DJ
Tel: +44-1236-443851 / Fax: +44-1236-102675

Torishima Service Solutions Europe Ltd. ●
Sunnyvale Works, Garthwaite Rd, Costridge, Scotland ML3 2DJ
Tel: +44-1236-443850 / Fax: +44-1236-702075

Torishima Europe Projects Ltd.
Torishima House, Brook Lane, Westbury, Wiltshire, England BA13 4EJ
Tel: +44-1373-658143

Torishima Europe Ltd. Madrid Office
Avenida Puente Nueva 124, 28703 San Sebastian de los Reyes, Madrid, Spain
Tel: +34-91-622-7541 / Fax: +34-91-254-8201

Torishima Europe Ltd. Poland Office
ul. Pomorzanska 7, 03-136 Warszawa, Poland
Tel: +48-604-567-137

North America

Torishima Pump Mfg. Co., Ltd. North America East Office
100 Grove Street, Suite 217, Worcester, MA 01605-2654 U.S.A.
Tel: +1-508-753-6600 / Fax: +1-508-753-8278

Torishima Pump Mfg. Co., Ltd. North America West Office
2190 Dupont Drive, Suite 112, Irvine, CA 92612 U.S.A.
Tel: +1-949-379-6181 / Fax: +1-949-379-6181

Central America

Torishima Europe Ltd. Mexico Office
Av Paseo de La Reforma 560, 1191 Roca, Juarez Cuernavaca, 99000, Ciudad de Mexico D.F., Mexico
Tel: +52-55-9171-1420 / Fax: +52-55-9171-1490

CAL (Cast Iron)

CAR (Stainless Steel)

End-Suction Volute Pump



CAR



CAL



PT TORISHIMA GUNA INDONESIA

● Manufacturing ● Service Center

The Torishima "Eco Pumps" lead the World!

End-Suction Volute Pump (10 bar type)

CAL is of Cast Iron construction. CAR is of Stainless Steel construction.

CA series pumps are eco-friendly high-efficiency pumps based on technology from our engineered pumps.



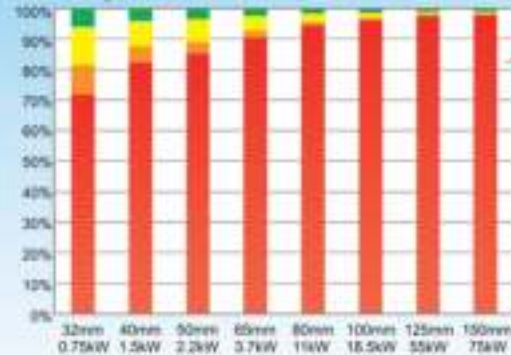
Energy Saving & Cost Reduction

Eco pumps significantly reduce the life cycle costs of pumps and CO₂ emissions because of their design (3D impeller, casing), motor (Torishima ultra high efficiency motor) and optimized specification (impeller cut).

Reduction of LCC (Life Cycle Cost)

About 90% of the pump LCC is generated from electricity cost. Increased efficiency leads to big reduction of LCC.

LCC composition



About 90% of pump LCC is electricity cost.

LCC is calculated on the basis of:
CAL size 32 to 150mm;
24hours/day, 365days, 10years operation;
Operating at 60Hz-4P with normal temperature clean water;
Electricity cost of JPY10 per kWh.

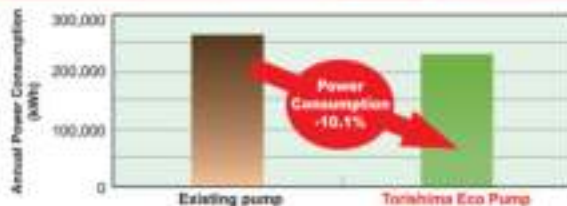
Operating cost: Electricity, Maintenance, Spare parts
Initial cost: Installation work, Unit price

Energy Saving with Eco Pumps

Cooling water pump

Annual operating hours: 8,760hours

	Existing pump (cm)		Bestcase pump CAL/105-250	Difference
	Facility size	Operating point	Operating point	
Capacity(m ³ /min)	4.7	4.7	4.7	0%
Head(m)	26.5	27.7	26.5	+1.2m
Pump efficiency(%)		78	81	+3.0%
Shaft power(kW)		27.2	25.1	-2.1kW
Motor efficiency(%)		81.3	84.5	+3.8%
Power consumption(kW)		29.0	25.6	-3.2kW (-10.1%)
Annual Power Consumption(kWh)		258,296	233,018	-25,278kWh



Annual Saving
USD\$2,628
(= 26,280 kWh x USD 0.1)

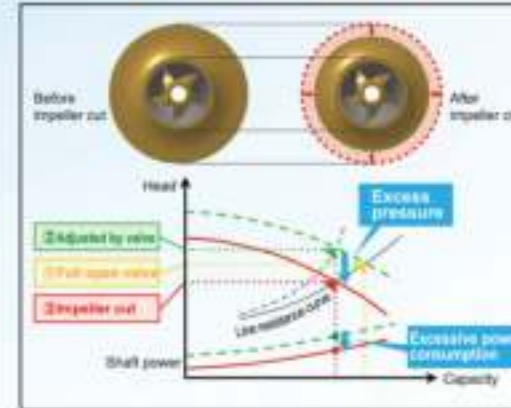
Electricity cost per kWh : USD 0.1

Annual CO₂ Reduction
11.8t-CO₂
(= 26,280 kWh x 0.00045 t-CO₂/kWh)

Conversion factor of CO₂ emission: 0.00045 (t-CO₂/kWh) referred from Tokyo Electric Power Co., Inc. 2011

Meeting Customer's Specification (Impeller cut)

The impeller diameter can be cut to meet the customer's specification to reduce unnecessary power consumption.



Maintenance & Operation

Mechanical Seal as Standard Part

Maintenance free.

No leakage from seal parts allows cleanliness around pumps.



Standard mechanical seal (rubber bellows seal) is easy to install and does not damage shaft, thus does not require shaft sleeve.

