

Helix Technologies Pty Ltd

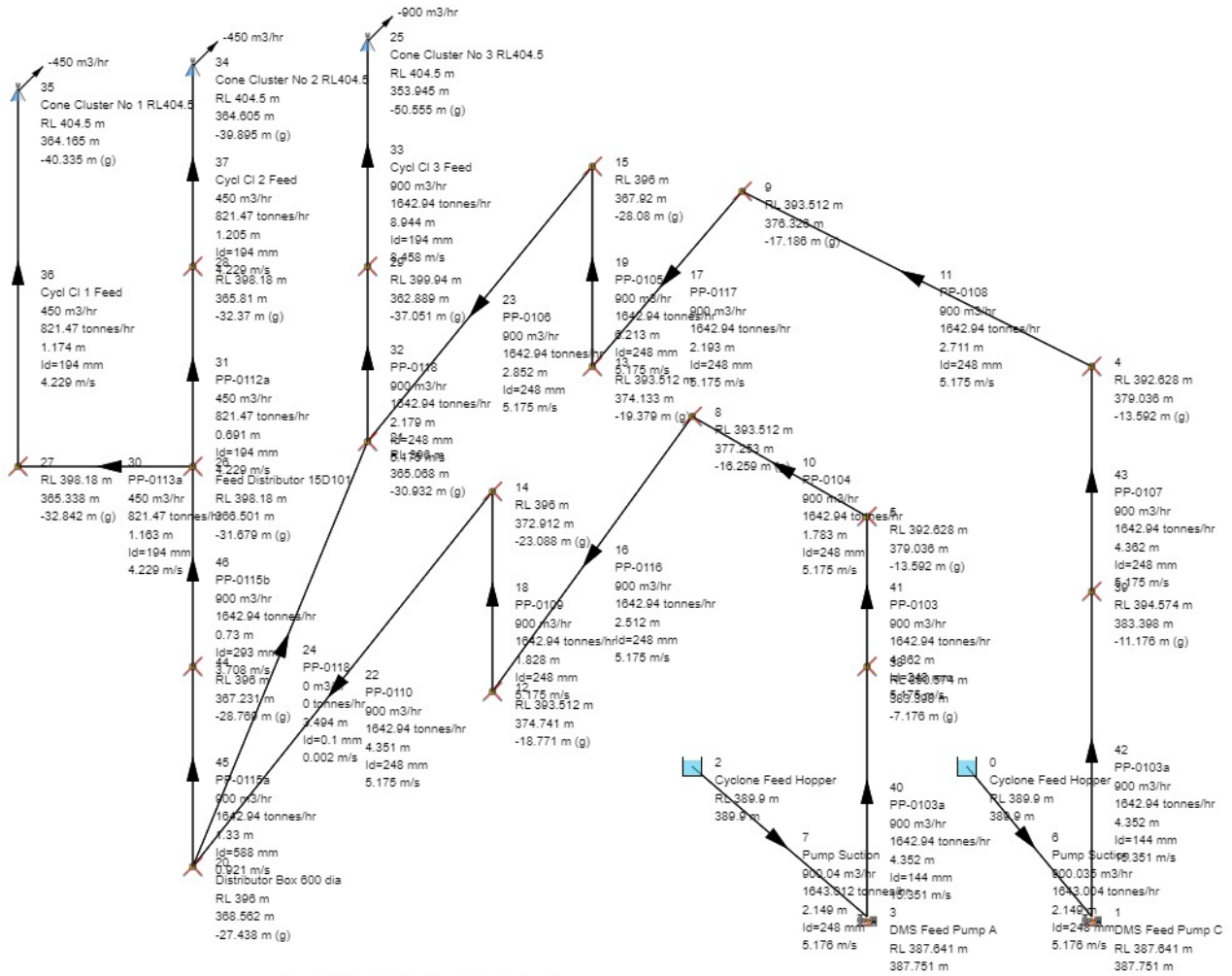
Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Network Type	Liquid	Calc. Method	Darcy
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		

Pipe no 24 blocked / Removed. Slurry changed to Sm=2.5 (Cw = 73%). Pump Speeds / heads adjusted to site 730m³/hr feed to 1 and 2 and 420m³/hr to cyclone cluster no 3. Flow units changed to m³/hr.

Click on System curve tab in reports section and press the Draw Curve button to see the system curve.

