

Wilo SCP
Horizontal Split Case Pumps

Technical Bulletin

1 General

1.1 Background Information

- For hydronic heating and cooling systems, industrial, pressure boosting and general pumping applications
- High efficiency, low operating costs
- Easy maintenance
- Seal options

1.2 Useful Pump Formulas

Pressure (psi) = [Head (Feet)xSpecific Gravity]/2.31

Head (Feet) = [Pressure (psi)x2.31]/ Specific Gravity

Vacuum (Inches of Mercury) = Dynamic Suction Lift (Feet)x.833x Specific Gravity

Horsepower (Brake) = [GPMxHead (Feet)xSpecific Gravity]/[3960 x Pump Eff.]

Horsepower (water) = [GPMxHead (Feet)xSpecific Gravity]/3960

Efficiency (Pump) = [Horsepower (Water)/Horsepower (brake)] x 100%

NPSH (available) = Positive Factors - Negative Factors

1.3 Affinity Laws:

Effect of change of speed or impeller diameter on centrifugal pumps

	GPM Capacity	Ft. Head	BHP
Impeller Diameter Change	$Q_2 = (D_2/D_1)Q_1$	$H_2 = (D_2/D_1)^2H_1$	$P_2 = (D_2/D_1)^3P_1$
Speed Change	$Q_2 = (RPM_2/RPM_1)Q_1$	$H_2 = (RPM_2/RPM_1)^2H_1$	$P_2 = (RPM_2/RPM_1)^3P_1$

Where:

- Q = GPM
- H = Head
- P = BHP
- D = Impeller Diameter
- RPM = Pump Speed

2 Standard Pump Features

2.1 Computer Controlled Impeller Balancing

SCP (Split Case) Series impellers are balanced to HI/ANSI 1.1-1.5-1994 section 1.4.6.1.3.1, balance grade G6.3 standards. This method of computer balancing impellers provides for quiet, efficient, vibration free performance. Diameters are computer selected at the factory to furnish assurance that your capacity requirements will be met.

2.2 Heavy Duty, Rugged Baseplate

The Wilo fabricated heavy duty baseplate is supplied as standard on every SCP (Split Case) Series pump. Unlike rolled steel and "C" channel baseplates, the SCP (Split Case) Series baseplate provides a heavy duty saddle assembly, seam welds, closed baseplate ends and an open top to provide ease of access for proper equipment grouting. See Figure 1.

2.5 Solid-Foot Mounted Casing

All SCP (Split Case) Series pumps are provided as standard with an integrally cast volute feet located directly beneath the pump volute. This integrally cast feet ensure that the alignment between the volute and motor assembly is maintained. Without solid support beneath the volute, the piping weight alone will cause distortion which can lead to premature failure of the bearings, shaft and mechanical seal. This feature is equally important on hot water applications. The SCP (Split Case) Series volute foot provides a solid foundation and eliminates the deflections which would otherwise exist within an unsupported overhung volute during the normal thermal expansion of the system piping against the volute. See Figure 1.

2.6 ANSI/OSHA-Complaint Coupling Guard

The coupler guard complies with ANSI B15.1, Section 8 and OSHA 1910.219. The guard offers increased protection against potential injuries and is standard on all SCP (Split Case Suction) Series pumps. The guards include slotted viewing windows for easy inspection. See Figure 2.



Figure 1: Standard SCP Series pump mounted to a heavy duty, rugged baseplate with solid foot mounted casing



Figure 2: Coupling Guard

3 Technical Data

3.1 Balance Standards

Impellers are balanced to Hydraulic Institute Standards (ANSI/HI 1.1-1.5-1994), section 1.4.6.1.3.1 Refer to Figure 1.106.

The allowable residual unbalance in the impeller rotating assembly conforms to ANSI grade G6.3.

ANSI Balance Quality Grades of G2.5 and G1 for the rotating assembly are also available. Consult your local Wilo Representative for additional details.

3.2 Vibration Limits

SCP (Split Case) Series pumps conform to Hydraulic Institute ANSI/HI 1.1-1.5-1994, section 1.4.6.1.1 for recommended acceptable unfiltered field vibration limits (as measured at the pump bearings per H.I. 1.4.6.5.2, Refer to Figure 1.108.) for pumps with rolling contact bearings.

Pump Speed RPM	Overall Displacement (Unfiltered) Peak to Peak - Mils [.001" (.025mm)]
3600	2.2
1800	3.8
1200	5.8

3.3 Seismic Capabilities

SCP (Split Case) Series pumps are capable of withstanding a horizontal load of 0.5g* without adversely affecting pump operation.

