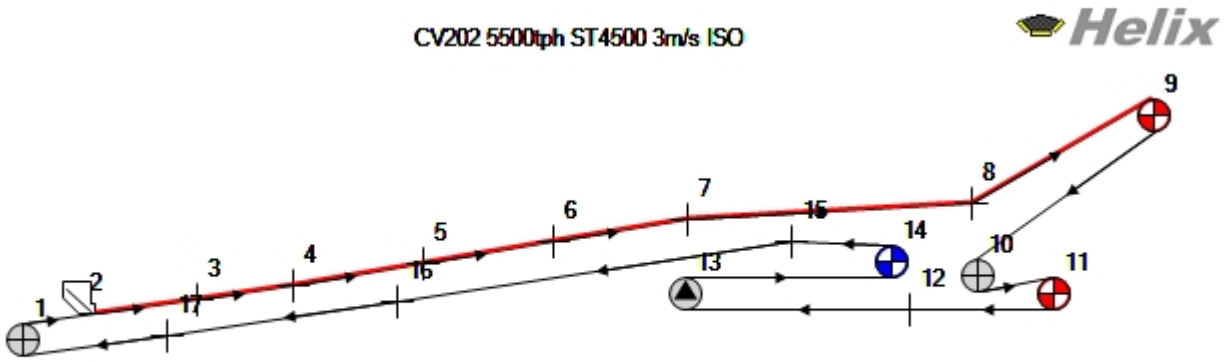
Conveyor Design Summary

Helix Technologies Pty Ltd

Project	ABC Iron Ore Mine	Client	ABC Mining Ltd
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



Conveyed Material					
Material Description	*Iron ore*		Surcharge Angle	*20*	deg
Low Bulk Density	*1750*	kg/m3	Angle of Repose	*30*	deg
High Bulk Density	*2200*	kg/m3	Material Lump size	*256*	mm
Conveyor Data					
Conveying Distance	**6210.14**	m	Design Capacity	*5500*	tonnes/hr
Nett Lift / Lower (-)	**17.60**	m	Belt Speed	*3*	m/s
Belt Details					
Belt Width Selected	*1800*	mm	Calculated Belt % Full	**74.2**	%
Belt Class & Run Safety Factor	*ST4500*	**6.88**	Top Cover Thickness	*10*	mm
Belt Rated Tension	*675*	kN/m	Bottom Cover Thickness	*8*	mm
Belt Total Length	**12552.2**	m	Belt Mass	**98.93**	kg/m
Belt Tensions and Power Calculations ISO					
Effective Tens. Fully Loaded	**919.92**	kN	Belt Power - Empty Belt	**811.79**	kW
Maximum Tension Tmax	**1177.26**	kN	Belt Power - Inclines Loaded	**2905.63**	kW
Minimum Tension Tmin	**210.84**	kN	Belt Power - Declines Loaded	**850.81**	kW
Sag Tension **2** %	**46.6**	kN	Belt Power - Fully Loaded	**2759.77**	kW
Takeup Type	*Horizontal Gravity*		Drive Efficiency	*95.0*	%
Takeup Mass	*43000*	kg	Absorbed Power Fully Loaded	**2905.04**	kW
Takeup Pulley Belt Tension	*210.84*	kN	Installed Motor Power	**3000**	kW
Carry and Return Idlers					
Carry Idler Trough Angle	*35*	°	Return Idler Trough Angle	*10*	°
Carry Idler Spacing	*1.25*	m	Return Idler Spacing	*5.244*	m
Carry Idler No Rolls x Dia	*3 x 178*	mm	Return Idler No Rolls x Dia	*2 x 178*	mm
Dynamics and Miscellaneous Data					
Startup Factor - Fully Loaded	*106*	%	CEMA Temperature Factor Kt	*1.00*	
Startup Factor - Empty	*34*	%	Total Braking Torque LSS	**70.00**	kNm
Starting Time - Fully Loaded	*150.44*	sec	Stop Time - Loaded, Braking	*19.44*	sec
Starting Time - Empty	*159.74*	sec	Stop Time - Loaded, Coasting	*21.76*	sec

Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

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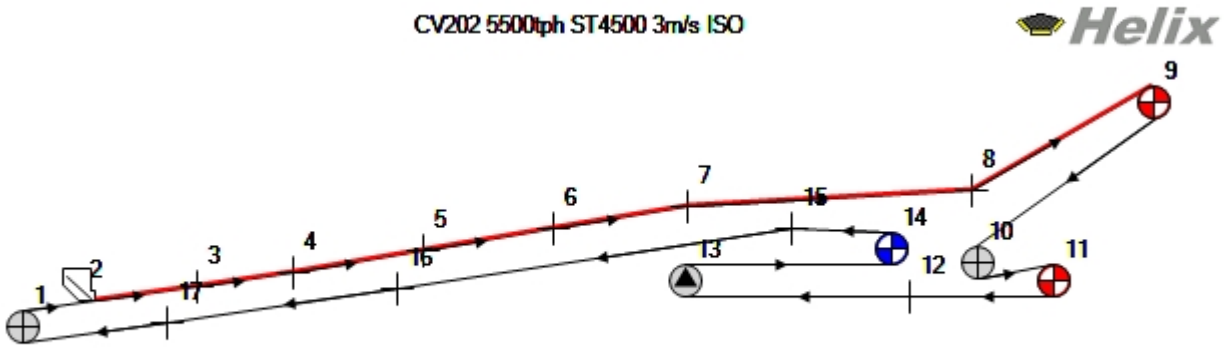

Station / Sectio Station	Description	Section Length m	Section Lift m	X co-ord m	Y co-ord m	Z co-ord m	Cap-acity tph	Ten Adj. kN	Idler Spacing m	Skirt Length m	No. of Scrapers	Friction Factor Input
1 Tail	Tail	4.00	-0.03	0.00	0.00	425.70	0		1.25			0.0000
2 Hopper	Hopper	10.00	0.00	4.00	0.00	426.30	5500		0.40	14.00		0.0000
3 Int. Pt		286.00	1.00	14.00	0.00	426.30	5500		1.25			0.0000
4 Int. Pt	CH300	700.00	1.00	300.00	0.00	427.30	5500		1.25			0.0000
5 Int. Pt	CH1000	2000.00	3.00	1000.00	0.00	428.30	5500		1.25			0.0000
6 Int. Pt	CH3000	1700.00	3.00	3000.00	0.00	431.30	5500		1.25			0.0000
7 Int. Pt	CH4700	1300.00	0.00	4700.00	0.00	434.30	5500		1.25			0.0000
8 Int. Pt	CH6000 IP	214.13	9.60	6000.00	0.00	434.30	5500		1.25			0.0000
9 Drive	Primary Drive	64.66	-7.69	6214.00	0.00	443.10	0		5.00		3	0.0000
10 Snub	Snub	4.84	0.90	6150.00	0.00	434.00	0		5.00			0.0000
11 Drive	Sec Drive	30.01	-0.70	6155.00	0.00	433.50	0		5.00			0.0000
12 Int. Pt		35.01	-0.63	6125.00	0.00	432.00	0		5.00			0.0000
13 Takeup	Takeup	50.37	6.05	6090.00	0.00	432.00	0		5.00			0.0000
14 Brake	Brake	140.16	-6.63	6140.00	0.00	439.30	0		5.00			0.0000
15 Int. Pt	Brake T2	1300.00	0.00	6000.00	0.00	433.30	0		5.00			0.0000
16 Int. Pt	CH4700 rtn	3700.01	-6.00	4700.00	0.00	433.30	0		5.00			0.0000
17 Int. Pt	CH1000 rtn	1000.00	-2.23	1000.00	0.00	427.30	0		5.00		2	0.0000
Totals:		**12539.18**	**0.66**					**0.00**		**14.00**	**5**	

Designers Comments

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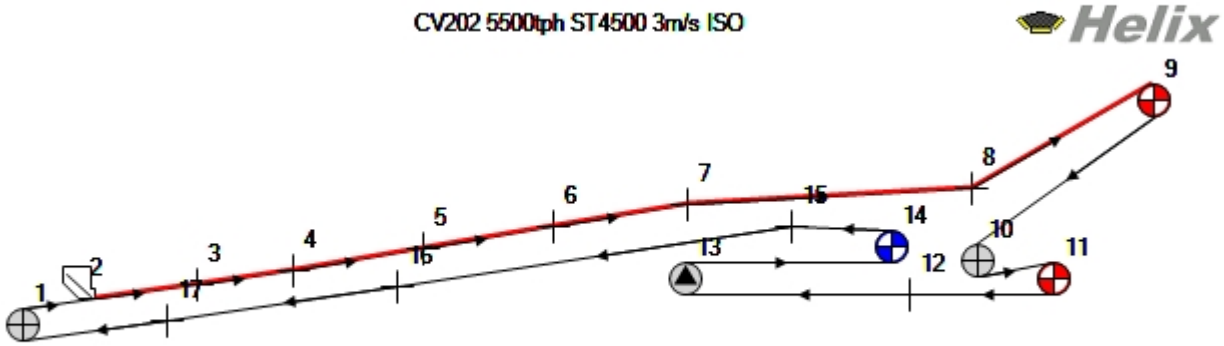

Drive Torque Start-up Factor Loaded	**106**	%		
Drive Torque Start-up Factor Empty	**34**	%	Takeup Mass	**43000** kg