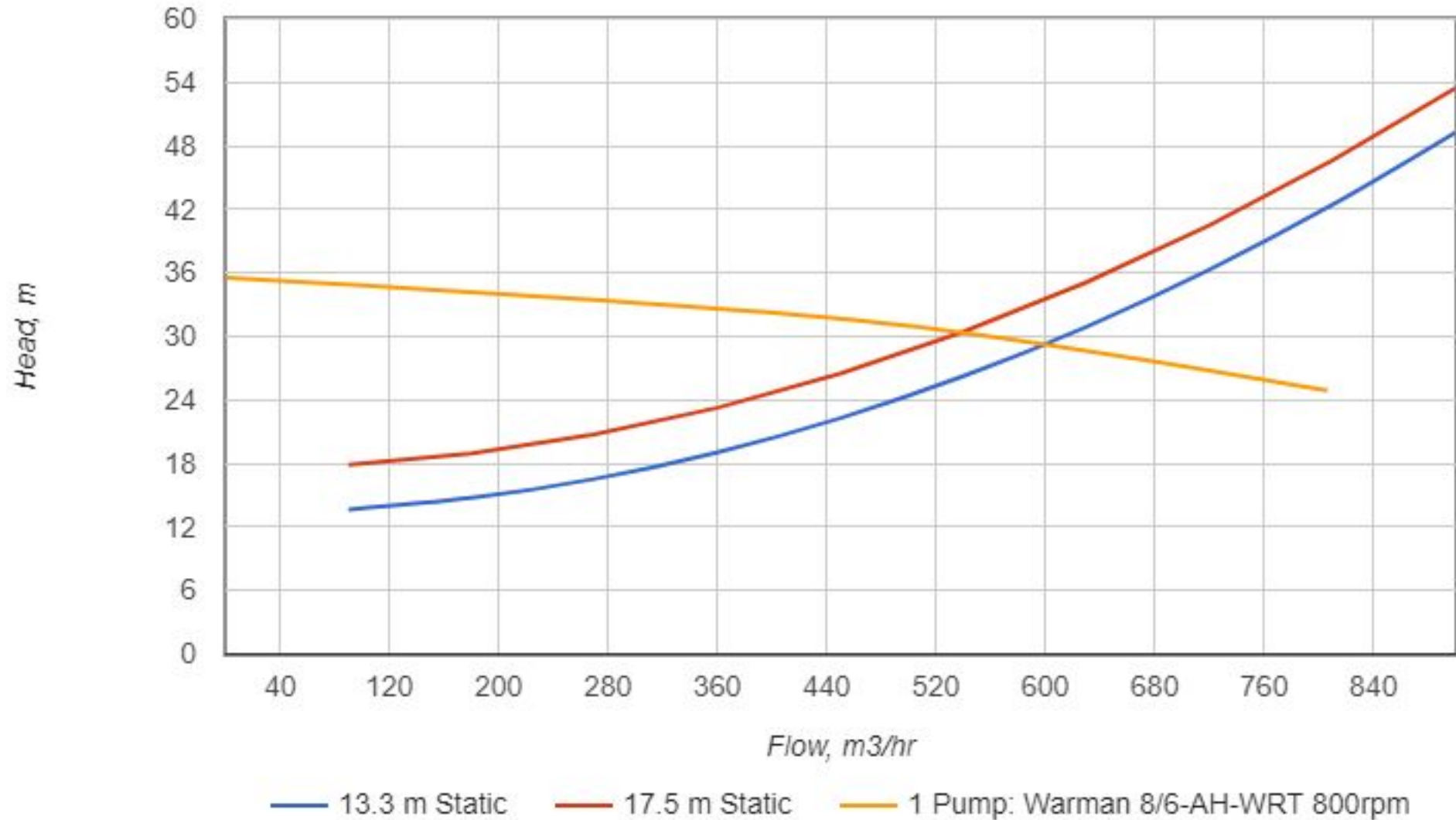
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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		