	Mechanical seal	Gland packing
Leakage	0 ccm/min	15 ccm/min
5-year leakage	0 t	39,420 t
Cost amount	USD\$ 0	USD\$ 138*

* In case of using tap water
- Inlet Water : USD\$ 17.74 (USD\$ 0.45/m³)
- Tap Water : USD\$ 136 (USD\$ 3.5/m³)
- Pure Water : USD\$ 841,000 (USD\$ 19)

39,420t leakage from using gland packing for 5 years equals to about 197 bathtubs (200t home bathtub)



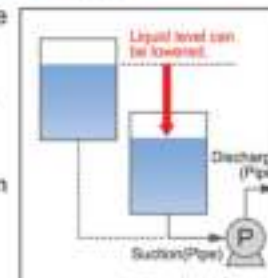
High Speed and Simplified Design

CAL/CAR are simplified with high speed and compact design, which enable to reduce the installation space.

Low NPSH and a Wide Application Range

Low NPSH performance enables lower suction level which reduces plant construction cost.

CAL/CAR can handle liquid temperatures from -40 to +350°C (heat medium) and various liquid types.



Safe Operation with Precision Bearing Design

Stable Operation

The stable pump performance facilitates valve control and parallel operation.

Coupling Guard

CAL/CAR are covered with and enclosed type coupling guard as an optional

An enclosed coupling guard improves safety and maintenance compared to an existing coupling guard due to the wide area of coverage



Standard Coupling Guard

Enclosed Coupling Guard
(as optional)

TU Motor : 2P-55kW or less, 4P-110kW or less
Coupling Diameter : 280 mm or less
Motors have different size and frame by manufacturers

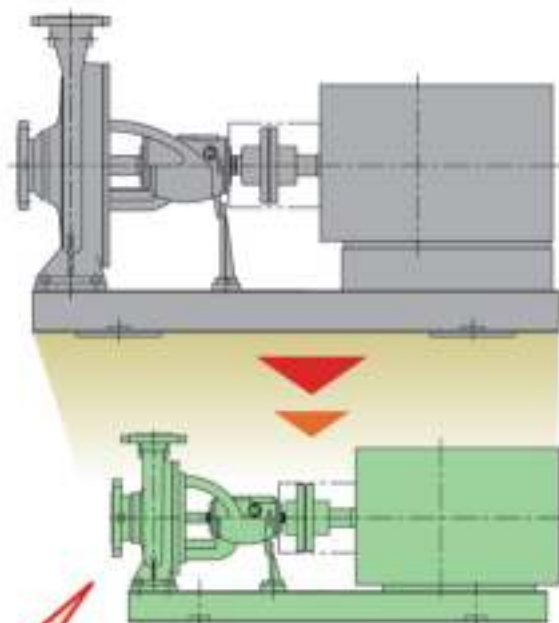
Downsizing to 2P Design

Increasing the pump speed by using a 2 pole motor reduces the pump size and weight.

Conditions: total head of 50m, capacity of 1m³/min, and 60Hz

Pole number: 4P
Pump size: CAL80-400
Motor output: 18.5kW
Weight: 400kg

Pole number: 2P
Pump size: CAL50-200
Motor output: 15kW
Weight: 209kg



**Weight reduced by 47%
compared to 4P**
= (400 - 209) ÷ 400 × 100



The above diagram describes characteristics of 2P. We can provide the design for 4P as well.
Weight includes pump, base plate, motor and coupling.
Motor weight differs depending on manufacturers.

Applications

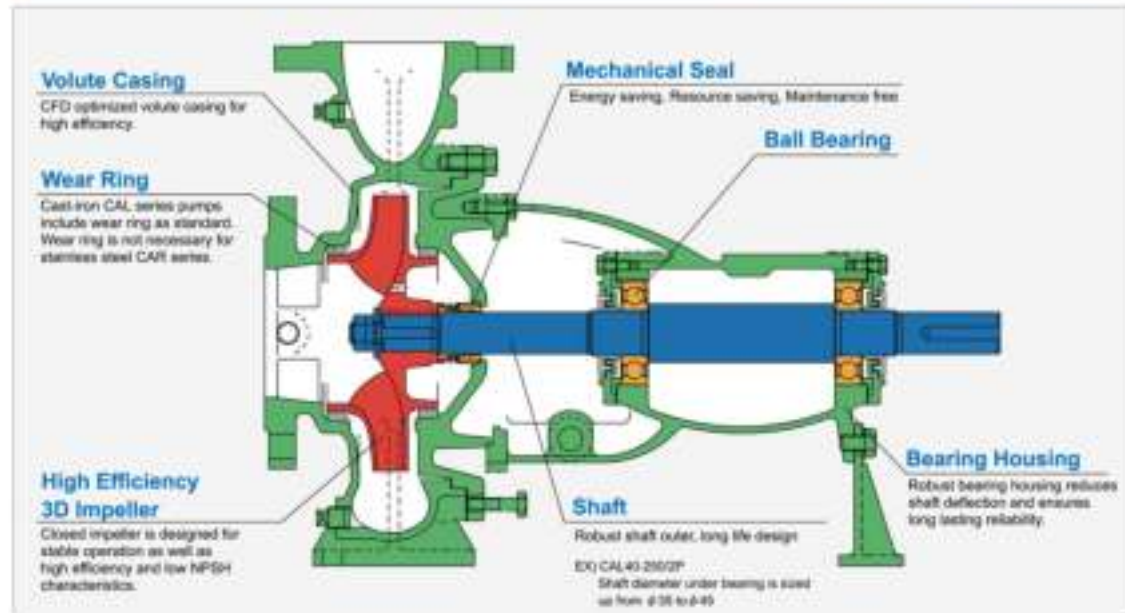
Utility	Co-generation	Cooling water pump, Hot water (circulation) pump	CAL
	Air conditioning	Cold water pump, Cooling water pump, Hot water pump	CAR
	Drainage treatment	Raw water pump, Filtrate pump, Back wash pump, Transfer pump	CAR
	Pure water facility	Raw water pump, RO wash pump, Recovering back wash pump, Filtrate water pump	CAR
Iron & Metal	Power generation	Deaerator feed water pump	CAL
	Hot rolling	Transfer pump, Hot water pump, Water pumping pump, Filtrate pump, Back wash pump	CAL
	Fine gas desulfurization	Cooling water pump, Industrial water pump	CAR
	Roll coolant	Spray pump	CAR
Food & Beverage	Plating	Wash pump (Rinse pump)	CAR
	Manufacturing process	Cold water pump, Cooling water pump (Circulation / Boost), Recycle water pump, Filtrate pump, Sprinkling pump	CAL
	Refrigerator	Chilled pump, Defrost pump	CAR
Automobile (Painting Plant)	CIP system	CIP supply / return pump	CAR
	Degreasing process	Degreasing pump, Hot / Cold water wash pump, Spray pump	CAR
	Transformation process	Chemical pump, Hot / Cold water wash pump, Pure water pump	CAR
Garbage Incinerating Plant	Electrodeposition process	Electrodeposition liquid circulation pump, Wash pump, Pure water pump	CAR
	Power generation	Deaerator feed water pump, Condensate pump,	CAL
	Heat decrease tower	Heat decrease pump, Spray pump for heat decrease tower	CAL
Other Liquid Handled	Drainage	Reuse water pump (pumping, transferring, feeding)	CAR
		Brain, Acetone, Calcium chloride, Potassium chloride, Alkaline solution, Ethylene glycol, Aqua fortis, Sulfate, Sodium hydroxide, Ammonia liquor, Caustic soda, etc.	CAR