Drive Number		Running		Starting		Braking	
		Fully Loaded	Empty Belt	Fully Loaded	Empty Belt	Fully Loaded	Empty Belt
Drive No.	**1 Drive**						
Pulley No. **9**	Lagging Type		**Ceramic**		**Ceramic**		**Ceramic**
Wrap Angle	°	**178**	**178**	**178**	**178**	**178**	**178**
Co-efficient of Friction		**0.35**	**0.35**	**0.45**	**0.45**	**0.45**	**0.45**
Drive Factor Cw		**0.509**	**0.509**	**0.328**	**0.328**	**0.328**	**0.328**
Calculated Belt Tension T1	*kN*	**1119.31**	**476.3**	**1214.12**	**506.19**	**495.49**	**413.66**
Calculated Belt Tension T2	*kN*	**510.09**	**298.48**	**575.17**	**318.12**	**316.96**	**286.75**
Minimum Required T2	*kN*	**310.09**	**90.51**	**209.58**	**61.69**	**58.56**	**41.63**
Surplus T2 Tension (T1-T2)	*kN*	**200**	**207.97**	**365.59**	**256.43**	**258.4**	**245.12**
Drive No.	**2 Drive**						
Pulley No. **11**	Lagging Type		**Ceramic**		**Ceramic**		**Ceramic**
Wrap Angle	°	**190**	**190**	**190**	**190**	**190**	**190**
Co-efficient of Friction		**0.35**	**0.35**	**0.45**	**0.45**	**0.45**	**0.45**
Drive Factor Cw		**0.456**	**0.456**	**0.29**	**0.29**	**0.29**	**0.29**
Calculated Belt Tension T1	*kN*	**511.34**	**297.93**	**576.62**	**317.77**	**316.62**	**285.08**
Calculated Belt Tension T2	*kN*	**211**	**211**	**256.85**	**224.39**	**226.76**	**222.07**
Minimum Required T2	*kN*	**136.96**	**39.64**	**92.73**	**27.08**	**26.06**	**18.27**
Surplus T2 Tension (T1-T2)	*kN*	**74.04**	**171.36**	**164.12**	**197.31**	**200.7**	**203.8**
Drive No.	**3 Brake**						
Pulley No. **14**	Lagging Type		**Rubber**		**Rubber**		**Rubber**
Wrap Angle	°	**180**	**180**	**180**	**180**	**180**	**180**
Co-efficient of Friction		**0.25**	**0.25**	**0.35**	**0.35**	**0.35**	**0.35**
Drive Factor Cw		**0.838**	**0.838**	**0.499**	**0.499**	**0.499**	**0.499**
Calculated Belt Tension T1	*kN*	**219.54**	**219.54**	**219.69**	**219.68**	**218.32**	**218.68**
Calculated Belt Tension T2	*kN*	**221.57**	**221.57**	**221.77**	**221.76**	**329.91**	**330.38**
Minimum Required T2	*kN*	**1.7**	**1.7**	**1.04**	**1.04**	**55.68**	**55.74**
Surplus T2 Tension (T1-T2)	*kN*	**217.84**	**217.84**	**218.65**	**218.64**	**162.64**	**162.94**

Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Tension Calculations - Summary Run / Start

Helix Technologies Pty Ltd

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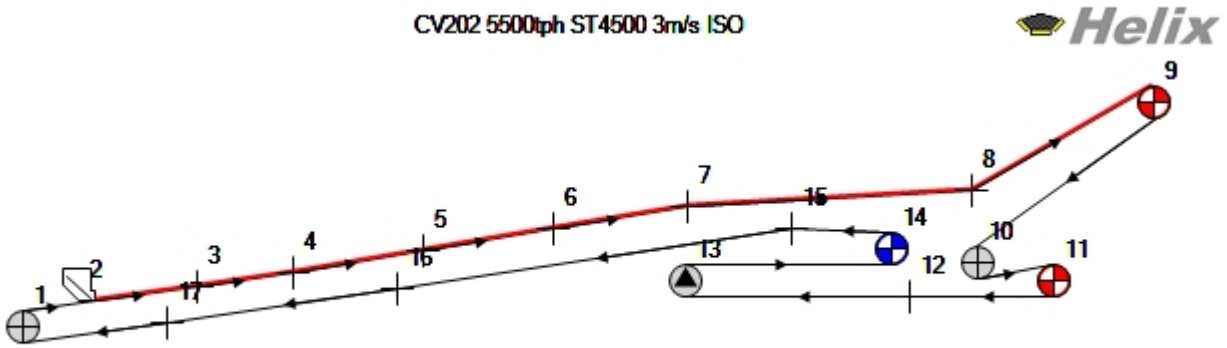
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



Drive Torque Start-up Factor Loaded	106	%
Drive Torque Start-up Factor Empty	106	%
Takeup Mass	43000	kg

Station No	Running				Starting		Braking		Coasting	
	Fully Loaded Tension kN	Empty Tension kN	Inclines Loaded Tension kN	Declines Loaded Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN
1 Tail	314.38	314.38	314.38	314.38	328.03	327.24	318.64	350.09	220.03	261.63
2 Hopper	317.31	317.31	317.31	317.31	331.02	330.22	321.12	352.70	222.55	264.32
3 Int. Pt	331.55	317.69	331.55	330.75	345.41	330.64	334.20	352.81	235.75	264.51
4 Int. Pt	372.17	325.19	372.29	338.25	389.76	338.93	345.92	355.80	250.55	268.81
5 Int. Pt	461.95	342.14	463.20	355.20	488.68	357.79	364.97	361.71	277.15	277.91
6 Int. Pt	714.01	390.71	722.43	403.77	766.86	411.82	414.95	378.75	348.70	304.05
7 Int. Pt	906.55	432.43	942.73	445.49	981.59	458.19	435.72	393.66	387.80	326.71
8 Int. Pt	1040.10	462.11	1095.19	475.17	1132.11	491.42	437.92	402.84	404.01	341.81
9 Drive	1119.31	476.30	1177.26	489.36	1214.12	506.19	495.49	413.66	463.90	353.60
10 Snub	505.87	294.26	525.58	298.57	571.09	314.04	311.61	281.73	299.94	259.56
11 Drive	511.34	297.93	529.25	302.24	576.62	317.77	316.62	285.08	305.00	263.00
12 Int. Pt	210.84	210.84	210.84	210.84	256.76	224.30	226.05	221.52	224.43	218.44
13 Takeup	210.84	210.84	210.84	210.84	210.84	210.84	210.84	210.84	210.84	210.84
14 Brake	219.54	219.54	219.54	219.54	219.69	219.68	218.32	218.68	218.45	218.93
15 Int. Pt	217.56	217.56	217.56	217.56	218.07	218.04	323.50	324.68	214.03	215.59
16 Int. Pt	239.96	239.96	239.96	239.96	243.32	243.13	323.87	331.61	216.75	226.99
17 Int. Pt	297.89	297.89	297.89	297.89	309.35	308.69	319.10	345.50	218.67	253.60
Minimum Ten	**210.84**	**210.84**	**210.84**	**210.84**	**210.84**	**210.84**	**210.84**	**210.84**	**210.84**	**210.84**
Maximum Ten	**1119.31**	**476.30**	**1177.26**	**489.36**	**1214.12**	**506.19**	**495.49**	**413.66**	**463.90**	**353.60**
Effective Ten	**919.92**	**270.60**	**968.54**	**283.60**						
Ave. Belt Ten	**489.21**	**328.41**	**498.84**	**334.89**	**520.02**	**342.37**	**362.26**	**356.98**	**278.97**	**271.64**
Belt Elong. m	**6.063**	**2.602**	**6.27**	**2.742**	**6.726**	**2.903**	**3.331**	**3.217**	**1.538**	**1.38**
T/up Travel m	**3.032**	**1.301**	**3.135**	**1.371**	**3.363**	**1.452**	**1.666**	**1.608**	**0.769**	**0.69**

Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low

Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Belt Details Report

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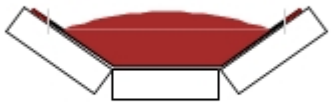
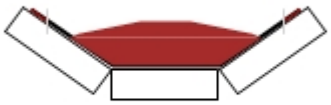


Low BD = 1750kg/m3



High BD = 2200kg/m3

Conveyed Material

Material Description	*Iron ore*	
Low Bulk Density	*1750*	kg/m3
High Bulk Density	*2200*	kg/m3
Surcharge Angle	*20*	deg
Angle of Repose	*30*	deg
Material Lump size	*256*	mm

Belt Make & Class

Belt Category	*Fenner Dunlop*	
Belt Description	*Fenner Dunlop*	
Belt Class / Plies	*ST4500*	*0*
Belt Reinforcement Fibre	*Steel*	
Belt Width Selected	*1800*	mm
Belt Modulus	*324000*	kN/m
Cord Diameter	*10.4*	mm
Cord Pitch	*19.4*	mm
Number of Cords	*0*	

Belt Tensions

Belt Rated Tension / m width	*675*	kN/m
Calculated Tension / m width	**654**	kN/m
Belt Rated Tension for width	*1215*	kN
Calculated Max Run Tension	**1177.26**	kN
Minimum Tension Tmin	**210.84**	kN
Allowable Tension Rise, Starting	*150*	%
Allowable Belt Tension, Starting	**1822.5**	kN
Actual Belt Tension, Starting	**1214.12**	kN