Demo DMS Cyclone Feed Case 03 cluster 3 system curve

Pump 017C to Cluster no. 3
System Curve Pipe No's 6,42,43,11,17,19,23,32,33



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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	6	From node to node	0 - 1
Description	Pump Suction	Equipment No	PP-0102
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1643.004 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.527 m/s
Settling Flow Rate	439.385 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	250 mm	Inside Diameter	248 mm
Outside Diameter	273 mm	Pipe Length	2.4 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Entrance - flush		1	0.2
Gate Valve		1	0.2
Reducer - long taper		1	0.04
Exit - Rounded		1	1
Total Fittings k	1.44	Total Fittings kf	0
Flow Rate	900.035 m3/hr	Velocity	5.176 m/s
Friction Loss	0.183 m	Fitting Losses	1.967 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	2.149 m	Total Pressure Drop	52.709 kPa
Entry Total Head	389.9 m	Exit Total Head	387.751 m
Entry Gauge Head	0 m	Exit Gauge Head	0.11 m
Reynolds No.	3209750.736	Friction Factor	0.013814 (Darcy f)

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	7	From node to node	2 - 3
Description	Pump Suction	Equipment No	PP-0102
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1643.012 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.527 m/s
Settling Flow Rate	439.385 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	250 mm	Inside Diameter	248 mm
Outside Diameter	273 mm	Pipe Length	2.4 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Entrance - flush		1	0.2
Gate Valve		1	0.2
Reducer - long taper		1	0.04
Exit - Rounded		1	1
Total Fittings k	1.44	Total Fittings kf	0
Flow Rate	900.04 m3/hr	Velocity	5.176 m/s
Friction Loss	0.183 m	Fitting Losses	1.967 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	2.149 m	Total Pressure Drop	52.709 kPa
Entry Total Head	389.9 m	Exit Total Head	387.751 m
Entry Gauge Head	0 m	Exit Gauge Head	0.11 m
Reynolds No.	3209766.89	Friction Factor	0.013814 (Darcy f)

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	10	From node to node	5 - 8
Description	PP-0104	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.527 m/s
Settling Flow Rate	439.385 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	250 mm	Inside Diameter	248 mm
Outside Diameter	273 mm	Pipe Length	6.2 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Bend - 90 degree elbow r/d = 8		2	0.48
			Kft value
			24
Total Fittings k	0.96	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	5.175 m/s
Friction Loss	0.472 m	Fitting Losses	1.311 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	1.783 m	Total Pressure Drop	43.721 kPa
Entry Total Head	379.036 m	Exit Total Head	377.253 m
Entry Gauge Head	-13.592 m	Exit Gauge Head	-16.259 m
Reynolds No.	3209625.676	Friction Factor	0.013814 (Darcy f)

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	11	From node to node	4 - 9
Description	PP-0108	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.527 m/s
Settling Flow Rate	439.385 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	250 mm	Inside Diameter	248 mm
Outside Diameter	273 mm	Pipe Length	8.7 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Bend - 90 degree elbow r/d = 8		2	0.48
Gate Valve		1	0.2
Bend - 20 degree elbow r/d = 6		1	0.34
Total Fittings k	1.5	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	5.175 m/s
Friction Loss	0.662 m	Fitting Losses	2.048 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	2.711 m	Total Pressure Drop	66.472 kPa
Entry Total Head	379.036 m	Exit Total Head	376.326 m
Entry Gauge Head	-13.592 m	Exit Gauge Head	-17.186 m
Reynolds No.	3209625.675	Friction Factor	0.013814 (Darcy f)

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	16	From node to node	8 - 12
Description	PP-0116	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.527 m/s
Settling Flow Rate	439.385 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	250 mm	Inside Diameter	248 mm
Outside Diameter	273 mm	Pipe Length	12.2 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Bend - 45 degree elbow r/d = 6		2	0.34
Bend - 90 degree elbow r/d = 8		1	0.48
			Kft value
			17
			24
Total Fittings k	1.16	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	5.175 m/s
Friction Loss	0.928 m	Fitting Losses	1.584 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	2.512 m	Total Pressure Drop	61.613 kPa
Entry Total Head	377.253 m	Exit Total Head	374.741 m
Entry Gauge Head	-16.259 m	Exit Gauge Head	-18.771 m
Reynolds No.	3209625.676	Friction Factor	0.013814 (Darcy f)