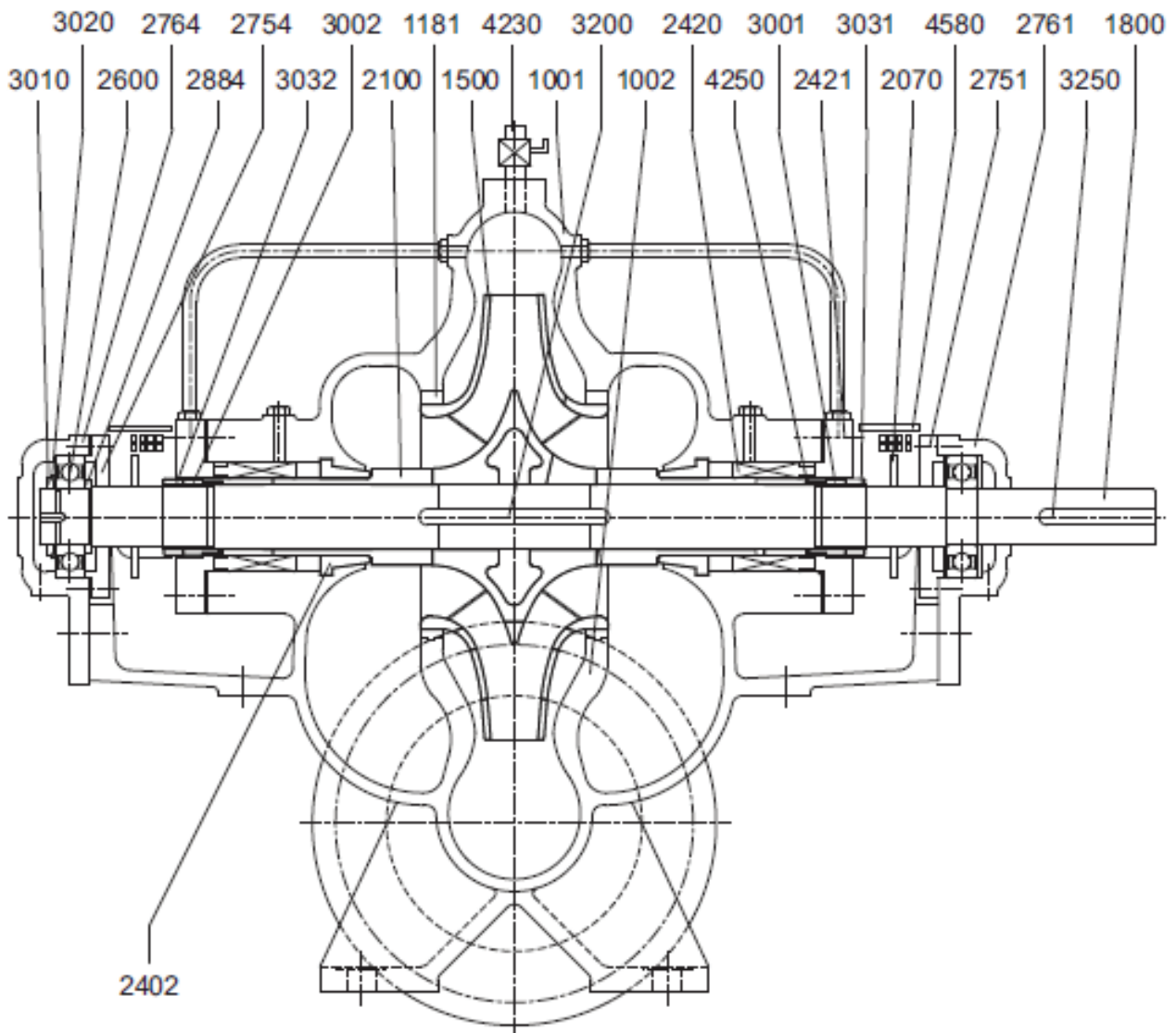
*Piping and/or fasteners used to anchor the pump to the mounting pads on the floor are excluded.

3.4 Mechanical Seal

Seal Features	
Standard Seal Type	Wilo
Externally Flushed Seal	Yes
Standard Seal Construction	Type MG1 - Q1Q1X4GG
Standard Working Pressure	175 psig (12 Bar)
Maximum Working Pressure	400 psig (27 Bar)
Standard Seal Temperature Rating	250 deg F [120 deg C]