Belt and Material Mass

Belt Top Cover Mass	**20.3**	kg/m
Belt Bottom Cover Mass	**16.3**	kg/m
Belt Carcass Mass	**62.3**	kg/m
Belt Mass Wb (per linear m)	**98.9**	kg/m
Material Mass Wm	**509.3**	kg/m
Total Mass (Wb + Wm)	**608.2**	kg/m
Total Belt Mass (Wb x L)	**1241788**	kg

Belt Speed & Capacity

Belt Speed	*3*	m/s
Belt Design Capacity Input	*5500*	tonnes/hr
Section Loading Max Capacity	*5500*	tonnes/hr
Carry Idler Trough Angle	*35*	°

Belt Dimensions

Top Cover Thickness	*10*	mm
Bottom Cover Thickness	*8*	mm
Belt Carcass Thickness	*10.4*	mm
Belt Total Thickness	**28.4**	mm
Belt Total Belt Length (L)	**12552.2**	m
Time for 1 Revolution	**4184.1**	sec

Belt Load Area and Capacity at 1750kg/m3

Minimum Rec. Edge Distance	**122**	mm
Actual Edge Distance Low BD	**215**	mm
Load Burden Depth	**290**	mm
Load Burden Width	**1137**	mm
Belt Load Area at Minimum Recommended Edge Distance	**0.3922**	m2
Belt Load Area Utilised at Low Bulk Density	**0.291**	m2
Belt Actual % Full at Low BD	**74.2**	%

Belt Load Area and Capacity at 2200kg/m3

Minimum Rec. Edge Distance	**122**	mm
Actual Edge Distance High BD	**280**	mm
Belt Load Area Utilised at High Bulk Density	**0.2315**	m2
Belt Actual % Full at High BD	**59**	%

Flooded Belt Capacity at 2200kg/m3

Flooded Belt Load Area at Zero Edge Distance	**0.525**	m2
Flooded Belt Capacity	**12474**	tonnes/hr
Flooded Belt Material Mass	**1155**	kg/m

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Tension Calculations - Summary Belt Sag

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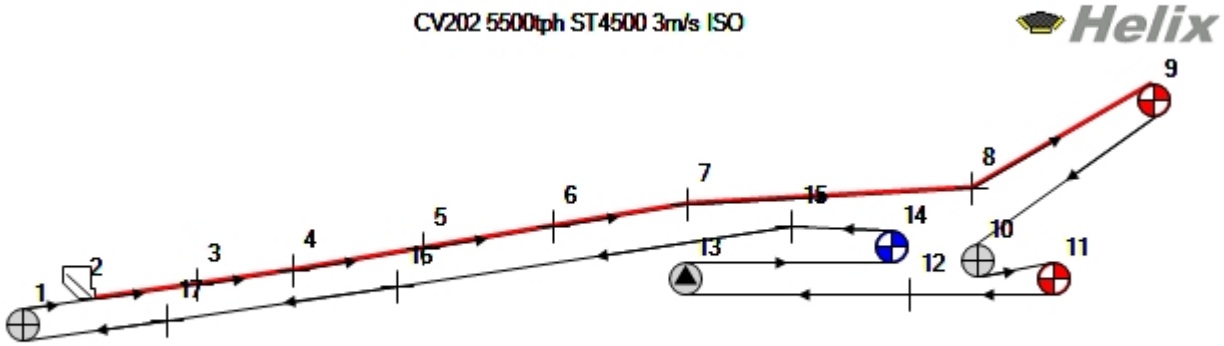


Allowable Belt Sag % Running 2 %

Allowable Belt Sag % Start / Stop 5 %

Takeup Mass 43000 kg

Station No	Running Fully Loaded Tension kN	Running Empty Tension kN	Running Inclines Loaded Tension kN	Running Declines Loaded Tension kN	Starting Fully Loaded Tension kN	Starting Empty Tension kN	Braking Fully Loaded Tension kN	Braking Empty Tension kN	Coasting Fully Loaded Tension kN	Coasting Empty Tension kN
1 Tail	314.38	314.38	314.38	314.38	328.03	327.24	318.64	350.09	220.03	261.63
Idler Spacing m	1.25									
Belt Sag %	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.07	0.06
2 Hopper	317.31	317.31	317.31	317.31	331.02	330.22	321.12	352.70	222.55	264.32
Idler Spacing m	0.40									
Belt Sag %	0.09	0.02	0.09	0.09	0.09	0.01	0.09	0.01	0.13	0.02
3 Int. Pt	331.55	317.69	331.55	330.75	345.41	330.64	334.20	352.81	235.75	264.51
Idler Spacing m	1.25									
Belt Sag %	0.28	0.05	0.28	0.05	0.27	0.05	0.28	0.04	0.4	0.06
4 Int. Pt	372.17	325.19	372.29	338.25	389.76	338.93	345.92	355.80	250.55	268.81
Idler Spacing m	1.25									
Belt Sag %	0.25	0.05	0.25	0.04	0.24	0.04	0.27	0.04	0.37	0.06
5 Int. Pt	461.95	342.14	463.20	355.20	488.68	357.79	364.97	361.71	277.15	277.91
Idler Spacing m	1.25									
Belt Sag %	0.2	0.04	0.2	0.04	0.19	0.04	0.26	0.04	0.34	0.05
6 Int. Pt	714.01	390.71	722.43	403.77	766.86	411.82	414.95	378.75	348.70	304.05
Idler Spacing m	1.25									
Belt Sag %	0.13	0.04	0.13	0.04	0.12	0.04	0.22	0.04	0.27	0.05
7 Int. Pt	906.55	432.43	942.73	445.49	981.59	458.19	435.72	393.66	387.80	326.71
Idler Spacing m	1.25									
Belt Sag %	0.1	0.04	0.1	0.21	0.09	0.03	0.21	0.04	0.24	0.05
8 Int. Pt	1040.10	462.11	1095.19	475.17	1132.11	491.42	437.92	402.84	404.01	341.81
Idler Spacing m	1.25									
Belt Sag %	0.09	0.03	0.09	0.03	0.08	0.03	0.21	0.04	0.23	0.04
9 Drive	1119.31	476.30	1177.26	489.36	1214.12	506.19	495.49	413.66	463.90	353.60
Idler Spacing m	5.00									
Belt Sag %	0.05	0.13	0.05	0.12	0.05	0.12	0.12	0.15	0.13	0.17
10 Snub	505.87	294.26	525.58	298.57	571.09	314.04	311.61	281.73	299.94	259.56
Idler Spacing m	5.00									
Belt Sag %	0.12	0.21	0.12	0.2	0.11	0.19	0.19	0.22	0.2	0.23

Tension Calculations - Summary Belt Sag

Station No	Running				Starting		Braking		Coasting	
	Fully Loaded Tension kN	Empty Tension kN	Inclines Loaded Tension kN	Declines Loaded Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN	Fully Loaded Tension kN	Empty Tension kN
11 Drive	511.34	297.93	529.25	302.24	576.62	317.77	316.62	285.08	305.00	263.00
Idler Spacing m	5.00									
Belt Sag %	0.12	0.2	0.11	0.2	0.11	0.19	0.19	0.21	0.2	0.23
12 Int. Pt	210.84	210.84	210.84	210.84	256.76	224.30	226.05	221.52	224.43	218.44
Idler Spacing m	5.00									
Belt Sag %	0.29	0.29	0.29	0.29	0.24	0.27	0.27	0.27	0.27	0.28
13 Takeup	210.84	210.84	210.84	210.84	210.84	210.84	210.84	210.84	210.84	210.84
Idler Spacing m	5.00									
Belt Sag %	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
14 Brake	219.54	219.54	219.54	219.54	219.69	219.68	218.32	218.68	218.45	218.93
Idler Spacing m	5.00									
Belt Sag %	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
15 Int. Pt	217.56	217.56	217.56	217.56	218.07	218.04	323.50	324.68	214.03	215.59
Idler Spacing m	5.00									
Belt Sag %	0.28	0.28	0.28	0.28	0.28	0.28	0.19	0.19	0.28	0.28
16 Int. Pt	239.96	239.96	239.96	239.96	243.32	243.13	323.87	331.61	216.75	226.99
Idler Spacing m	5.00									
Belt Sag %	0.25	0.25	0.25	0.25	0.25	0.25	0.19	0.18	0.28	0.27
17 Int. Pt	297.89	297.89	297.89	297.89	309.35	308.69	319.10	345.50	218.67	253.60
Idler Spacing m	5.00									
Belt Sag %	0.2	0.2	0.2	0.2	0.2	0.2	0.19	0.18	0.28	0.24
Minimum Ten	**210.84**	**210.84**	**210.84**	**210.84**	**210.84**	**210.84**	**210.84**	**210.84**	**210.84**	**210.84**
Maximum Sag	**0.29**	**0.29**	**0.29**	**0.29**	**0.29**	**0.29**	**0.29**	**0.29**	**0.4**	**0.29**