Please ask about special fluid.

Specification

		CAL(Cast Iron) 	CAR(Stainless Steel) 
Handled liquid	Kinds	Clean water, Warm water, Oil, Chemical medicine, Alkaline solution, Brine, Heat transfer media, Abrasive slurry liquid under 3wt%, etc.	Pure water, Hot water, Sea water, Salted water, Refrigerant, Electrodeposition paint, Abrasive slurry liquid under 3wt%, etc.
	Temperature	Standard: -10°C ~ T+100°C Option: 100°C < T < 350°C	Standard: -50°C to +80°C Option: -60°C to +140°C
Max. discharge pressure		Standard: 1MPa (10kgf/cm ²) Option: 1.4MPa (14kgf/cm ²)	1MPa (10kgf/cm ²)
Max. suction pressure		0.8MPa (8kgf/cm ²)	0.8MPa (8kgf/cm ²)
Design	Impeller	Closed	Closed
	Shaft seals	Standard: Single mechanical seal (Rubber bellows) Option: Double mechanical seal, Gland packing	Standard: Single mechanical seal (Rubber bellows) Option: Double mechanical seal, Gland packing
	Water injection for shaft seal	Standard: Internal injection Option: Quenching, Flushing	Standard: Internal injection Option: Quenching, Flushing
	Lubricated bearing	Standard: Grease lubrication Option: Oil lubrication	Standard: Grease lubrication Option: Oil lubrication
Flange standard, Suction / Discharge direction		JIS 10KR Shaft direction suction / Vertical top discharge	JIS 10KR Shaft direction suction / Vertical top discharge
Pump material	Casing	Standard: FC250 Option: FCD400	Standard: SC513 Option: SC514
	Impeller	Standard: FC250 Option: SC513, SC514, SC6	Standard: SC513 Option: SC514
	Shaft	Standard: SUS420J2 Option: SUS329J1, SUS304	Standard: SUS304 Option: SUS316, SUS329J1
	Case wear ring	Standard: FC200	-

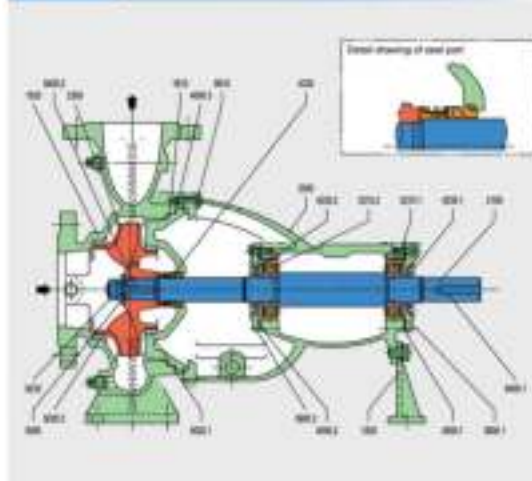
Design Features



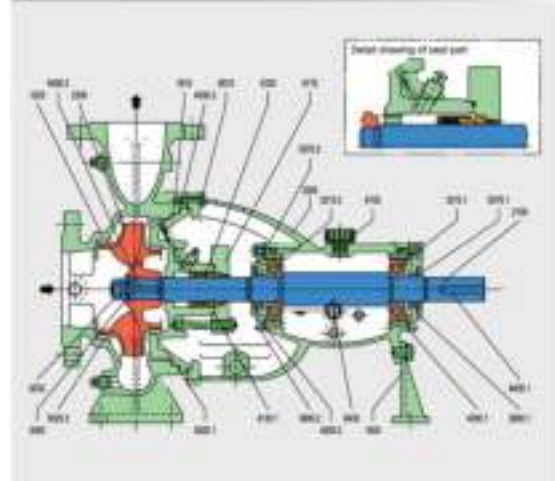
Pump Sectional Drawing

The basic structure is same between CAL and CAR for parts interchangeability. CAR, which is made from stainless, does not require case wear ring. Due to adopting build to order method, various combination with pump material, seal and bearing is available according to liquids kinds and temperature.