4 Materials of Construction

4.1 Cross Section View of Standard SCP (Split Case) Series Pump



Item No.	Description	Cast Iron, Bronze Fitted Pump (Standard Construction)
1001	CASING TOP HALF 1	CAST IRON (ASTM A48 CLASS 35)
1002	CASING LOWER HALF 1	CAST IRON (ASTM A48 CLASS 35)
	CASING JOINT GASKET (SUCTION)	NON ASBESTOS PAPER
	CASING JOINT GASKET (DISCHARGE)	NON ASBESTOS PAPER
1181	NECK RING	BRONZE (ASTM B584 C93 700)
1500	IMPELLER 3	BRONZE (ASTM 584 C 83 600)
1800	SHAFT 2	STAINLESS STEEL (A 276 TYPE 410)
2070	WATER DEFLECTOR	RUBBER AND STEEL
2100	SHAFT SLEEVE	STAINLESS STEEL (A 276 TYPE 410)
2402	STUFFING BOX BUSH	CAST IRON (ASTM A48 CLASS 35)
2420	MECHANICAL SEAL (UNBALANCED) 0	FACE COMBINATION C VS SiC (CODE AQ1EGG)
2421	GLAND PLATE COVER (MECHANICAL SEAL COVER)	STAINLESS STEEL (A 276 TYPE 316)
2600	BEARING (DRIVE END) BALL	STEEL
2601	BEARING (NON-DRIVE END) BALL	STEEL
2751	BEARING END COVER (DRIVE END)	CAST IRON (ASTM A48 CLASS 35)
2754	BEARING END COVER (NON-DRIVE END)	CAST IRON (ASTM A48 CLASS 35)
2761	BEARING HOUSING (DRIVE END)	CAST IRON (ASTM A48 CLASS 35)
2764	BEARING HOUSING (NON-DRIVE END)	CAST IRON (ASTM A48 CLASS 35)
2884	THRUST COLLAR	EN8
3001	COWL NUT (L.H.)	STAINLESS STEEL (A 276 TYPE 410)
3002	COWL NUT (R.H.)	STAINLESS STEEL (A 276 TYPE 410)
3010	LOCK NUT	STEEL
3020	LOCKING WASHER	STEEL
3031	SHAFT SLEEVE NUT (L.H.)	STAINLESS STEEL (A 276 TYPE 410)
3032	SHAFT SLEEVE NUT (R.H.)	STAINLESS STEEL (A 276 TYPE 410)
3031	SLEEVE NUT (L.H.)	STAINLESS STEEL (A 276 TYPE 410)
3032	SLEEVE NUT (R.H.)	STAINLESS STEEL (A 276 TYPE 410)
3200	IMPELLER KEY	STEEL
3250	COUPLING KEY	STEEL
4230	AIR VENT COCK	STAINLESS STEEL (A 276 TYPE 304)
4250	O-RING	RUBBER (EPDM)
4580	SHAFT GUARD	ALUMINUM PERFORATED

- 0** – Optional modifications available, if specified at extra cost.
1 – For 276 psi (19 Bar) and 400 (27 Bar) working pressures, casing material is ni-resist cast iron (BS 3468 GR2) or ductile iron (BS 2789500.7)
2 – Optional shaft material: stainless steel (BS 970 316 S 316)
3 – Optional impeller material: cast iron (ASTM A 48 class 35), stainless steel (BS 3100 316 C16), Bronze (BS 1400 LG2)

4.2 Standard Pump Construction

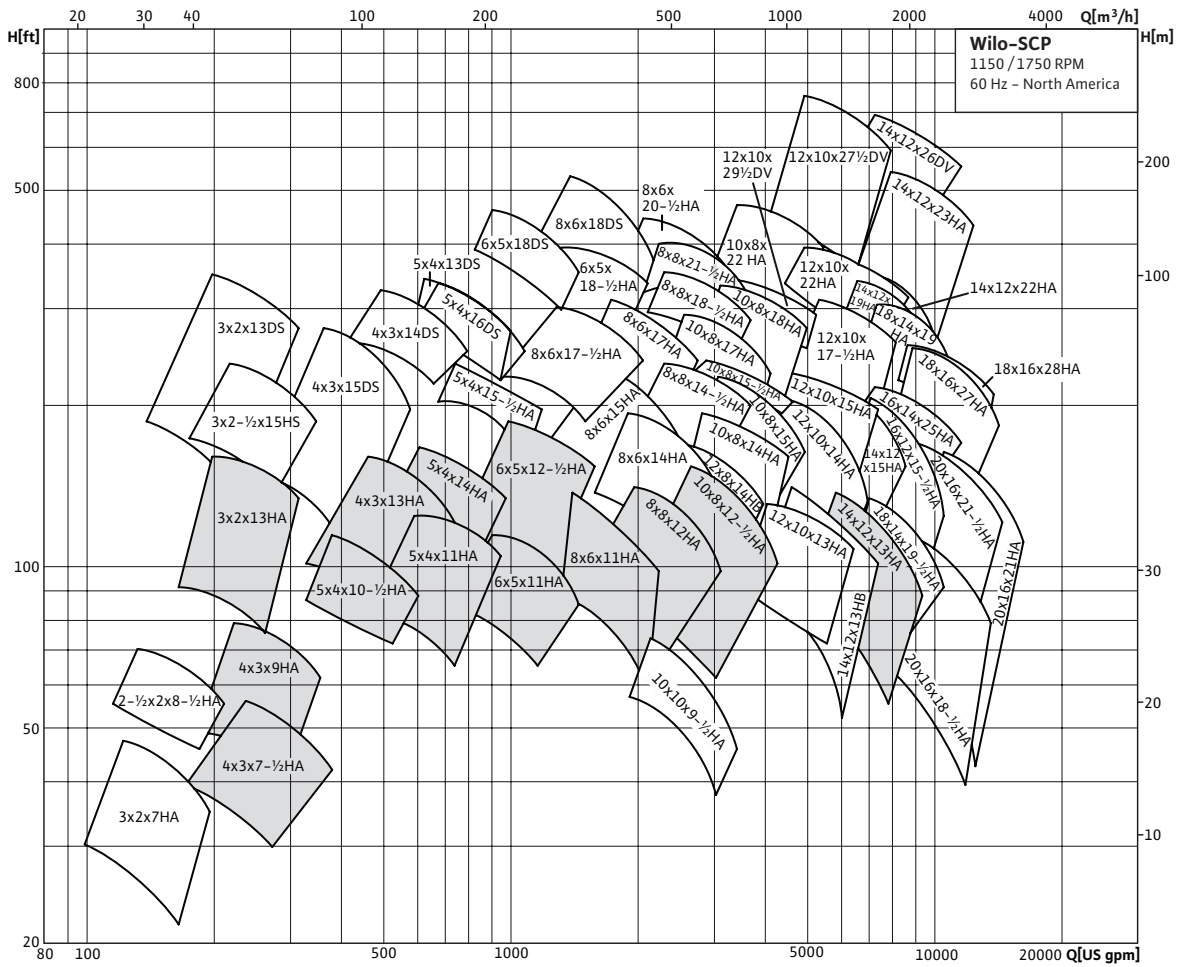
- 175 psig (12 Bar) Maximum Working Pressure
- 150 psig (10 Bar) Maximum Suction / Inlet Pressure
- 125 # FF ANSI Flange (ANSI A21.10, AWWA C110 and ANSI B16.1 Class 125)
- Type MG1 Mechanical Seal, EPDM/Carbon/SiC, 232 psig (16 Bar) Maximum Suction Pressure from -20 to 250 °F [-28 to 121 °C]