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	17	From node to node	9 - 13
Description	PP-0117	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.527 m/s
Settling Flow Rate	439.385 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	250 mm	Inside Diameter	248 mm
Outside Diameter	273 mm	Pipe Length	8 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Bend - 45 degree elbow r/d = 6		2	0.34
Bend - 90 degree elbow r/d = 8		1	0.48
			Kft value
			17
			24
Total Fittings k	1.16	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	5.175 m/s
Friction Loss	0.609 m	Fitting Losses	1.584 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	2.193 m	Total Pressure Drop	53.778 kPa
Entry Total Head	376.326 m	Exit Total Head	374.133 m
Entry Gauge Head	-17.186 m	Exit Gauge Head	-19.379 m
Reynolds No.	3209625.675	Friction Factor	0.013814 (Darcy f)

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	18	From node to node	12 - 14
Description	PP-0109	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.527 m/s
Settling Flow Rate	439.385 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	250 mm	Inside Diameter	248 mm
Outside Diameter	273 mm	Pipe Length	6.8 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Bend - 90 degree elbow r/d = 8		2	0.48
			Kft value
			24
Total Fittings k	0.96	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	5.175 m/s
Friction Loss	0.517 m	Fitting Losses	1.311 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	1.828 m	Total Pressure Drop	44.84 kPa
Entry Total Head	374.741 m	Exit Total Head	372.912 m
Entry Gauge Head	-18.771 m	Exit Gauge Head	-23.088 m
Reynolds No.	3209625.676	Friction Factor	0.013814 (Darcy f)

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	19	From node to node	13 - 15
Description	PP-0105	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid SI	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.527 m/s
Settling Flow Rate	439.385 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	250 mm	Inside Diameter	248 mm
Outside Diameter	273 mm	Pipe Length	13.8 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Bend - 90 degree elbow r/d = 8		3	0.48
Bend - 45 degree elbow r/d = 6		1	0.34
Tee - Line to Line		1	0.4
Magnetic Flow Meter Optiflux 4000		1	1.2
Density Meter		1	0.4
Total Fittings k	3.78	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	5.175 m/s
Friction Loss	1.05 m	Fitting Losses	5.162 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	6.213 m	Total Pressure Drop	152.352 kPa
Entry Total Head	374.133 m	Exit Total Head	367.92 m
Entry Gauge Head	-19.379 m	Exit Gauge Head	-28.08 m
Reynolds No.	3209625.675	Friction Factor	0.013814 (Darcy f)

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	22	From node to node	14 - 20
Description	PP-0110	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.527 m/s
Settling Flow Rate	439.385 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	250 mm	Inside Diameter	248 mm
Outside Diameter	273 mm	Pipe Length	15.9 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Bend - 45 degree elbow r/d = 8		2	0.48
Bend - 30 degree elbow r/d = 6		1	0.34
Exit - Sharp edged		1	1
			Kft value
			24
			17
			0
Total Fittings k	2.3	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	5.175 m/s
Friction Loss	1.21 m	Fitting Losses	3.141 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	4.351 m	Total Pressure Drop	106.699 kPa
Entry Total Head	372.912 m	Exit Total Head	368.562 m
Entry Gauge Head	-23.088 m	Exit Gauge Head	-27.438 m
Reynolds No.	3209625.676	Friction Factor	0.013814 (Darcy f)

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	23	From node to node	15 - 21
Description	PP-0106	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.527 m/s
Settling Flow Rate	439.385 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	250 mm	Inside Diameter	248 mm
Outside Diameter	273 mm	Pipe Length	12 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Bend - 45 degree elbow r/d = 8		1	0.48
Bend - 30 degree elbow r/d = 6		1	0.34
Gate Valve		1	0.2
Tee - Line to Line		1	0.4
Total Fittings k	1.42	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	5.175 m/s
Friction Loss	0.913 m	Fitting Losses	1.939 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	2.852 m	Total Pressure Drop	69.949 kPa
Entry Total Head	367.92 m	Exit Total Head	365.068 m
Entry Gauge Head	-28.08 m	Exit Gauge Head	-30.932 m
Reynolds No.	3209625.675	Friction Factor	0.013814 (Darcy f)