Standard Seal: Mechanical seal
Bearing: Grease lubrication



Option Seal: Mechanical seal + Water cooling
Bearing: Oil lubrication



Parts Interchangeability

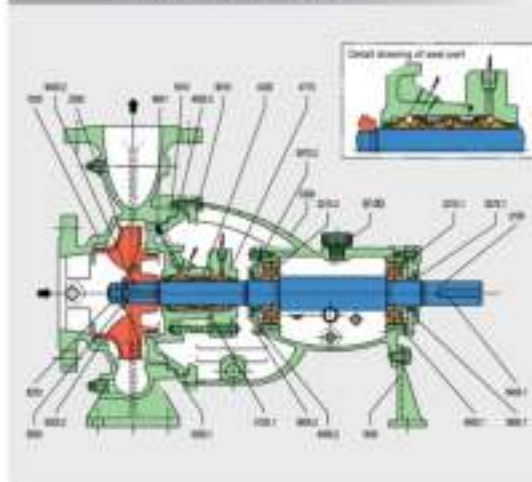
■2P type Same color and number in the same parts indicate interchangeability

Parts Pump type	Casing	Casing Cover	Bearing Housing	Shaft	Mechanical Seal
32-125	1	1	1	1	1
40-125	2	1	1	1	1
65-125	3	1	1	1	1
32-160	4	1	1	1	1
40-160	5	2	1	1	1
60-160	6	1	1	1	1
32-200	7	1	1	1	1
45-200	8	3	1	1	1
60-200	9	1	1	1	1
80-180	10	4	2	2	1
80-250	11	5	1	1	1
32-250	12	1	1	1	1
40-250	13	6	3	3	2
70-200	14	1	1	1	1
80-250	15	7	1	1	1

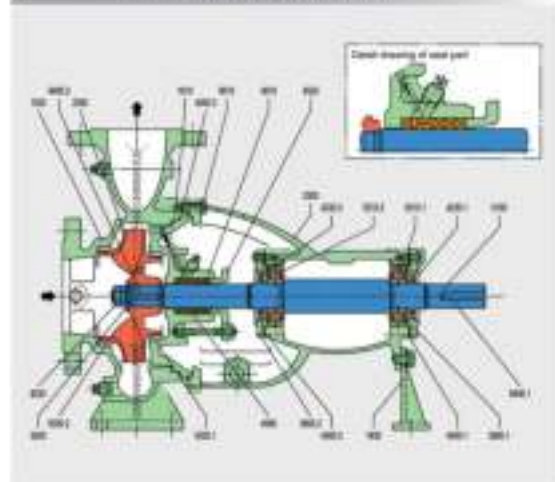
■4P type Same color and number in the same parts indicate interchangeability

Parts Pump type	Casing	Casing Cover	Bearing Housing	Shaft	Mechanical Seal
32-125	1	1	1	1	1
40-125	2	1	1	1	1
65-125	3	1	1	1	1
32-160	4	1	1	1	1
40-160	5	2	1	1	1
60-160	6	1	1	1	1
32-200	7	1	1	1	1
45-200	8	3	1	1	1
60-200	9	1	1	1	1
80-180	10	4	2	2	1
80-250	11	5	1	1	1
32-250	12	1	1	1	1
40-250	13	6	3	3	2
70-200	14	1	1	1	1
80-250	15	7	1	1	1
100-180	16	8	1	1	1
100-250	17	9	1	1	1
125-200	18	10	1	1	1
125-250	19	11	1	1	1
150-180	20	12	1	1	1
150-250	21	13	1	1	1
175-200	22	14	1	1	1
175-250	23	15	1	1	1
200-180	24	16	1	1	1
200-250	25	17	1	1	1
250-180	26	18	1	1	1
250-250	27	19	1	1	1
300-180	28	20	1	1	1
300-250	29	21	1	1	1
350-180	30	22	1	1	1
350-250	31	23	1	1	1
400-180	32	24	1	1	1
400-250	33	25	1	1	1
450-180	34	26	1	1	1
450-250	35	27	1	1	1

Option Seal: Double mechanical seal
Bearing: Oil lubrication



Option Seal: Gland packing
Bearing: Grease lubrication



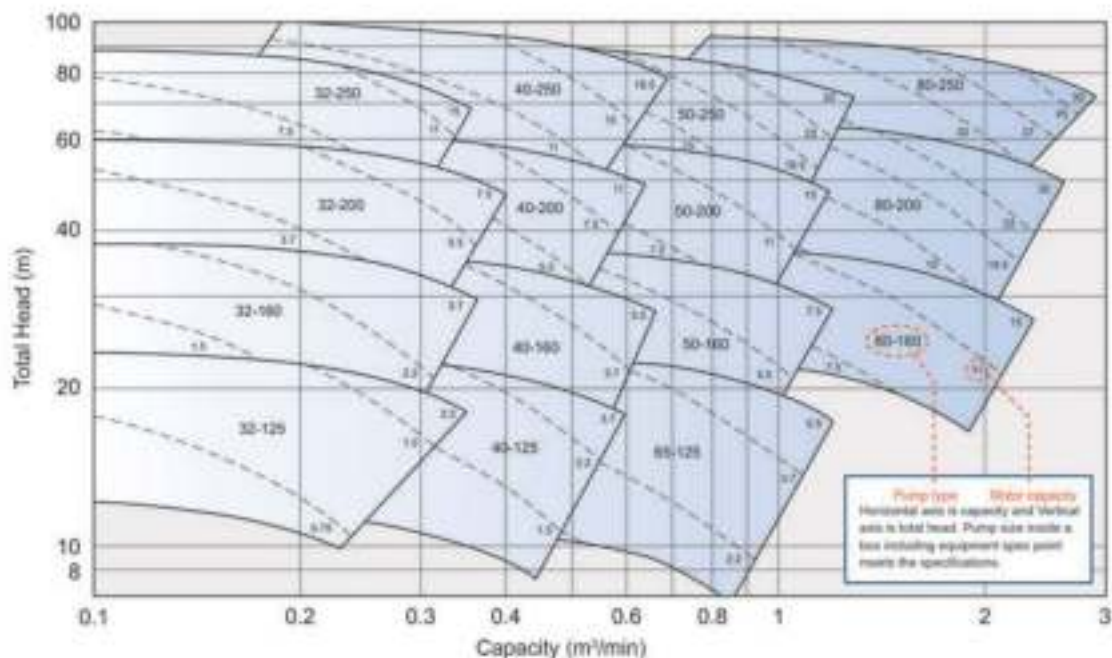
Parts number	Parts name	Parts number	Parts name	Parts number	Parts name	Parts number	Parts name
1020	Volute casing	3800.2	Bearing cover	4580	Lantern ring	9010	Hex. bolt
1610	Casing cover	4000.1	Flat gasket	4610	Gland packing	9041	Nock
1830	Support foot	4000.2	Flat gasket	4710	Seal cover	9130	Plug
2100	Shaft	4000.3	Flat gasket	5020.1	Casing wear ring	9233	Lock nut
2300	Impeller	4120.1	O-ring	5020.2	Casing wear ring	9400.1	Key
3210.1	Deep groove ball bearing	4230.1	Labyrinth ring	5070.1	Deflector	9400.2	Key
3210.2	Deep groove ball bearing	4230.2	Mechanical seal	5070.2	Deflector		
3300	Bearing housing	4330	Shaft box gland	5500	Washer		
3800.1	Bearing cover	4520		6430	Oil gauge		