4.3 Optional Pump Construction

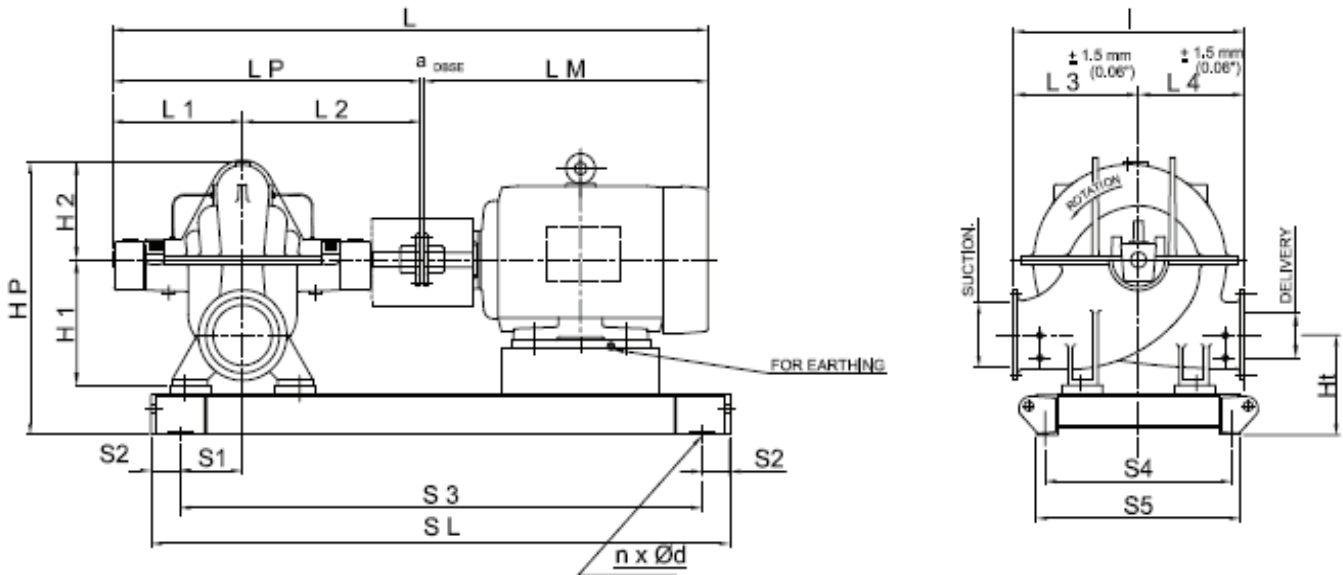
- 400 psig (27 Bar) Maximum Working Pressure
- 145 psig (10 Bar) Maximum Suction / Inlet Pressure
- 250 # FF ANSI Flange (ANSI B16.1 Class 250)