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	24	From node to node	21 - 20
Description	PP-0118	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	0 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	0.051 m/s
Settling Flow Rate	0 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined - Pipe Closed	Pipe Class	Sch 20
Nominal Diameter	250 mm	Inside Diameter	0.1 mm
Outside Diameter	273 mm	Pipe Length	3 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description	Qty	K value	Kft value
Bend - 30 degree elbow r/d = 6	1	0.34	17
Exit - Sharp edged	1	1	0
Gate Valve	1	0.2	8
Tee - Line to Branch	1	1.2	60
Total Fittings k	2.74	Total Fittings kf	0
Flow Rate	0 m3/hr	Velocity	0.002 m/s
Friction Loss	3.494 m	Fitting Losses	0 m
Slurry Losses	2.794 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	3.494 m	Total Pressure Drop	85.677 kPa
Entry Total Head	368.562 m	Exit Total Head	365.068 m
Entry Gauge Head	-30.932 m	Exit Gauge Head	-34.426 m
Reynolds No.	0.446	Friction Factor	143.413343 (Darcy f)

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	30	From node to node	26 - 27
Description	PP-0113a	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	821.47 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.235 m/s
Settling Flow Rate	237.805 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipes AS1836 Rubber lined	Pipe Class	Sch 20
Nominal Diameter	200 mm	Inside Diameter	194 mm
Outside Diameter	219 mm	Pipe Length	3.388 m
Pipe Roughness	0.045 mm	Allowable Press.	5560 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Entrance - flush		1	0.2
Bend - 90 degree elbow r/d = 8		1	0.48
Bend - 45 degree elbow r/d = 6		1	0.34
Total Fittings k	1.02	Total Fittings kf	0
Flow Rate	450 m3/hr	Velocity	4.229 m/s
Friction Loss	0.233 m	Fitting Losses	0.93 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	1.163 m	Total Pressure Drop	28.512 kPa
Entry Total Head	366.501 m	Exit Total Head	365.338 m
Entry Gauge Head	-31.679 m	Exit Gauge Head	-32.842 m
Reynolds No.	2051513.318	Friction Factor	0.014602 (Darcy f)

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	31	From node to node	26 - 28
Description	PP-0112a	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	821.47 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.235 m/s
Settling Flow Rate	237.805 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	200 mm	Inside Diameter	194 mm
Outside Diameter	219 mm	Pipe Length	1.035 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Bend - 90 degree elbow r/d = 8		1	0.48
Gate Valve		1	0.2
Total Fittings k	0.68	Total Fittings kf	0
Flow Rate	450 m3/hr	Velocity	4.229 m/s
Friction Loss	0.071 m	Fitting Losses	0.62 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.691 m	Total Pressure Drop	16.948 kPa
Entry Total Head	366.501 m	Exit Total Head	365.81 m
Entry Gauge Head	-31.679 m	Exit Gauge Head	-32.37 m
Reynolds No.	2051513.318	Friction Factor	0.014602 (Darcy f)

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	32	From node to node	21 - 29
Description	PP-0118	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.527 m/s
Settling Flow Rate	439.385 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	250 mm	Inside Diameter	248 mm
Outside Diameter	273 mm	Pipe Length	1.35 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Tee - Line to Branch		1	1.2
Gate Valve		1	0.2
Reducer - short taper		1	0.12
Total Fittings k	1.52	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	5.175 m/s
Friction Loss	0.103 m	Fitting Losses	2.076 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	2.179 m	Total Pressure Drop	53.429 kPa
Entry Total Head	365.068 m	Exit Total Head	362.889 m
Entry Gauge Head	-30.932 m	Exit Gauge Head	-37.051 m
Reynolds No.	3209625.676	Friction Factor	0.013814 (Darcy f)

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	33	From node to node	29 - 25
Description	Cycl CI 3 Feed	Equipment No	PP-0119 +0114
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.235 m/s
Settling Flow Rate	237.805 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	200 mm	Inside Diameter	194 mm
Outside Diameter	219 mm	Pipe Length	6.1 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Bend - 45 degree elbow r/d = 6		2	0.34
Bend - 39 degree elbow r/d = 6		1	0.32
Exit - Sharp edged		1	1
			Kft value
			17
			17
			0
Total Fittings k	2	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	8.458 m/s
Friction Loss	1.65 m	Fitting Losses	7.294 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	8.944 m	Total Pressure Drop	219.345 kPa
Entry Total Head	362.889 m	Exit Total Head	353.945 m
Entry Gauge Head	-37.051 m	Exit Gauge Head	-50.555 m
Reynolds No.	4103026.637	Friction Factor	0.014385 (Darcy f)