CAL (Cast Iron) Selection Range Charts

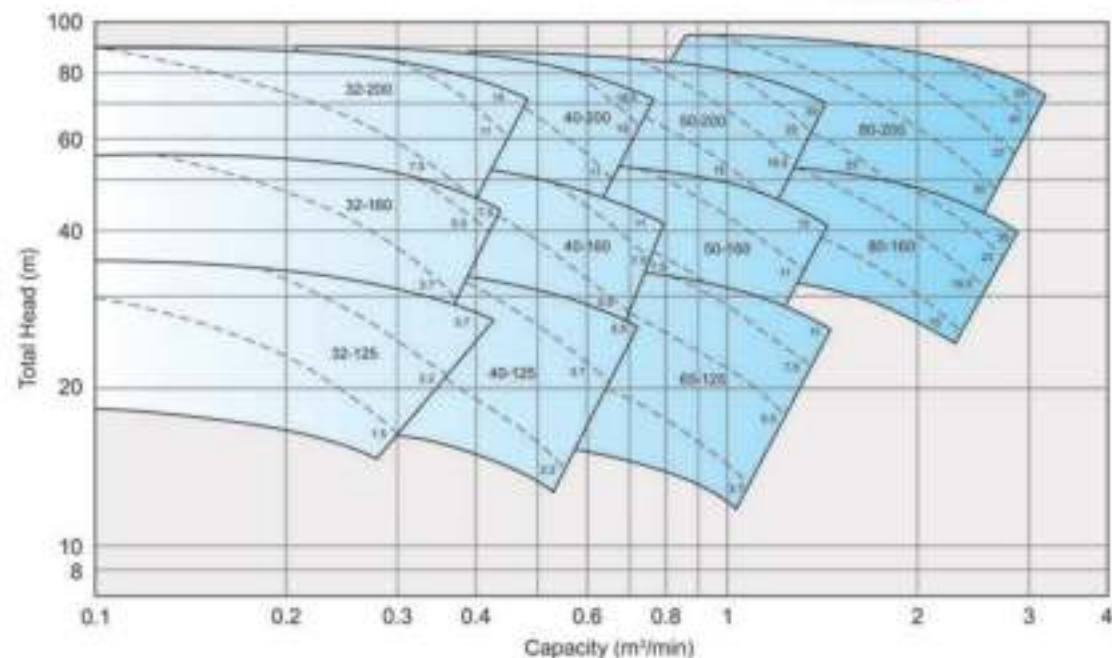
IP is also available. Please ask our sales representative for details.



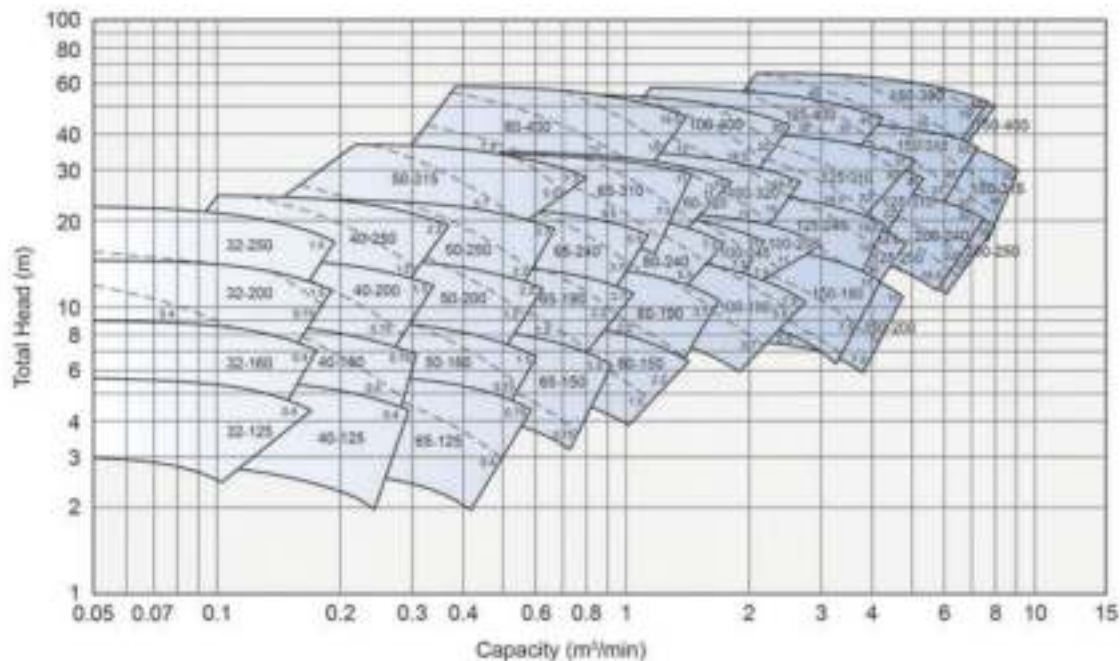
■ 50Hz-2P (3000min⁻¹)