5 60 Cycle Performance Curves

Pump Model/Size	RPM	Pump Model/Size	RPM
SCP 2-1/2 X 2 X 8-1/2 HA	1750	SCP 10 X 8 X 15 HA	1750
SCP 3 X 2 X 7 HA	1750	SCP 10 X 8 X 17 HA	1750
SCP 3 X 2 X 13 HA	1750	SCP 10 X 8 X 15-1/2 HA	1750
SCP 3 X 2 X 13 DS	1750	SCP 10 X 8 X 18 HA	1750
SCP 3 X 2-1/2 X 15 HS	1750	SCP 8 X 8 X 21-1/2 HA	1750
SCP 4 X 3 X 9 HA	1750	SCP 8 X 8 X 18-1/2 HA	1750
SCP 4 X 3 X 7-1/2 HA	1750	SCP 10 X 8 X 22 HA	1750
SCP 4 X 3 X 15 DS	1750	SCP 10 X 10 X 9-1/2 HA	1750
SCP 4 X 3 X 13 HA	1750	SCP 12 X 10 X 13 HA	1750
SCP 4 X 3 X 14 DS	1750	SCP 12 X 10 X 15 HA	1750
SCP 5 X 4 X 10-1/2 HA	1750	SCP 12 X 10 X 14 HA	1750
SCP 5 X 4 X 11 HA	1750	SCP 12 X 10 X 17-1/2 HA	1750
SCP 5 X 4 X 14 HA	1750	SCP 12 X 10 X 22 HA	1750
SCP 5 X 4 X 15-1/2 HA	1750	SCP 12 X 10 X 27-1/2 HA	1120
SCP 5 X 4 X 13 DS	1750	SCP 12 X 10 X 29-1/2 DV	1120
SCP 5 X 4 X 16 DS	1750	SCP 14 X 12 X 13 HA	1750
SCP 6 X 5 X 11 HA	1750	SCP 14 X 12 X 13 HB	1750
SCP 6 X 5 X 12-1/2 HA	1750	SCP 14 X 12 X 15 HA	1750
SCP 6 X 5 X 18-1/2 HA	1750	SCP 16 X 12 X 15-1/2 HA	1750
SCP 6 X 5 X 18 DS	1750	SCP 14 X 12 X 19 HA	1750
SCP 8 X 6 X 11 HA	1750	SCP 14 X 12 X 23 HA	1750
SCP 8 X 6 X 15 HA	1750	SCP 14 X 12 X 22 HA	1750
SCP 8 X 6 X 14 HA	1750	SCP 14 X 12 X 26 DV	1750
SCP 8 X 6 X 17-1/2 HA	1750	SCP 18 X 14 X 19-1/2 HA	1120
SCP 8 X 6 X 17 HA	1750	SCP 18 X 14 X 19 HA	1750
SCP 8 X 6 X 20-1/2 HA	1750	SCP 16 X 14 X 25 HA	1120
SCP 8 X 6 X 18 DS	1750	SCP 20 X 16 X 21 HA	1120
SCP 8 X 8 X 12 HA	1750	SCP 20 X 16 X 18-1/2 HA	1120
SCP 10 X 8 X 12-1/2 HA	1750	SCP 20 X 16 X 21-1/2 HA	1120
SCP 10 X 8 X 14 HA	1750	SCP 18 X 16 X 28 HA	1120
SCP 8 X 8 X 14-1/2 HA	1750	SCP 18 X 16 X 27 HA	1120
SCP 12 X 8 X 14 HB	1750	Denotes Stock Pump	



6 Dimensions, 1750 RPM



- Standard: 125 # FF ANSI Flange (ANSI A21.10, AWWA C110 and ANSI B16.1 Class 125)
- Optional: 250 # FF ANSI Flange (ANSI B16.1 Class 250)
- Dimensions are subject to change.
- Not to be used for construction purposes unless certified.
- * Motor Dimensions are approximate for "T" frames.
- Vary by manufacturer and motor type.
- "a" = .50 [13mm]
- Dimensions in inches [mm]