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	36	From node to node	27 - 35
Description	Cycl CI 1 Feed	Equipment No	PP-0113b
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid SI	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	821.47 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.235 m/s
Settling Flow Rate	237.805 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	200 mm	Inside Diameter	194 mm
Outside Diameter	219 mm	Pipe Length	3.812 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Exit - Sharp edged		1	1
			Kft value
			0
Total Fittings k	1	Total Fittings kf	0
Flow Rate	450 m3/hr	Velocity	4.229 m/s
Friction Loss	0.262 m	Fitting Losses	0.912 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	1.174 m	Total Pressure Drop	28.778 kPa
Entry Total Head	365.338 m	Exit Total Head	364.165 m
Entry Gauge Head	-32.842 m	Exit Gauge Head	-40.335 m
Reynolds No.	2051513.318	Friction Factor	0.014602 (Darcy f)

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	37	From node to node	28 - 34
Description	Cycl CI 2 Feed	Equipment No	PP-0112b
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid SI	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	821.47 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.235 m/s
Settling Flow Rate	237.805 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	200 mm	Inside Diameter	194 mm
Outside Diameter	219 mm	Pipe Length	4.265 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Exit - Sharp edged		1	1
			Kft value
			0
Total Fittings k	1	Total Fittings kf	0
Flow Rate	450 m3/hr	Velocity	4.229 m/s
Friction Loss	0.293 m	Fitting Losses	0.912 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	1.205 m	Total Pressure Drop	29.541 kPa
Entry Total Head	365.81 m	Exit Total Head	364.605 m
Entry Gauge Head	-32.37 m	Exit Gauge Head	-39.895 m
Reynolds No.	2051513.318	Friction Factor	0.014602 (Darcy f)

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	40	From node to node	3 - 38
Description	PP-0103a	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	1.925 m/s
Settling Flow Rate	112.881 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	150 mm	Inside Diameter	144 mm
Outside Diameter	168 mm	Pipe Length	0.4 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Entrance - flush		1	0.2
Reducer - short taper		1	0.12
			Kft value
			0
			6
Total Fittings k	0.32	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	15.351 m/s
Friction Loss	0.508 m	Fitting Losses	3.845 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	4.352 m	Total Pressure Drop	106.73 kPa
Entry Total Head	387.751 m	Exit Total Head	383.398 m
Entry Gauge Head	0.11 m	Exit Gauge Head	-7.176 m
Reynolds No.	5527688.664	Friction Factor	0.015205 (Darcy f)

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	41	From node to node	38 - 5
Description	PP-0103	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.527 m/s
Settling Flow Rate	439.385 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	250 mm	Inside Diameter	248 mm
Outside Diameter	273 mm	Pipe Length	2.044 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Bellow, Wier FSF		1	2
Gate Valve		1	0.2
Tee - Line to Line		1	0.4
Bend - 90 degree elbow r/d = 8		1	0.48
Total Fittings k	3.08	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	5.175 m/s
Friction Loss	0.156 m	Fitting Losses	4.206 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	4.362 m	Total Pressure Drop	106.974 kPa
Entry Total Head	383.398 m	Exit Total Head	379.036 m
Entry Gauge Head	-7.176 m	Exit Gauge Head	-13.592 m
Reynolds No.	3209625.676	Friction Factor	0.013814 (Darcy f)

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	42	From node to node	1 - 39
Description	PP-0103a	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	1.925 m/s
Settling Flow Rate	112.881 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	150 mm	Inside Diameter	144 mm
Outside Diameter	168 mm	Pipe Length	0.4 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Entrance - flush		1	0.2
Reducer - short taper		1	0.12
			Kft value
			0
			6
Total Fittings k	0.32	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	15.351 m/s
Friction Loss	0.508 m	Fitting Losses	3.845 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	4.352 m	Total Pressure Drop	106.73 kPa
Entry Total Head	387.751 m	Exit Total Head	383.398 m
Entry Gauge Head	0.11 m	Exit Gauge Head	-11.176 m
Reynolds No.	5527688.663	Friction Factor	0.015205 (Darcy f)