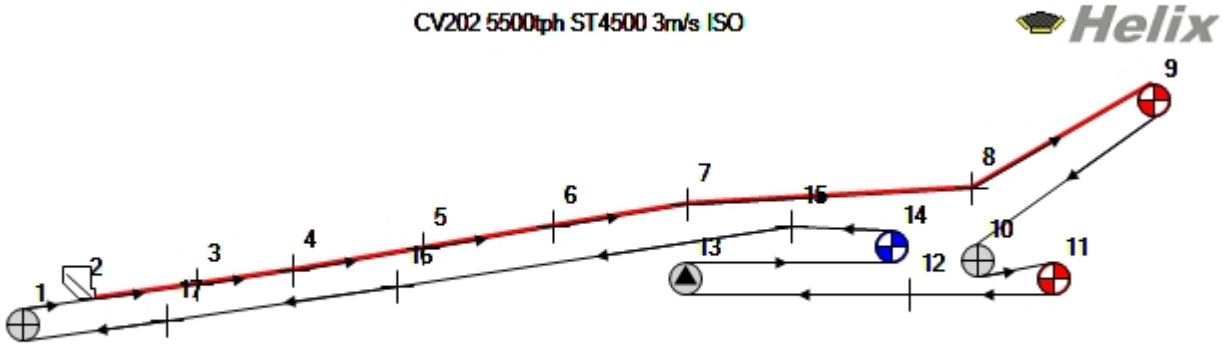
Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Tension Calculations - Run Fully Loaded

Helix Technologies Pty Ltd

Project	ABC Iron Ore Mine	Client	ABC Mining Ltd
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



Takeup Mass 43000 kg

Station / Pulley		Section Length m	Section Lift m	Tensions T1 Run kN	T2 Run kN	Tp Pulley	Drive Te kN	Ten Adj. kN	Material Accel. kN	Skirt Friction kN	Scraper Friction kN	Section Effective Tension	ISO Friction Factor
1	Tail	4.00	-0.03	314.38	317.24	2.85						0.07	0.016
2	Hopper	10.00	0.00	317.31	317.31				4.58	8.48		1.18	0.016
3	Int. Pt	286.00	1.00	331.55	331.55							40.62	0.0189
4	Int. Pt	700.00	1.00	372.17	372.17							89.78	0.0186
5	Int. Pt	2000.00	3.00	461.95	461.95							252.06	0.0182
6	Int. Pt	1700.00	3.00	714.01	714.01							192.54	0.016
7	Int. Pt	1300.00	0.00	906.55	906.55							133.55	0.016
8	Int. Pt	214.13	9.60	1040.10	1040.10							79.21	0.016
9	Drive	64.66	-7.69	1119.31	510.09	7.13	609.22				2.13	-6.35	0.016
10	Snub	4.84	0.90	505.87	510.38	4.50						0.96	0.016
11	Drive	30.01	-0.70	511.34	211.00	3.24	300.33					-0.16	0.016
12	Int. Pt	35.01	-0.63	210.84	210.84							0.00	0.016
13	Takeup	50.37	6.05	210.84	212.81	1.96						6.73	0.016
14	Brake	140.16	-6.63	219.54	221.57	2.04						-4.01	0.016
15	Int. Pt	1300.00	0.00	217.56	217.56							22.40	0.016
16	Int. Pt	3700.01	-6.00	239.96	239.96							57.93	0.016
17	Int. Pt	1000.00	-2.23	297.89	297.89						1.42	15.07	0.016
Totals:						**21.73**	**909.6**	**0.00**	**4.58**	**8.48**	**3.55**	**881.58**	

Maximum Tension	**1119.31**	kN	Total Effective Tension	**919.92**	kN
Minimum Tension	**210.84**	kN	Total Belt Power (Te x V)	**2759.77**	kW
Average Tension Fully Loaded	**489.21**	kN	Belt Modulus	**324000**	kN/m
Average Tension Belt Stationary	**207.51**	kN	Total Belt Length	**12552.19**	m
Average Tension Difference	**281.7**	kN	Belt Elastic Elongation	**6.063**	m
			Takeup Movement	**3.032**	m

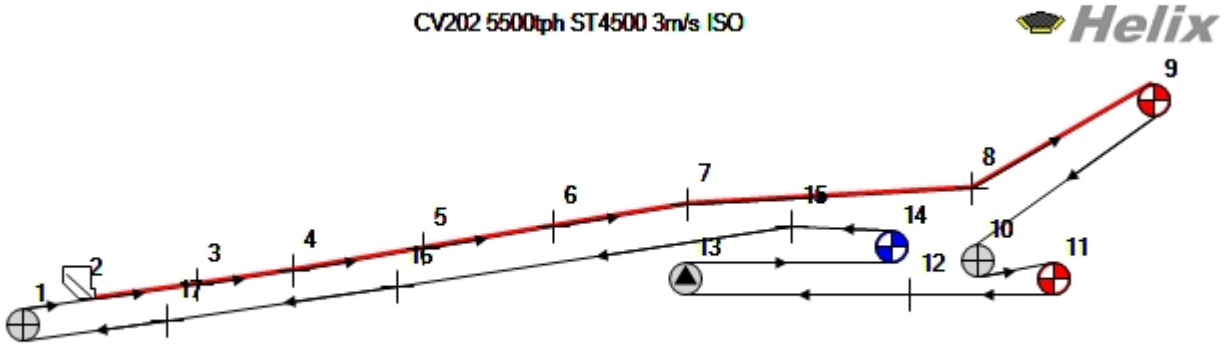
Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Tension Calculations - Run Empty

Helix Technologies Pty Ltd

Project	ABC Iron Ore Mine	Client	ABC Mining Ltd
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



Station / Pulley Station		Section Length m	Section Lift m	Tensions T1 Run kN	T2 Run kN	Tp Pulley	Drive Te kN	Ten Adj. kN	Material Accel. kN	Skirt Friction kN	Scraper Friction kN	Section Effective Tension	ISO Friction Factor
1	Tail	4.00	-0.03	314.38	317.24	2.85						0.07	0.016
2	Hopper	10.00	0.00	317.31	317.31							0.38	0.016
3	Int. Pt	286.00	1.00	317.69	317.69							7.50	0.0189
4	Int. Pt	700.00	1.00	325.19	325.19							16.95	0.0186
5	Int. Pt	2000.00	3.00	342.14	342.14							48.57	0.0182
6	Int. Pt	1700.00	3.00	390.71	390.71							41.72	0.016
7	Int. Pt	1300.00	0.00	432.43	432.43							29.68	0.016
8	Int. Pt	214.13	9.60	462.11	462.11							14.19	0.016
9	Drive	64.66	-7.69	476.30	298.48	3.48	177.82				2.13	-6.35	0.016
10	Snub	4.84	0.90	294.26	296.97	2.71						0.96	0.016
11	Drive	30.01	-0.70	297.93	211.00	2.37	86.93					-0.16	0.016
12	Int. Pt	35.01	-0.63	210.84	210.84							0.00	0.016
13	Takeup	50.37	6.05	210.84	212.81	1.96						6.73	0.016
14	Brake	140.16	-6.63	219.54	221.57	2.04						-4.01	0.016
15	Int. Pt	1300.00	0.00	217.56	217.56							22.40	0.016
16	Int. Pt	3700.01	-6.00	239.96	239.96							57.93	0.016
17	Int. Pt	1000.00	-2.23	297.89	297.89						1.42	15.07	0.016
Totals:						**15.42**	**264.75**	**0.00**			**3.55**	**251.63**	

Maximum Tension	**476.3**	kN	Total Effective Tension	**270.6**	kN
Minimum Tension	**210.84**	kN	Total Belt Power (Te x V)	**811.79**	kW
Average Tension Fully Loaded	**328.41**	kN	Belt Modulus	**324000**	kN/m
Average Tension Belt Stationary	**207.51**	kN	Total Belt Length	**12552.19**	m
Average Tension Difference	**120.9**	kN	Belt Elastic Elongation	**2.602**	m
			Takeup Movement	**1.301**	m

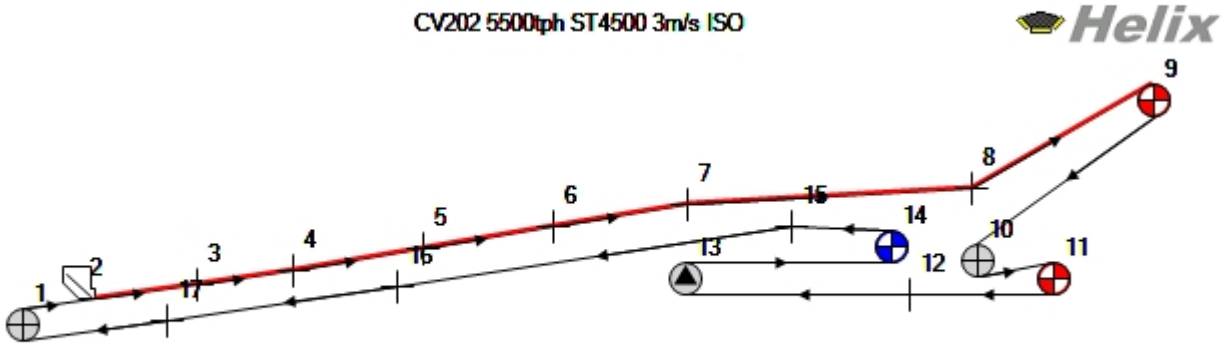
Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Tension Calculations - Run Inclines Loaded

Helix Technologies Pty Ltd

Project	ABC Iron Ore Mine	Client	ABC Mining Ltd
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