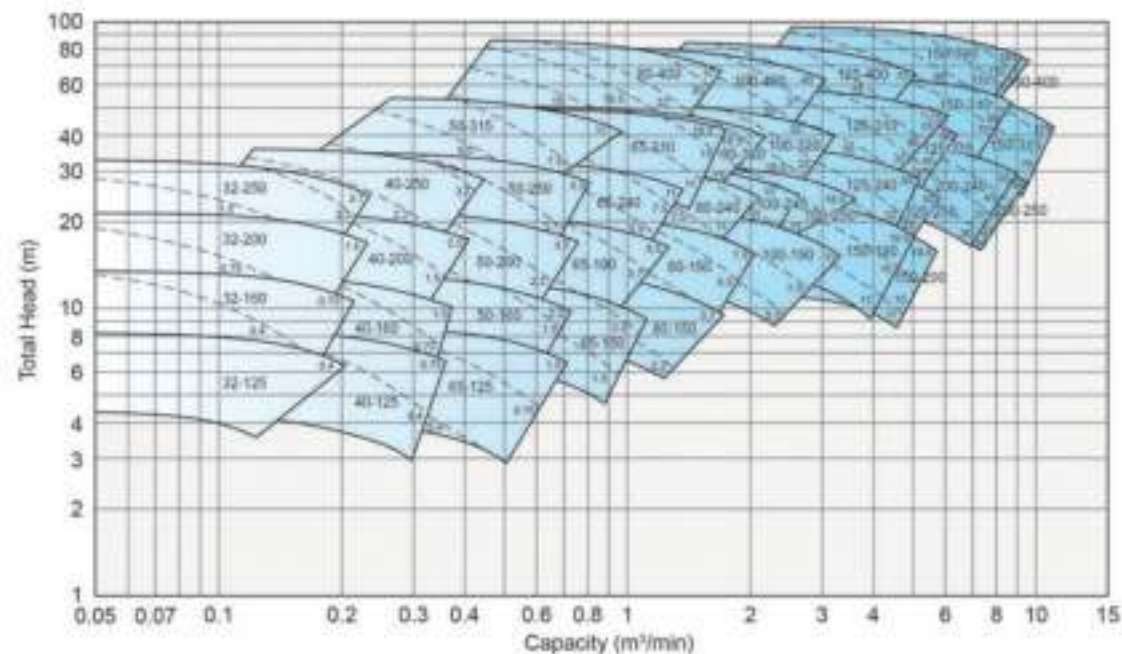
■ 60Hz-2P (3600min⁻¹)



■ 50Hz-4P (1500min⁻¹)



■ 60Hz-4P (1800min⁻¹)