Pump Size	Motor Frame	H1	H2	HP	Ht	I	L1	L2	L3	L4	LP	S1	S2	n x Ød	L*	LM*	S3	SL	S4	S5	
SCP 3x2x13 HA	182-184													4 x .93 [23.5]	44.69 [1135]	16.56 [421]	26.44 [672]	34.44 [875]	10.25 [260]	11.88 [302]	
	213-215	9.81 [249]	8.38 [213]	22.88 [581]	6.94 [176]	18.88 [479]	12.50 [318]	15.19 [386]	10.25 [260]	8.56 [217]	27.63 [702]	1.31 [33]	4.00 [102]		46.00 [1168]	17.88 [454]	29.38 [746]	37.38 [949]	10.31 [262]		
	254-256														51.31 [1303]	23.19 [589]	33.94 [862]	41.94 [1065]	12.31 [313]		13.88 [352]
SCP 4 x3x7 1/2 HA	182-184	9.81 [249]	6.13 [156]	20.63 [524]	9.19 [233]	16.31 [414]	13.06 [332]	15.69 [398]	8.88 [225]	7.50 [191]	28.75 [730]	1.31 [33]	4.00 [102]	4 x .93 [23.5]	45.81 [1164]	16.56 [421]	27.00 [686]	35.00 [889]	10.25 [260]	11.88 [302]	
	213														47.13 [1197]	17.88 [454]	29.88 [759]	37.88 [962]	10.31 [262]		
SCP 4 x3x9 HA	182-184	9.81 [249]	6.5 [165]	21.00 [533]	8.75 [222]	16.31 [414]	13.63 [346]	15.69 [398]	8.88 [225]	7.50 [191]	29.38 [746]	1.31 [33]	4.00 [102]	4 x .93 [23.5]	46.38 [1178]	16.56 [421]	27.00 [686]	35.00 [889]	10.25 [260]	11.88 [302]	
	213														48.88 [1242]	19.00 [483]	29.88 [759]	37.88 [962]	10.31 [262]		
SCP 4 x3x13 HA	215													4 x .93 [23.5]	48.88 [1242]	19.00 [483]	29.88 [759]	37.88 [962]	10.31 [262]	11.88 [302]	
	254-256	11.81 [300]	8.88 [225]	25.31 [643]	8.56 [217]	19.88 [505]	13.63 [346]	15.69 [398]	10.81 [275]	9.06 [230]	29.38 [746]	1.31 [33]	4.00 [102]		53.00 [1346]	23.19 [589]	34.50 [876]	42.50 [1080]	12.31 [313]		13.88 [353]
	284-286														55.81 [1418]	25.94 [659]	36.81 [935]	44.81 [1138]	13.56 [344]		15.13 [384]
SCP 5x4x10 1/2 HA	215													4 x .93 [23.5]	48.88 [1242]	19.00 [483]	32.88 [835]	40.88 [1038]	12.31 [313]	14.19 [360]	
	254-256	10.63 [270]	7.81 [198]	23.00 [584]	8.69 [221]	20.25 [514]	13.63 [346]	15.69 [398]	11.25 [286]	9.06 [230]	29.38 [746]	4.25 [108]	4.00 [102]		50.94 [1294]	21.06 [535]	35.75 [908]	43.75 [1111]	12.31 [313]		13.88 [353]
	284-286														55.81 [1418]	25.94 [659]	39.75 [1010]	47.75 [1213]	13.56 [344]		15.13 [384]
SCP 5x4x11 HA	215													4 x .93 [23.5]	48.88 [1242]	19.00 [483]	32.88 [835]	40.88 [1038]	12.31 [313]	14.19 [360]	
	254-256	10.63 [270]	7.5 [191]	22.75 [578]	8.38 [213]	21.63 [549]	13.63 [346]	15.69 [398]	11.81 [300]	9.81 [249]	29.38 [746]	4.25 [108]	4.00 [102]		53.00 [1346]	23.19 [589]	37.50 [953]	45.50 [1156]	12.31 [313]		14.19 [360]
	284-286														55.81 [1418]	25.94 [689]	39.75 [1010]	47.75 [1213]	13.56 [344]		15.13 [384]
	324														60.25 [1530]	30.38 [771]	33.69 [856]	41.69 [1059]	15.31 [389]		16.88 [429]
SCP 5x4x14 HA	256													4 x .93 [23.5]	53.00 [1346]	23.19 [589]	37.50 [953]	45.50 [1156]	13.56 [344]	15.00 [381]	
	284-286	12.63 [321]	9.63 [245]	26.88 [683]	8.38 [213]	24.63 [626]	13.63 [346]	15.69 [398]	13.75 [349]	10.81 [275]	29.38 [746]	4.25 [108]	4.00 [102]		55.81 [1418]	25.94 [689]	39.75 [1010]	47.75 [1213]	13.56 [344]		15.13 [384]
	324-326														60.25 [1530]	30.38 [771]	42.00 [1067]	50.00 [1270]	15.31 [389]		16.88 [429]
SCP 6x5x12 1/2 HA	286													4 x 1.08 [27.5]	60.06 [1526]	25.94 [689]	42.13 [1070]	50.13 [1273]	12.81 [325]	15.13 [384]	
	324-326	12.63 [321]	9.44 [240]	27.69 [703]	9.88 [251]	25.06 [637]	15.63 [367]	18.06 [459]	13.75 [349]	11.25 [286]	33.63 [854]	4.25 [108]	4.00 [102]		64.50 [1638]	30.38 [771]	44.31 [1126]	52.31 [1329]	14.56 [370]		16.88 [429]
	364-365														67.13 [1705]	33.00 [838]	45.94 [1167]	53.94 [1370]	16.56 [421]		18.88 [479]
	404-405														71.38 [1813]	37.25 [946]	49.88 [1267]	57.88 [1470]	18.94 [481]		21.25 [540]
SCP 6x5x11 HA	256													4 x 1.08 [27.5]	57.31 [1456]	23.19 [589]	39.81 [1011]	47.81 [1214]	12.63 [321]	15.00 [381]	
	284-286	12.63 [321]	9.63 [245]	27.69 [703]	9.88 [251]	24.63 [626]	15.63 [367]	18.06 [459]	13.75 [349]	10.81 [275]	33.63 [854]	4.25 [108]	4.00 [102]		60.06 [1526]	25.94 [689]	42.13 [1070]	50.13 [1273]	12.81 [325]		15.13 [384]
	324-326														64.25 [1632]	30.38 [771]	44.31 [1126]	52.31 [1329]	14.56 [370]		16.88 [429]
SCP 8x6x11 HA	326													4 x 1.08 [27.5]	64.50 [1638]	30.38 [771]	43.88 [1115]	51.88 [1318]	15.19 [386]	17.56 [446]	
	364-365	14.94 [379]	10.06 [256]	30.63 [779]	11.94 [303]	24.19 [614]	15.63 [367]	18.06 [459]	13.75 [349]	10.44 [265]	33.63 [854]	3.88 [99]	4.00 [102]		67.13 [1705]	33.00 [838]	45.50 [1156]	53.50 [1359]	16.56 [421]		18.88 [479]
	404-405														71.38 [1813]	37.25 [946]	49.50 [1257]	57.50 [1461]	18.94 [481]		21.25 [540]
SCP 8x8x12 HA	326													4 x 1.08 [27.5]	65.75 [1670]	30.38 [771]	46.88 [1191]	54.88 [1394]	17.38 [442]	19.75 [502]	
	364-365	13.50 [343]	10.63 [270]	29.94 [760]	10.38 [264]	28.50 [724]	16.19 [411]	18.69 [475]	16.00 [406]	12.50 [318]	34.81 [884]	6.25 [159]	4.00 [102]		68.38 [1737]	33.00 [838]	48.50 [1232]	59.50 [1435]	17.38 [442]		19.75 [502]
	404-405														72.56 [1843]	37.25 [946]	52.50 [1334]	60.50 [1537]	18.94 [481]		21.25 [540]
	444														79.56 [2021]	44.25 [1124]	57.75 [1467]	65.75 [1670]	21.81 [554]		24.13 [613]