Station / Pulley Station		Section Length m	Section Lift m	Tensions T1 Run kN	T2 Run kN	Tp Pulley	Drive Te kN	Ten Adj. kN	Material Accel. kN	Skirt Friction kN	Scraper Friction kN	Section Effective Tension	ISO Friction Factor
1	Tail	4.00	-0.03	314.38	317.24	2.85						0.07	0.016
2	Hopper	10.00	0.00	317.31	317.31				4.58	8.48		1.18	0.016
3	Int. Pt	286.00	1.00	331.55	331.55							40.74	0.0189
4	Int. Pt	700.00	1.00	372.29	372.29							90.91	0.0189
5	Int. Pt	2000.00	3.00	463.20	463.20							259.23	0.0188
6	Int. Pt	1700.00	3.00	722.43	722.43							220.30	0.0185
7	Int. Pt	1300.00	0.00	942.73	942.73							152.46	0.0183
8	Int. Pt	214.13	9.60	1095.19	1095.19							82.07	0.0181
9	Drive	64.66	-7.69	1177.26	529.80	1.46	647.46				2.13	-6.35	0.016
10	Snub	4.84	0.90	525.58	528.29	2.71						0.96	0.016
11	Drive	30.01	-0.70	529.25	211.00	1.37	318.25					-0.16	0.016
12	Int. Pt	35.01	-0.63	210.84	210.84							0.00	0.016
13	Takeup	50.37	6.05	210.84	212.81	1.96						6.73	0.016
14	Brake	140.16	-6.63	219.54	221.57	2.04						-4.01	0.016
15	Int. Pt	1300.00	0.00	217.56	217.56							22.40	0.016
16	Int. Pt	3700.01	-6.00	239.96	239.96							57.93	0.016
17	Int. Pt	1000.00	-2.23	297.89	297.89						1.42	15.07	0.016
Totals:						**21.73**	**909.55**	**0.00**	**4.58**	**8.48**	**3.55**	**881.58**	

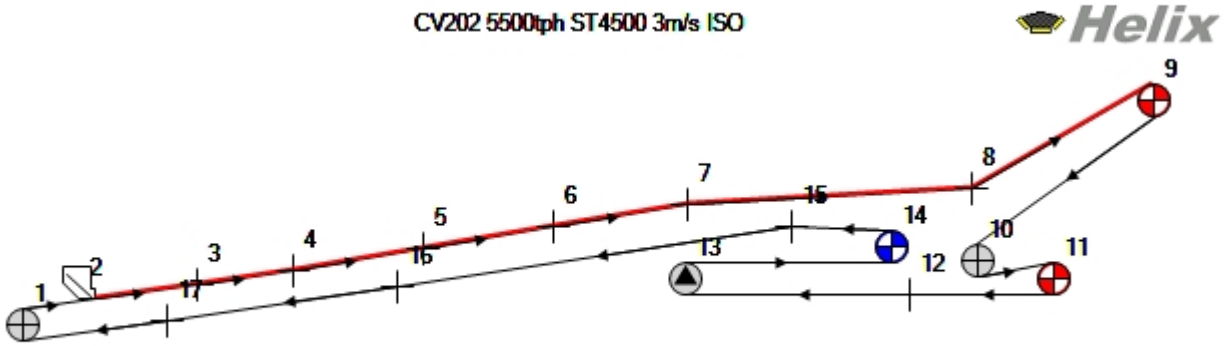
Maximum Tension	**1177.26**	kN	Total Effective Tension	**968.54**	kN
Minimum Tension	**210.84**	kN	Total Belt Power (Te x V)	**2905.63**	kW
Average Tension Inclines Loaded	**498.84**	kN	Belt Modulus	**324000**	kN/m
Average Tension Belt Stationary	**207.51**	kN	Total Belt Length	**12552.19**	m
Average Tension Difference	**291.33**	kN	Belt Elastic Elongation	**6.27**	m
			Takeup Movement	**3.135**	m

Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Helix Technologies Pty Ltd

Project	ABC Iron Ore Mine	Client	ABC Mining Ltd
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



Station / Pulley Station		Section Length m	Section Lift m	Tensions T1 Run kN	T2 Run kN	Tp Pulley	Drive Te kN	Ten Adj. kN	Material Accel. kN	Skirt Friction kN	Scraper Friction kN	Section Effective Tension	ISO Friction Factor
1	Tail	4.00	-0.03	314.38	317.24	2.85						0.07	0.016
2	Hopper	10.00	0.00	317.31	317.31				4.58	8.48		0.38	0.016
3	Int. Pt	286.00	1.00	330.75	330.75							7.50	0.0189
4	Int. Pt	700.00	1.00	338.25	338.25							16.95	0.0186
5	Int. Pt	2000.00	3.00	355.20	355.20							48.57	0.0182
6	Int. Pt	1700.00	3.00	403.77	403.77							41.72	0.016
7	Int. Pt	1300.00	0.00	445.49	445.49							29.68	0.016
8	Int. Pt	214.13	9.60	475.17	475.17							14.19	0.016
9	Drive	64.66	-7.69	489.36	302.79	3.45	186.57				2.13	-6.35	0.016
10	Snub	4.84	0.90	298.57	301.28	2.71						0.96	0.016
11	Drive	30.01	-0.70	302.24	211.00	2.35	91.24					-0.16	0.016
12	Int. Pt	35.01	-0.63	210.84	210.84							0.00	0.016
13	Takeup	50.37	6.05	210.84	212.81	1.96						6.73	0.016
14	Brake	140.16	-6.63	219.54	221.57	2.04						-4.01	0.016
15	Int. Pt	1300.00	0.00	217.56	217.56							22.40	0.016
16	Int. Pt	3700.01	-6.00	239.96	239.96							57.93	0.016
17	Int. Pt	1000.00	-2.23	297.89	297.89						1.42	15.07	0.016
Totals:						**21.73**	**909.6**	**0.00**	**4.58**	**8.48**	**3.55**	**881.58**	

Maximum Tension	**489.36**	kN	Total Effective Tension	**283.6**	kN
Minimum Tension	**210.84**	kN	Total Belt Power (Te x V)	**850.81**	kW
Average Tension Declines Loaded	**334.89**	kN	Belt Modulus	**324000**	kN/m
Average Tension Belt Stationary	**207.51**	kN	Total Belt Length	**12552.19**	m
Average Tension Difference	**127.38**	kN	Belt Elastic Elongation	**2.742**	m
			Takeup Movement	**1.371**	m

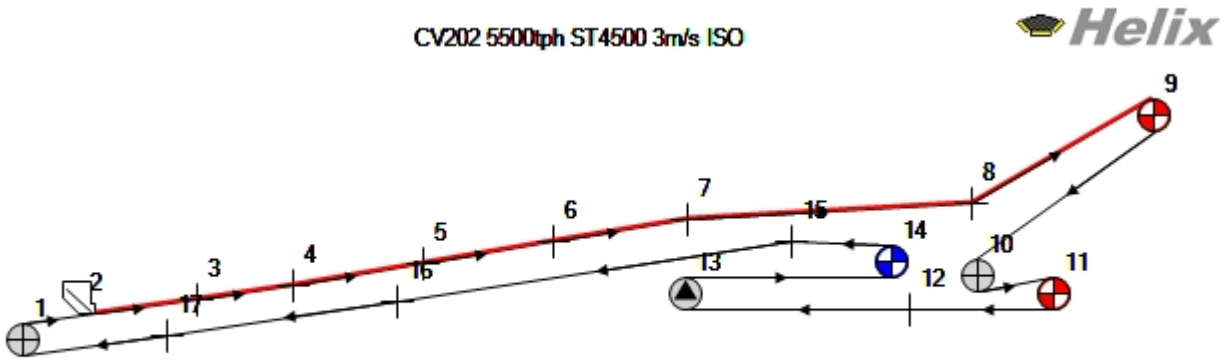
Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Conveyor Starting and Stopping

Helix Technologies Pty Ltd

Project	ABC Iron Ore Mine	Client	ABC Mining Ltd
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



System Masses

Mass of Belt	**1,241,811**	kg
Mass of Material	**3,162,571**	kg
Carry Idler Equivalent Mass	**290,302**	kg
Return Idler Equivalent Mass	**68,816**	kg
Pulley Equivalent Mass	**15,922**	kg
Drive Equivalent Mass	**1,893,868**	kg
Total System Equivalent Mass	**6,673,290**	kg

Tensions and Accelerating Forces

Effective Tens. Fully Loaded	**919.92**	kN
Effective Tension Empty	**270.60**	kN
Total Braking Force	**109.89**	kN
Tension Available to Accelerate Conveyor		
Accelerating Tension - Loaded	**133.07**	kN
Accelerating Tension - Empty	**65.93**	kN

Starting Times & Acceleration Rates

Starting Time - Fully Loaded	**150.44**	sec
Starting Time - Empty	**159.74**	sec
Acceleration Rate - Loaded	**0.02**	m/s2
Accelerating Rate - Empty	**0.02**	m/s2

Belt Tension Rise Starting / Braking

Max Belt Tension, Start/Brake	**1214.12**	kN
Belt Width	**1800**	mm
Maximum Belt Tension / width	**674.51**	kN/m
Belt Rated Tension / width	**675**	kN/m
Actual Max Tension, Start/Brake	**99.9**	%

Input Data

Belt Speed	***3***	m/s
Belt Rated Tension	***675***	kN/m
Allow. Belt Start Tension Rise	***150***	%
Drive Inertia	***1602***	kg-m2
Total Braking Torque	***70***	kNm
Start-up Factor - Loaded	***106***	%
Start-up Factor - Empty	***34***	%
Installed Power	***3000***	kW
Drive Efficiency (Average)	***95***	%