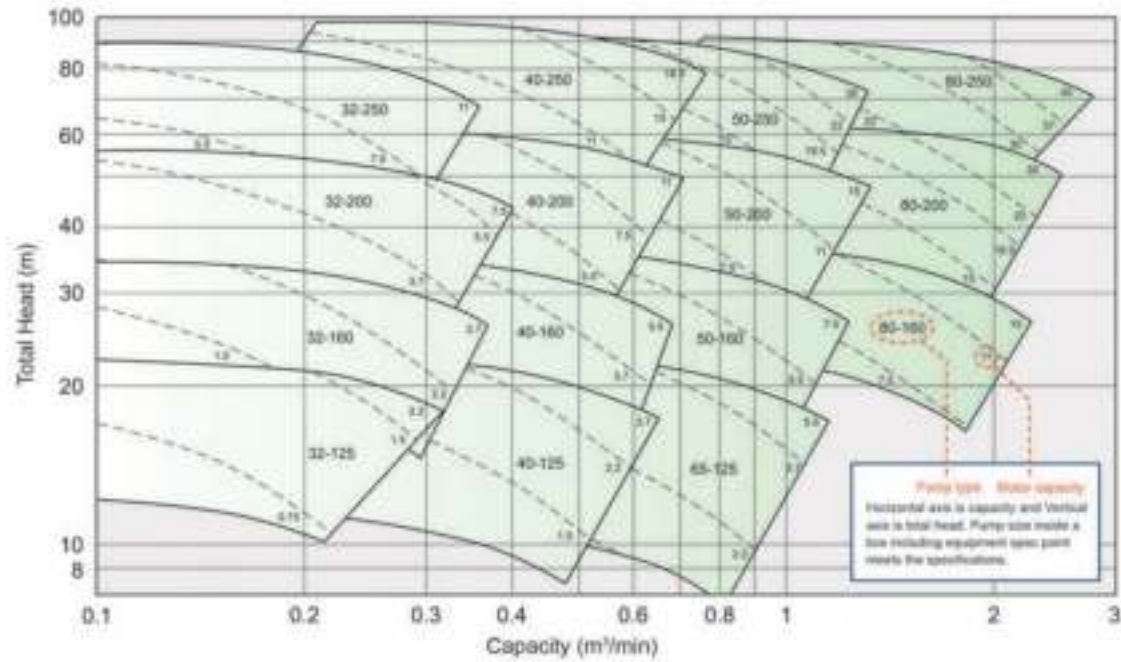


CAR (Stainless Steel) Selection Range Charts

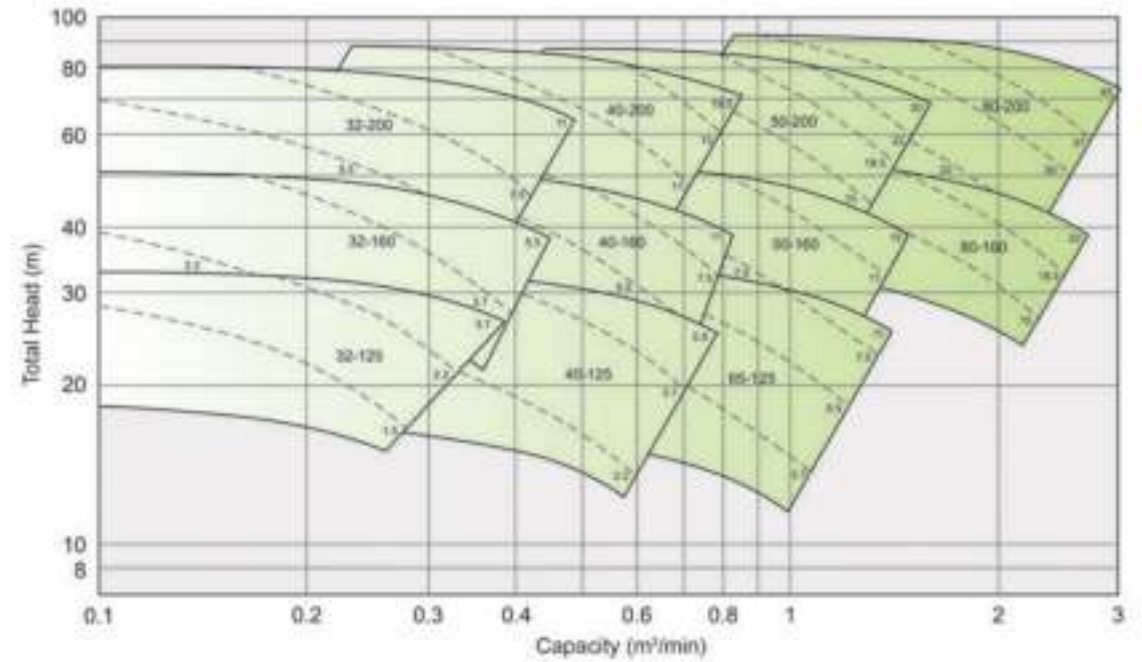
6P is also available. Please ask our sales representative for details.



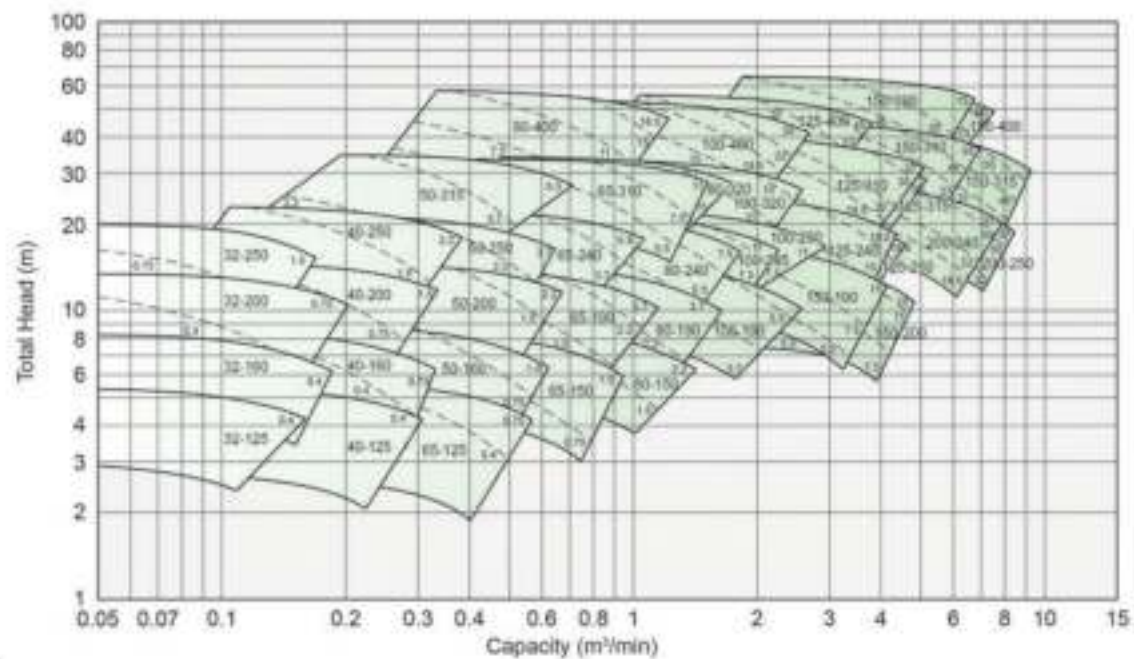
50Hz-2P (3000min⁻¹)



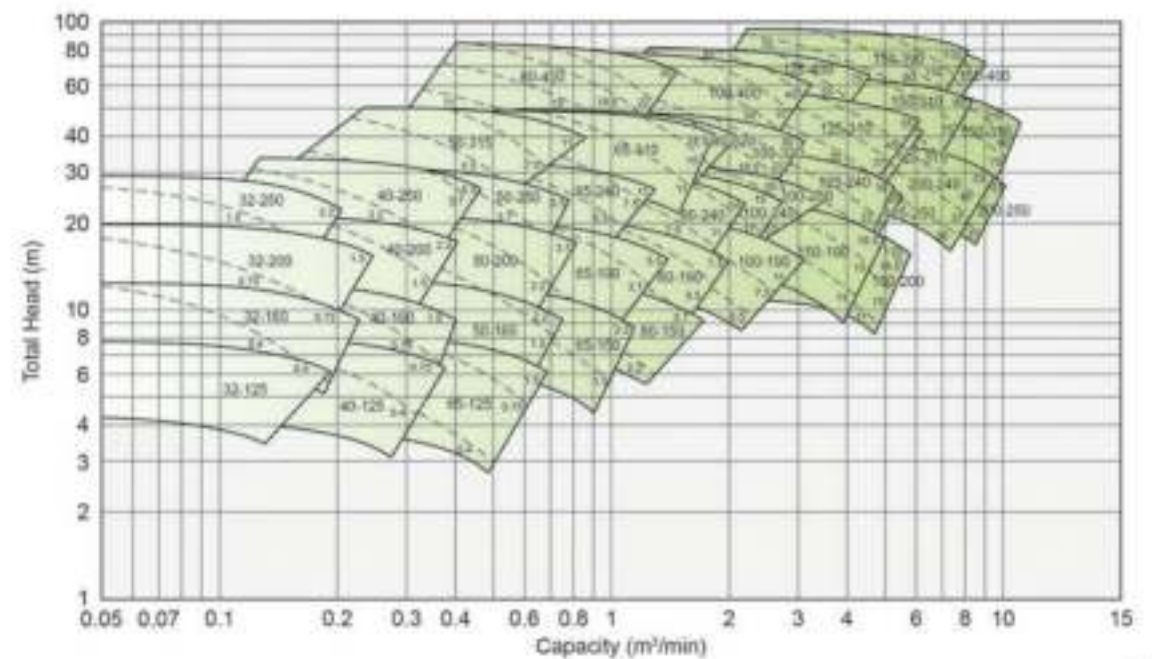
60Hz-2P (3600min⁻¹)