Pump Size	Mtr. Frame	H1	H2	HP	Ht	I	L1	L2	L3	L4	LP	S1	S2	n x Ød	L*	LM*	S3	SL	S4	S5
SCP 10x8x12 1/2 HA	364-365													4 x 1.08 [27.5]	68.38 [1737]	33.00 [838]	48.50 [1232]	56.50 [1435]	17.38 [442]	19.75 [502]
	404-405	16.75 [425]	11.44 [291]	33.94 [862]	12.75 [324]	29.50 [749]	16.19 [411]	18.69 [475]	17.00 [432]	12.50 [318]	34.81 [884]	6.25 [159]	4.00 [102]		72.56 [1843]	37.25 [946]	52.50 [1334]	60.50 [1537]	18.94 [481]	21.25 [540]
	444-445														79.56 [2021]	44.25 [1124]	57.75 [1467]	65.75 [1670]	21.81 [554]	24.13 [613]
SCP 12x10 x13 HA	405													6 x 1.08 [27.5]	90.31 [2294]	44.25 [1124]	59.63 [1515]	67.63 [1718]	18.56 [471]	20.88 [531]
	444-445	18.25 [464]	13.00 [330]	37.00 [940]	13.25 [337]	33.25 [845]	21.50 [546]	24.13 [613]	20.00 [508]	13.25 [337]	45.56 [1157]	8.19 [208]	4.00 [102]		90.31 [2294]	44.25 [1124]	65.19 [1656]	73.19 [1859]	21.81 [554]	24.13 [613]
	447														93.50 [2375]	47.75 [1213]	69.38 [1762]	77.38 [1965]	21.81 [554]	24.13 [613]
SCP 14x12x13 HA	445	21.50 [546]	15.38 [391]	42.63 [1083]	14.81 [376]	37.63 [956]	19.88 [505]	24.13 [613]	22.25 [565]	15.38 [391]	44.00 [1118]	8.19 [208]	4.00 [102]	6 x 1.08 [27.5]	88.75 [2254]	44.25 [1124]	65.19 [1656]	73.19 [1859]	23.88 [606]	26.19 [665]
															97.63 [2480]	53.38 [1356]	73.75 [1873]	81.75 [2076]	23.88 [606]	26.19 [665]

7 Typical Specifications for Double Suction SCP (Split Case) Series Base Mounted, Flexible Coupled Pumps

7.1 Manufacturer

Contractor shall furnish and install new double suction horizontal split case pumps for chilled water and hot water heating systems as indicated on the drawings.