Stopping Times & Deceleration Rates

Stopping Time Loaded Braking	**19.44**	sec
Stopping Time Loaded Coasting	**21.76**	sec
Stopping Time Empty Braking	**27.68**	sec
Stopping Time Empty Coasting	**38.92**	sec
Deceleration - Loaded Braking	**-0.15**	m/s2
Deceleration - Loaded Coasting	**-0.14**	m/s2
Deceleration - Empty Braking	**-0.11**	m/s2
Deceleration - Empty Coasting	**-0.08**	m/s2

Stopping Distances & Discharge Volumes

Stopping Distance Loaded Braking	**29.16**	m
Stopping Distance Loaded Coasting	**32.64**	m
Stopping Distance Empty Braking	**41.52**	m
Stopping Distance Empty Coasting	**58.38**	m
Discharge Mass, Braking	**14850**	kg
Discharge Mass, Coasting	**16624**	kg
Discharge Volume, Braking	**8.49**	m3
Discharge Volume, Coasting	**9.5**	m3

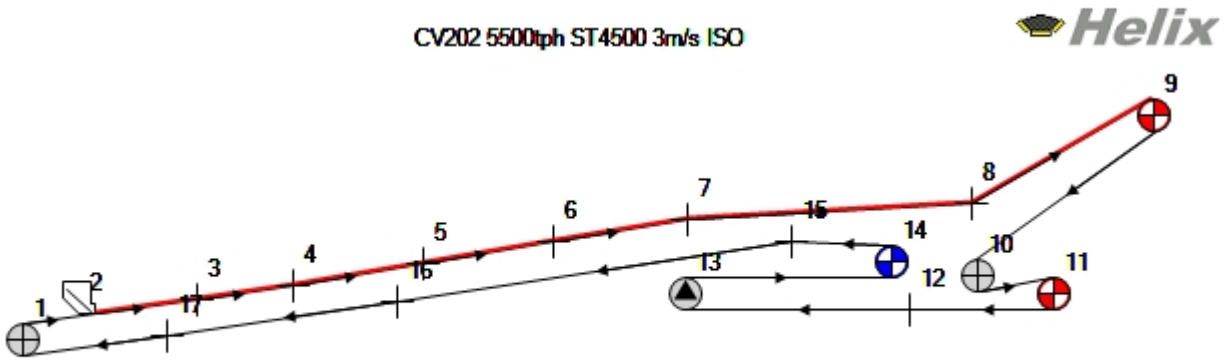
Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

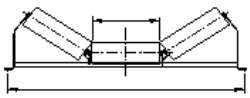
Conveyor Idler Details Report

Helix Technologies Pty Ltd

Project	ABC Iron Ore Mine	Client	ABC Mining Ltd
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



	Carry Side Idlers		Return Side Idlers	
Idler Category	*Sandvik Carry*		*Sandvik Vee Return*	
Idler Description	*Series 60 3 Roll Carry 178 Plain Inline*		*Vee Return Series 59 2 Roll 178 Dia*	
Idler Design Belt Width	*1800*	mm	*1800*	mm
Idler Series	*60*		*59*	
Drawing Number				
Nominal Idler Spacing	*1.25*	m	*5.244*	m
Total Number of Idlers	4988		1265	
Idler Price	*0*		*0*	
Troughing Angle	*35.0*	deg	*10.0*	deg
Idler Shaft Diameter	*45.0*	mm	*40.0*	mm
Idler Bearing Diameter	*45.0*	mm	*40.0*	mm
Number of Idler Rolls	*3*		*2*	
Idler Roll Diameter	*178*	mm	*178*	mm
Idler Rotation Speed	322	rpm	322	rpm
Roll Face Width	*633*	mm	*945*	mm
Roll Bearing Centres	*535.9*	mm	*870.5*	mm
Shaft Support Centres	*659.5*	mm	*973.5*	mm
Idler Support Fixing Width	*2200*	mm	*2200*	mm
Idlerset Rotating Mass	*58.2*	kg	*54.4*	kg
Idlerset Total Mass	*139*	kg	*116.6*	kg
Idler Vertical Misalignment Allowance	*3.0*	mm	*6.0*	mm
Dynamic Load Factor	1.13		1.40	
Belt Deviation Load	*5,600*	N	*570*	N
Total Load on Centre Roll	11,320	N	4,922	N
Type of Bearing	*Ball*		*Ball*	
Bearing Designation	*6309*		*6308*	
Bearing Dynamic Load Rating C	*52,700*	N	*41,000*	N
Bearing L10h Life	41,792	hrs	239,422	hrs
Allowable Shaft Deflection at Bearing	*8.00*	min	*10.00*	min
Actual Shaft Deflection at Bearing	7.62	min	7.19	min

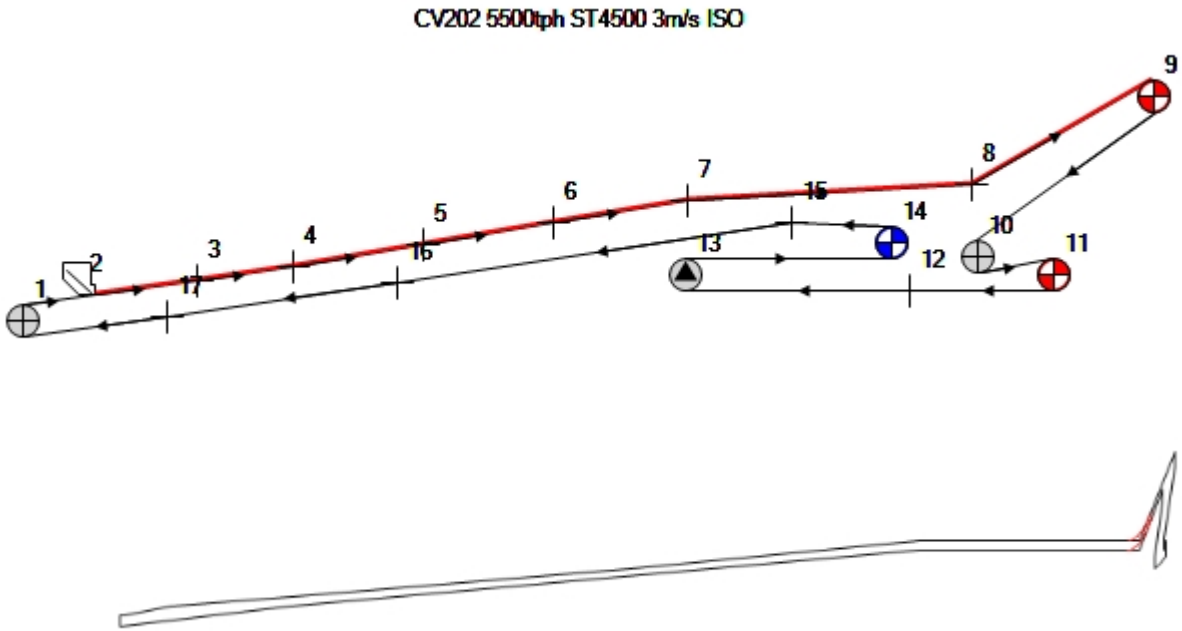


Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Helix Technologies Pty Ltd

Project	ABC Iron Ore Mine	Client	ABC Mining Ltd
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



26 Sep 2011 10:40 **Vertical Curve Radius Calculations** Page 16/39

Belt Width	***1800***	mm	% Belt Mass for Lift-off Calculation	***75***	%
Belt Mass - New Belt	***98.93***	kg/m	Curve Tension Safety Factor	***1***	
Top Cover Mass - New Belt	***20.34***	kg/m	Average Drive Torque Start-up Factor - Loaded	**106**	%
Bottom Cover Mass	***16.27***	kg/m	Average Drive Torque Start-up Factor - Empty	**34**	%
Worn Belt Mass	**74.2**	kg/m	Belt Modulus	***324000***	kN/m
Reduction of Top Cover Mass	**121.6**	%	Belt Rated Tension ***675*** kN/m	***1215***	kN
Conveyed Material Mass	**509.26**	kg/m	Allowable Edge Tension - Running: ***115*** % Starting	***150***	%

Vertical Curve Radius Calculations

Belt Width	1800	mm	% Belt Mass for Lift-off Calculation			75	%
Belt Mass - New Belt	98.93	kg/m	Curve Tension Safety Factor			1	
Top Cover Mass - New Belt	20.34	kg/m	Average Drive Torque Start-up Factor - Loaded			106	%
Bottom Cover Mass	16.27	kg/m	Average Drive Torque Start-up Factor - Empty			34	%
Worn Belt Mass	74.2	kg/m	Belt Modulus			324000	kN/m
Reduction of Top Cover Mass	121.6	%	Belt Rated Tension	675	kN/m	1215	kN
Conveyed Material Mass	509.26	kg/m	Allowable Edge Tension - Running:	115	% Starting	150	%

Station / Sectio				Running				Starting				Braking				Largest Reqd. Radius
				Fully Loaded		Empty		Fully Loaded		Empty		Fully Loaded		Empty		
Station	Curve Type	Load Capacity tonnes/hr	Design Vertical Curve Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	m
1 Tail				314.38		314.38		328.03		327.24		318.64		350.09		
2 Hopper		5500		317.31		317.31		331.02		330.22		321.12		352.7		
3 Int. Pt		5500		331.55		317.69		345.41		330.64		334.2		352.81		
4 Int. Pt		5500		372.17		325.19		389.76		338.93		345.92		355.8		
5 Int. Pt		5500		461.95		342.14		488.68		357.79		364.97		361.71		
6 Int. Pt		5500		714.01		390.71		766.86		411.82		414.95		378.75		
7 Int. Pt		5500		906.55		432.43		981.59		458.19		435.72		393.66		
8 Int. Pt	Concave	5500	3000	1040.1		462.11		1132.11		491.42		437.92		402.84		
Belt Tension at Curve kN				1040.1		462.11		1132.11		491.42		437.92		402.84		
Min. Concave Lift Off Radius					1429		635		1556		675		602		554	1556
Min. Edge Tension Radius					48		109		44		102		115		125	
Max. Centre Tension Radius					187		71		252		74		70		67	
9 Drive				1119.31		476.3		1214.12		506.19		495.49		413.66		