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	43	From node to node	39 - 4
Description	PP-0107	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.527 m/s
Settling Flow Rate	439.385 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	250 mm	Inside Diameter	248 mm
Outside Diameter	273 mm	Pipe Length	2.044 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Bellow, Wier FSF		1	2
Gate Valve		1	0.2
Tee - Line to Line		1	0.4
Bend - 90 degree elbow r/d = 8		1	0.48
Total Fittings k	3.08	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	5.175 m/s
Friction Loss	0.156 m	Fitting Losses	4.206 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	4.362 m	Total Pressure Drop	106.974 kPa
Entry Total Head	383.398 m	Exit Total Head	379.036 m
Entry Gauge Head	-11.176 m	Exit Gauge Head	-13.592 m
Reynolds No.	3209625.675	Friction Factor	0.013814 (Darcy f)

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	45	From node to node	20 - 44
Description	PP-0115a	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid SI	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	3.891 m/s
Settling Flow Rate	3803.288 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipe rubber lined	Pipe Class	Sch 20
Nominal Diameter	600 mm	Inside Diameter	588 mm
Outside Diameter	619 mm	Pipe Length	1 m
Pipe Roughness	0.045 mm	Allowable Press.	4440 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Entrance - flush		2	0.2
Reducer - short taper		1	0.12
Tee - Line to Branch		4	1.2
Sudden Enlargement - 1:2		1	0.6
Total Fittings k	5.92	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	0.921 m/s
Friction Loss	1.074 m	Fitting Losses	0.256 m
Slurry Losses	1.073 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	1.33 m	Total Pressure Drop	32.62 kPa
Entry Total Head	368.562 m	Exit Total Head	367.231 m
Entry Gauge Head	-27.438 m	Exit Gauge Head	-28.769 m
Reynolds No.	1353719.673	Friction Factor	0.012736 (Darcy f)

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Pipe No	46	From node to node	44 - 26
Description	PP-0115b	Equipment No	
Slurry Type	Settling Slurry		
Slurry Description	Lithium Spodumene Slurry	Slurry Reference	
SG Carrier Liquid Sl	1	Liquid Viscosity	1 cP
SG of Dry Solids	5.62	SG of Mixture	2.501
Conc. by Mass Cw	73 % w/w	Concentration by Vol	2.501 % v/v
Solids Flow Rate	1642.94 tonnes/hr	Particle Size d50	0.03 mm
Grading	Closely Graded		
Durand co-eff. FI	0.533	Settling Velocity VI	2.746 m/s
Settling Flow Rate	666.63 m3/hr		
Pump Wear Factor Pw	1	Pump Head Ratio HR	0.886
Pipe Description	Steel Pipes AS1836 Rubber lined	Pipe Class	
Nominal Diameter	300 mm	Inside Diameter	293 mm
Outside Diameter	324 mm	Pipe Length	0.911 m
Pipe Roughness	0.045 mm	Allowable Press.	5590 kPa
Orifice Plate Dia	-	Non Return Valve	No
Pipe Fitting Description		Qty	K value
Sudden Enlargement - 1:5		1	1
			Kft value
			50
Total Fittings k	1	Total Fittings kf	0
Flow Rate	900 m3/hr	Velocity	3.708 m/s
Friction Loss	0.029 m	Fitting Losses	0.701 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.73 m	Total Pressure Drop	17.912 kPa
Entry Total Head	367.231 m	Exit Total Head	366.501 m
Entry Gauge Head	-28.769 m	Exit Gauge Head	-31.679 m
Reynolds No.	2716679.753	Friction Factor	0.013485 (Darcy f)

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	0	Node Type	Tank
Description	Cyclone Feed Hopper	Equipment No	17HOP13
Rel. Level (RL)	389.9 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	389.9 m		

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	1	Node Type	Pump
Description	DMS Feed Pump C	Equipment No	PP-017C
Rel. Level (RL)	387.641 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	387.751 m		
Pump Head	0 m	Pump Flow Rate	900.035 m3/hr
Pump / Fan Efficiency	71.1 %	Pump Absorbed Power	0 kW
Casing Pressure	2.689 kPa		
Pump NPSH required	2.82 m	Pump NPSH available	3.967 m

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	2	Node Type	Tank
Description	Cyclone Feed Hopper	Equipment No	17HOP13
Rel. Level (RL)	389.9 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	389.9 m		