50Hz-4P (1500min⁻¹)



60Hz-4P (1800min⁻¹)



Dimension Chart

Dimension Chart for 4P Motor Drive

Pump Size	Pump								Motor		Base Plate		Foundation Dimensions										Coupling		Refs					
	Dow		Dimension			Axis			Weight	Frame	Dimension		Base Plate		Foundation Dimensions											Coupling	Refs			
	DN1	DN2	a	f	h1	h2	h3	Grade L			Grade R	B	W	h1	h2	h3	h4	h5	h6	h7	h8	h9	h10	h11				h12	h13	h14
32-125	50	32	80	200	132	140	24	27	28	71M	130	14	220	670	0	27	280	45	280	420	300	34	4	502	100	145	3	1.1	681	
40-100	63	40	80	200	132	140	24	28	29	80M	140	19	220	670	0	27	280	45	280	420	300	34	4	502	100	145	3	1.1	728	
50-100	80	50	100	200	132	140	24	30	31	71M	120	14	220	670	0	28	220	45	280	420	300	34	4	502	100	145	3	1.1	681	
63-100	80	63	100	200	132	140	24	31	32	80M	140	19	220	670	0	28	220	45	280	420	300	34	4	502	100	145	3	1.1	728	
80-100	100	80	100	200	132	140	24	32	33	90M	160.5	24	220	720	0	30	220	55	280	480	300	34	4	502	112	155	3	1.1	779	
100-100	125	100	100	200	132	140	24	33	34	100M	180.5	29	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	830	
125-100	150	125	100	200	132	140	24	34	35	112M	200	29	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	881	
150-100	180	150	100	200	132	140	24	35	36	125M	220	38	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	932	
180-100	200	180	100	200	132	140	24	36	37	140M	240	47	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	983	
200-100	220	200	100	200	132	140	24	37	38	160M	260.5	56	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1034	
250-100	280	250	100	200	132	140	24	38	39	180M	280.5	65	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1085	
300-100	340	300	100	200	132	140	24	39	40	200M	300.5	74	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1136	
350-100	400	350	100	200	132	140	24	40	41	220M	320.5	83	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1187	
400-100	460	400	100	200	132	140	24	41	42	240M	340.5	92	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1238	
450-100	520	450	100	200	132	140	24	42	43	260M	360.5	101	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1289	
500-100	580	500	100	200	132	140	24	43	44	280M	380.5	110	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1340	
550-100	640	550	100	200	132	140	24	44	45	300M	400.5	119	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1391	
600-100	700	600	100	200	132	140	24	45	46	320M	420.5	128	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1442	
650-100	760	650	100	200	132	140	24	46	47	340M	440.5	137	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1493	
700-100	820	700	100	200	132	140	24	47	48	360M	460.5	146	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1544	
750-100	880	750	100	200	132	140	24	48	49	380M	480.5	155	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1595	
800-100	940	800	100	200	132	140	24	49	50	400M	500.5	164	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1646	
850-100	1000	850	100	200	132	140	24	50	51	420M	520.5	173	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1697	
900-100	1060	900	100	200	132	140	24	51	52	440M	540.5	182	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1748	
950-100	1120	950	100	200	132	140	24	52	53	460M	560.5	191	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1799	
1000-100	1180	1000	100	200	132	140	24	53	54	480M	580.5	200	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1850	
1050-100	1240	1050	100	200	132	140	24	54	55	500M	600.5	209	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1901	
1100-100	1300	1100	100	200	132	140	24	55	56	520M	620.5	218	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	1952	
1150-100	1360	1150	100	200	132	140	24	56	57	540M	640.5	227	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	2003	
1200-100	1420	1200	100	200	132	140	24	57	58	560M	660.5	236	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	2054	
1250-100	1480	1250	100	200	132	140	24	58	59	580M	680.5	245	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	2105	
1300-100	1540	1300	100	200	132	140	24	59	60	600M	700.5	254	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	2156	
1350-100	1600	1350	100	200	132	140	24	60	61	620M	720.5	263	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	2207	
1400-100	1660	1400	100	200	132	140	24	61	62	640M	740.5	272	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	2258	
1450-100	1720	1450	100	200	132	140	24	62	63	660M	760.5	281	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	2309	
1500-100	1780	1500	100	200	132	140	24	63	64	680M	780.5	290	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	2360	
1550-100	1840	1550	100	200	132	140	24	64	65	700M	800.5	299	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	2411	
1600-100	1900	1600	100	200	132	140	24	65	66	720M	820.5	308	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	2462	
1650-100	1960	1650	100	200	132	140	24	66	67	740M	840.5	317	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	2513	
1700-100	2020	1700	100	200	132	140	24	67	68	760M	860.5	326	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	2564	
1750-100	2080	1750	100	200	132	140	24	68	69	780M	880.5	335	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	2615	
1800-100	2140	1800	100	200	132	140	24	69	70	800M	900.5	344	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	2666	
1850-100	2200	1850	100	200	132	140	24	70	71	820M	920.5	353	220	720	0	32	250	55	280	480	300	34	4	502	112	155	3	1.1	2717	
1900-100	2260	1900	100	200																										