Pumps shall be model SCP (SPlit Case) as manufactured by Wilo under base bid. Equivalent units may be submitted as deduct alternates. Pumps shall meet types, sizes, capacities, and characteristics as scheduled on the Equipment Schedule drawings.

7.2 Double Suction, Horizontal Split Case Pump (Base Mounted)

1. The pumps shall be long coupled, base mounted, single stage, double suction, horizontally split case design, in cast iron bronze fitted construction specifically designed and guaranteed for quiet operation. Suitable standard operations at 225°F (107°C) and 175 psig (12 BAR) working pressure or optional operations at up to 250°F (121°C) and 400 psig (27 BAR) working pressures. Working pressures shall not be de-rated at temperatures up to 250°F (121°C). The pump internals shall be capable of being serviced without disturbing piping connections or electrical motor connections.

2. A bearing housing shall supply support for a pair of heavy-duty ball bearings. A drive-end (inboard) single row bearing will absorb thermal expansive forces while an outboard double row bearing will be clamped in place to absorb both radial and thrust loads and keep the rotating element in proper axial alignment. Bearings shall be replaceable without disturbing the system piping and shall be replaceable without removal of the bearings from the bearing housing.

3. The pump shaft shall be a solid 410 stainless steel shaft.

4. Pump shall be equipped with a pair of externally flushed mechanical seal assemblies in direct contact with the pump shaft. Seal assemblies shall be a Type MG1 having a stainless steel housing, EPDM bellows and seat gasket, stainless steel spring, and be of against a stationary ceramic face.

5. Impeller shall be of the enclosed double suction type made of bronze, both hydraulically and dynamically 1.4.6.1.3.1, figure 1.106, balance grade G6.3 keyed to the shaft and fixed in the axial position.

6. A center drop-out type coupling, capable of absorbing torsional vibration, shall be employed between the the coupler sleeve should be constructed of an EPDM (considered special) or Hytrel material to maximize performance life.

7. The coupling shall be shielded by a dual rated ANSI B15.1, Section 8 and OSHA 1910.219 compliant coupling guard and contain viewing windows for inspection of the coupling.

8. Pump volute shall be of a cast iron (rated for 232 psig [16 BAR] Max Working Pressure) or ductile iron (rated for 400 psig [27 BAR] Max Working Pressure) axially-split design with flanges (175 psig [12 BAR] drilled for 125# ANSI companion flanges or optional 400 psig [27 BAR] working pressures are drilled 250# flange drilled) and mounting feet integral cast into the bottom half of the casing. Suction and discharge flanges shall be on a common centerline in both the horizontal and vertical planes, and the volute shall include Bronze Neck Wear Rings, priming port, gauge ports at nozzles, and vent and drain ports. The upper half casing shall be capable of being removed without disturbing piping connections or electrical motor connections.

9. Pump seal flushing lines shall be mounted on the upper half pump casing. Sealing from an external source shall be possible for lubrication and/or cooling.

10. Motors shall meet scheduled horsepower, speed, voltage, and enclosure design. Pump and motors shall be factory aligned, and shall be realigned after installation by the manufacturer's representative. Motors shall be non-overloading at any point on the pump curve and shall meet NEMA specifications and conform to the standards outlined in EPACT 92.

11. Base plate shall be of structural steel or fabricated steel channel with fully enclosed sides and ends, and securely welded cross members. Grouting area shall be fully open. The combined pump and motor base plate shall be sufficiently stiff as to limit the susceptibility of vibration. The minimum base plate stiffness shall conform to ANSI/HI 1.3.4-1997 for Horizontal Baseplate Design standards. Base shall be capable of being field grouted.

13. The pump(s) selected shall conform to ANSI/HI 9.6.3.1 standards for Preferred Operating Region (POR) unless otherwise approved by the engineer. The pump NPSH shall conform to the ANSI/HI 9.6.1-1997 standards for Centrifugal and Vertical Pumps for NPSH Margin.

14. Pump rotation shall be clockwise or counter-clockwise as viewed from the coupling end.

15. Pump manufacturer shall be ISO-9001 certified.

16. The seismic capability of the pump shall allow it to withstand a horizontal load of 0.5g, excluding piping and/or fasteners used to anchor the pump to mounting pads or to the floor, without adversely affecting pump operation (Wilo does not guarantee seismic capability).

17. Each pump shall be factory hydrostatically tested per Hydraulic Institute standards and name-plated before shipment. It shall then be thoroughly cleaned and painted with at least one coat of high-grade paint prior to shipment.

18. Pumps shall be SCP (Split Case) Series as manufactured by Wilo USA LLC or approved equal.

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