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	3	Node Type	Pump
Description	DMS Feed Pump A	Equipment No	PP-017A
Rel. Level (RL)	387.641 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	387.751 m		
Pump Head	0 m	Pump Flow Rate	900.04 m3/hr
Pump / Fan Efficiency	71.1 %	Pump Absorbed Power	0 kW
Casing Pressure	2.689 kPa		
Pump NPSH required	2.82 m	Pump NPSH available	3.967 m

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Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	4	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	392.628 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-13.592 m	Int.(Gauge) Pressure	-333.313 kPa
Total Node Head	379.036 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		

Node No	5	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	392.628 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-13.592 m	Int.(Gauge) Pressure	-333.313 kPa
Total Node Head	379.036 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	8	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	393.512 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-16.259 m	Int.(Gauge) Pressure	-398.712 kPa
Total Node Head	377.253 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	9	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	393.512 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-17.186 m	Int.(Gauge) Pressure	-421.463 kPa
Total Node Head	376.326 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	12	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	393.512 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-18.771 m	Int.(Gauge) Pressure	-460.326 kPa
Total Node Head	374.741 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	13	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	393.512 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-19.379 m	Int.(Gauge) Pressure	-475.241 kPa
Total Node Head	374.133 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	14	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	396 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-23.088 m	Int.(Gauge) Pressure	-566.18 kPa
Total Node Head	372.912 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	15	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	396 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-28.08 m	Int.(Gauge) Pressure	-688.607 kPa
Total Node Head	367.92 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	20	Node Type	Junction
Description	Distributor Box 600 dia	Equipment No	
Rel. Level (RL)	396 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-27.438 m	Int.(Gauge) Pressure	-672.879 kPa
Total Node Head	368.562 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	21	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	396 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-30.932 m	Int.(Gauge) Pressure	-758.555 kPa
Total Node Head	365.068 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		

Node No	25	Node Type	Nozzle
Description	Cone Cluster No 3 RL404.5	Equipment No	15CY03
Rel. Level (RL)	404.5 m	Pressure Input	0 kPa
Nozzle K value	0	Ext Flow (+In/-Out)	-900 m3/hr
Int.(Gauge) Head	-50.555 m	Int.(Gauge) Pressure	-1239.776 kPa
Total Node Head	353.945 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		

Node No	26	Node Type	Junction
Description	Feed Distributor 15D101	Equipment No	
Rel. Level (RL)	398.18 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-31.679 m	Int.(Gauge) Pressure	-776.872 kPa
Total Node Head	366.501 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	27	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	398.18 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-32.842 m	Int.(Gauge) Pressure	-805.384 kPa
Total Node Head	365.338 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		

Node No	28	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	398.18 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-32.37 m	Int.(Gauge) Pressure	-793.82 kPa
Total Node Head	365.81 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	29	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	399.94 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-37.051 m	Int.(Gauge) Pressure	-908.606 kPa
Total Node Head	362.889 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		

Node No	34	Node Type	Nozzle
Description	Cone Cluster No 2 RL404.5	Equipment No	15CY02
Rel. Level (RL)	404.5 m	Pressure Input	0 kPa
Nozzle K value	0	Ext Flow (+In/-Out)	-450 m3/hr
Int.(Gauge) Head	-39.895 m	Int.(Gauge) Pressure	-978.347 kPa
Total Node Head	364.605 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	35	Node Type	Nozzle
Description	Cone Cluster No 1 RL404.5	Equipment No	15CY01
Rel. Level (RL)	404.5 m	Pressure Input	0 kPa
Nozzle K value	0	Ext Flow (+In/-Out)	-450 m ³ /hr
Int.(Gauge) Head	-40.335 m	Int.(Gauge) Pressure	-989.148 kPa
Total Node Head	364.165 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		

Node No	38	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	390.574 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-7.176 m	Int.(Gauge) Pressure	-175.968 kPa
Total Node Head	383.398 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	39	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	394.574 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-11.176 m	Int.(Gauge) Pressure	-274.061 kPa
Total Node Head	383.398 m		

Helix Technologies Pty Ltd

Project	Demo Project	Client	ABC Mining Pty Ltd
Project No.	4567	Design Date	29/11/2016
Category	Demo Pump System Curve	Atmos. Press	96.923 kPa
Description	Demo DMS Cyclone Feed Case 03 cluster 3 system curve		
Node No	44	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	396 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-28.769 m	Int.(Gauge) Pressure	-705.499 kPa
Total Node Head	367.231 m		