Vertical Curve Radius Calculations

Belt Width	1800	mm	% Belt Mass for Lift-off Calculation			75	%
Belt Mass - New Belt	98.93	kg/m	Curve Tension Safety Factor			1	
Top Cover Mass - New Belt	20.34	kg/m	Average Drive Torque Start-up Factor - Loaded			106	%
Bottom Cover Mass	16.27	kg/m	Average Drive Torque Start-up Factor - Empty			34	%
Worn Belt Mass	74.2	kg/m	Belt Modulus			324000	kN/m
Reduction of Top Cover Mass	121.6	%	Belt Rated Tension	675	kN/m	1215	kN
Conveyed Material Mass	509.26	kg/m	Allowable Edge Tension - Running:	115 %	Starting	150	%

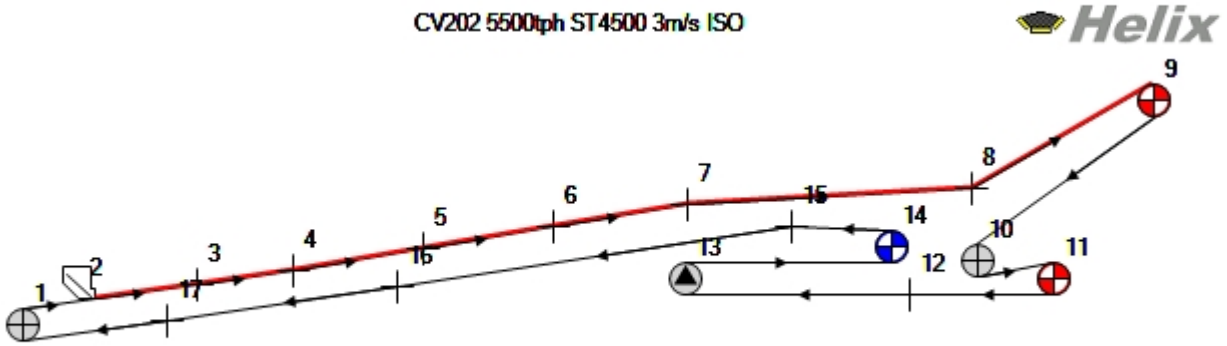
Station / Sectio				Running				Starting				Braking				Largest Reqd. Radius
				Fully Loaded		Empty		Fully Loaded		Empty		Fully Loaded		Empty		
Station	Curve Type	Load Capacity tonnes/hr	Design Vertical Curve Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	Tension kN	Radius m	m
10 Snub				505.87		294.26		571.09		314.04		311.61		281.73		
11 Drive				511.34		297.93		576.62		317.77		316.62		285.08		
12 Int. Pt				210.84		210.84		256.76		224.3		226.05		221.52		
13 Takeup				210.84		210.84		210.84		210.84		210.84		210.84		
14 Brake				219.54		219.54		219.69		219.68		218.32		218.68		
15 Int. Pt	Concave		3000	217.56		217.56		218.07		218.04		323.5		324.68		
Belt Tension at Curve kN				217.56		217.56		218.07		218.04		323.5		324.68		
Min. Concave Lift Off Radius					299		299		300		300		445		446	446
Min. Edge Tension Radius					231		231		230		230		155		155	
Max. Centre Tension Radius					17		17		17		17		19		19	
16 Int. Pt				239.96		239.96		243.32		243.13		323.87		331.61		
17 Int. Pt				297.89		297.89		309.35		308.69		319.1		345.5		

Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Helix Technologies Pty Ltd

Project	ABC Iron Ore Mine	Client	ABC Mining Ltd
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



Viscoelastic Calculations Input Data

Belt Rubber Description	*Rubber description ...*			Carry Idler Centre Roll Dia	*178* mm
Top Cover Dynamic Modulus E'	*6* N/mm2			Carry Idler Centre Roll Drag	*3.8* N
Top Cover Dynamic Loss Factor Tan(delta)	*0.13*			Carry Idler Wing Roll Dia	*178* mm
Belt Top Cover Temperature	*30* deg C			Carry Idler Wing Roll Drag	*3.8* N
Rolling Resistance Factor RRF Top	*0.072*	RRF Bot.	*0.072*	Return Idler Centre Roll Dia	*178* mm
Bottom Cover Dynamic Modulus E'	*6* N/mm2			Return Idler Centre Roll Drag	*3.2* N
Bot Cover Dynamic Loss Factor Tan(delta)	*0.13*			Return Idler Wing Roll Dia	*178* mm
Belt Bottom Cover Temperature	*30* deg C			Return Idler Wing Roll Drag	*3.2* N
Belt & Material Flexure Adjustment factor	*1*			Idlerset Skew Angle	*0.1* deg
☐ Belt has Turnover on Return Run				Idlerset Forward Tilt angle	*0.1* deg

Station / Section			friction factor f (loaded)											Empty
			Total	Indentation			Matl.& Belt		Idler Drag		Idler Skew & Tilt			
No	Section Length	Idler Spacing	Loaded Friction factor f	Indent factor fi	Indent factor %	Freq uency rad/s	Flexure friction fm	Flexure friction %	Drag factor fr	Drag factor %	Tilt friction ft	Tilt friction %		Empty Friction factor f
1	4.00	1.25	0.0160	0.00916	45.0	938	0.00050	2.4	0.00940	46.1	0.00131	6.4		0.0160
2	10.00	0.40	0.0160	0.00900	45.8	631	0.00482	24.5	0.00478	24.3	0.00103	5.3		0.0160
3	286.00	1.25	0.0189	0.01316	64.5	431	0.00469	23.0	0.00153	7.5	0.00103	5.1		0.0160
4	700.00	1.25	0.0186	0.01316	65.7	431	0.00431	21.5	0.00153	7.6	0.00103	5.2		0.0160
5	2000.00	1.25	0.0182	0.01316	68.0	431	0.00362	18.7	0.00153	7.9	0.00103	5.3		0.0160
6	1700.00	1.25	0.0160	0.01316	71.9	431	0.00259	14.1	0.00153	8.4	0.00103	5.6		0.0160
7	1300.00	1.25	0.0160	0.01316	74.6	431	0.00191	10.8	0.00153	8.7	0.00103	5.9		0.0160
8	214.13	1.25	0.0160	0.01316	75.9	431	0.00161	9.3	0.00153	8.8	0.00103	6.0		0.0160
9	64.66	5.00	0.0160	0.00760	80.4	568	0.00010	1.0	0.00132	14.0	0.00043	4.6		0.0160
10	4.84	5.00	0.0160	0.00760	79.7	568	0.00019	2.0	0.00132	13.8	0.00043	4.5		0.0160
11	30.01	5.00	0.0160	0.00760	79.7	568	0.00019	2.0	0.00132	13.8	0.00043	4.5		0.0160
12	35.01	5.00	0.0160	0.00760	77.8	568	0.00041	4.2	0.00132	13.5	0.00043	4.4		0.0160
13	50.37	5.00	0.0160	0.00760	77.9	568	0.00041	4.2	0.00132	13.5	0.00043	4.4		0.0160
14	140.16	5.00	0.0160	0.00760	77.9	568	0.00040	4.1	0.00132	13.5	0.00043	4.4		0.0160
15	1300.00	5.00	0.0160	0.00760	78.0	568	0.00040	4.1	0.00132	13.5	0.00043	4.4		0.0160
16	3700.01	5.00	0.0160	0.00760	78.0	568	0.00039	4.0	0.00132	13.5	0.00043	4.4		0.0160
17	1000.00	5.00	0.0160	0.00760	78.3	568	0.00036	3.7	0.00132	13.6	0.00043	4.4		0.0160

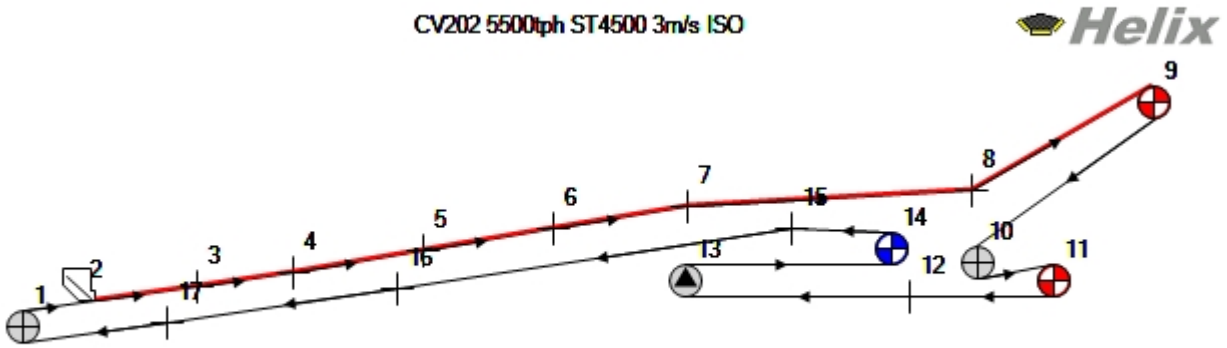
Station / Section			friction factor f (loaded)										Empty
			Total	Indentation			Matl.& Belt		Idler Drag		Idler Skew & Tilt		
No	Section Length	Idler Spacing	Loaded Friction factor f	Indent factor fi	Indent factor %	Frequency rad/s	Flexure friction fm	Flexure friction %	Drag factor fr	Drag factor %	Tilt friction ft	Tilt friction %	Empty Friction factor f
Totals:			12539.18		0.66				0.00		14.00	5	

Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Helix Technologies Pty Ltd

Project	ABC Iron Ore Mine	Client	ABC Mining Ltd
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



Carry Roll Diameter	178	mm	Belt Speed	3	m/s
Return Roll Diameter	178	mm	Takeup Mass	43000	kg

Station / Sectio		Running Fully Loaded Belt Resonance									
Station	Description	Start Belt Tension kN	End Belt Tension kN	Belt Transverse Wave Frequency Range Hz	to Hz	Idler Roll Excitation Frequency Hz	Section Idler Spacing m	Critical Idler Spacing Start m	Critical Idler Spacing End m	Idler Spacing within +/- 10% m	Mode
1	Tail	317.24	331.55	22.59	23.09	5.36	1.25	5.26	5.38	OK	
2	Hopper	317.31	372.17	28.06	30.47	5.36	0.4	2.09	2.27	OK	
3	Int. Pt	331.55	461.95	9.19	10.89	5.36	1.25	2.14	2.54	Caution	1/2
4	Int. Pt	372.17	714.01	9.75	13.6	5.36	1.25	2.27	3.17	Caution	1/2
5	Int. Pt	461.95	906.55	10.89	15.35	5.36	1.25	2.54	3.58	Caution	1/2
6	Int. Pt	714.01	1040.1	13.6	16.45	5.36	1.25	3.17	3.83	OK	
7	Int. Pt	906.55	1119.31	15.35	17.08	5.36	1.25	3.58	3.98	OK	
8	Int. Pt	1040.1	505.87	16.45	11.41	5.36	1.25	3.83	2.66	Caution	1/2
9	Drive	510.09	511.34	7.17	7.18	5.36	5	6.68	6.69	OK	
10	Snub	510.38	210.84	7.17	4.6	5.36	5	6.68	4.28	OK	
11	Drive	211.0	210.84	4.6	4.6	5.36	5	4.29	4.28	OK	
12	Int. Pt	210.84	219.54	4.6	4.69	5.36	5	4.28	4.37	OK	
13	Takeup	212.81	217.56	4.62	4.67	5.36	5	4.3	4.35	OK	
14	Brake	221.57	239.96	4.71	4.91	5.36	5	4.39	4.57	Caution	1
15	Int. Pt	217.56	297.89	4.67	5.47	5.36	5	4.35	5.1	Caution	1
16	Int. Pt	239.96	314.38	4.91	5.62	5.36	5	4.57	5.24	Caution	1
17	Int. Pt	297.89	314.38	5.47	5.62	5.36	5	5.1	5.24	Caution	1

Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Helix Technologies Pty Ltd

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Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011

Takeup Travel

Takeup Type	***Horizontal Gravity***	
☐ **Auto Calc Takeup Mass**		
Takeup Mass step increment	***2000***	kg
Max no. of Calc Increments	***100***	
Takeup Mass kg (Manual Input)	***43000***	kg
Takeup Mass Calculated	**43000**	kg

Takeup Travel Estimate

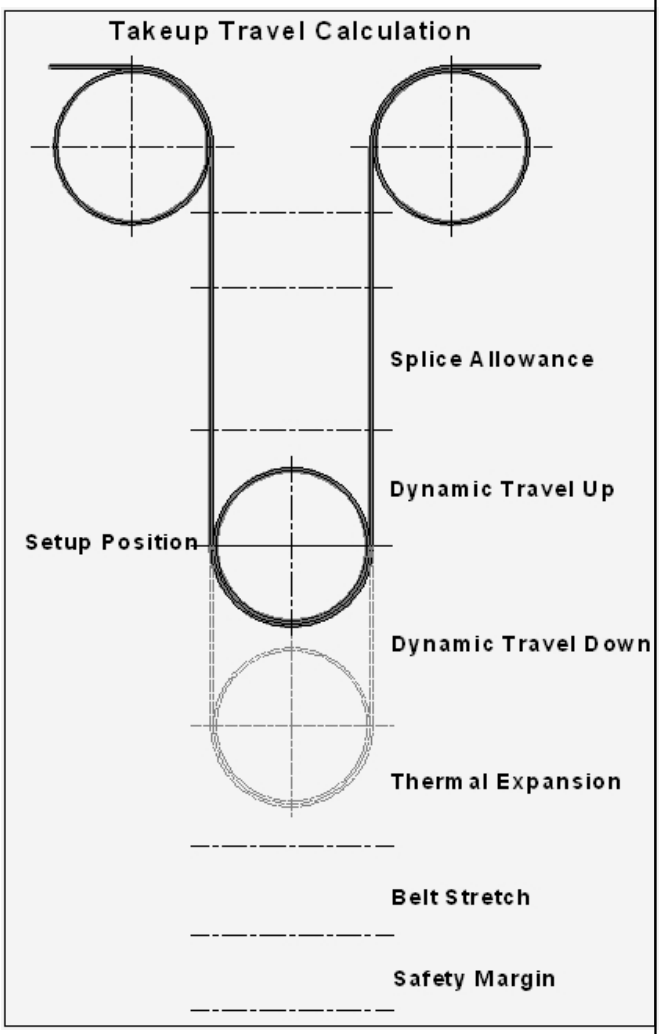
Safety Margin Top	+	***1***	m
Belt Splice Allowance	+	***2.7***	m
Dynamic Travel Up	+	***3.8***	m
Dynamic Travel Down	+	***5***	m
Safety Margin Bottom	+	***1***	m

Thermal Expansion Distance

Minimum Site Temperature		***0***	deg
Maximum Site Temperature		***45***	deg
Belt Expansion co-efficient m/m per degree C		***1.17E-05***	
Total Belt Length		**12552.19**	m
Thermal Expansion Distance	+	**3.304**	m

Permanent Belt Stretch

Permanent Stretch co-efficient % of Belt Length		***0.15***	%
Permanent Belt Stretch Distance	+	**9.414**	m
Total Takeup Travel Distance		**26.22**	m



Helix Technologies Pty Ltd

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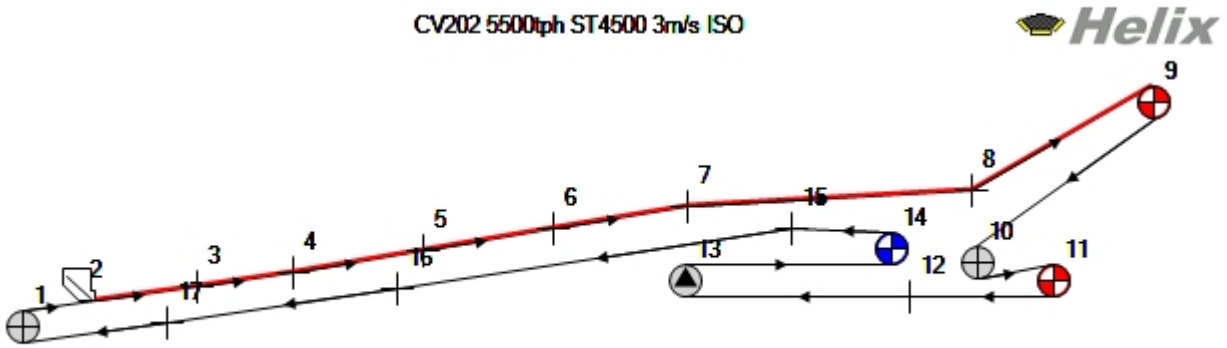
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



Drive No.	1 Drive	
Drive Description	**Head**	
Load Share on Drive Pulley	**67**	%
Starting Torque Factor, Fully Loaded	**106**	%
Starting Torque Factor, Empty	**34**	%
Number of Motors on Drive Pulley	**2**	
Motor Description	**ABB SQ 690V Motor**	
Motor Power Rating	**1000**	kW
Motor Voltage	**690**	Volts
Gearbox Description	**Flender Helical Bevel Gear**	
Drive Efficiency	**95**	%

High Speed Coupling		
HS Coupling Make	**Falk**	
HS Coupling Model	**1120T**	

Low Speed Coupling		
LS Coupling Make	**Falk**	
LS Coupling Model	**1120G**	

Brake		
Brake Location	**None**	
Low Speed Brake Torque Input	**0**	kNm
Equiv HS Brake Torque	**0**	Nm

Holdback		
Static Analysis Runback Force Fv	**87877**	kN
Static Analysis Horizontal Force Fh	**832043**	kN
Calculated Holdback Torque	**N/A**	Nm
Holdback Required (Yes / No)	**No**	Fv>Fh/2
Holdback Torque 3 x Motor FLT	**1624120**	Nm

Pulley No.	9	
Pulley Condition	**Moist**	
Pulley Lagging Type	**Ceramic**	
Belt Wrap Angle	**178**	°
Coefficient of Friction, Running	**0.35**	
Drive Factor Cw, Running	**0.51**	
Coefficient of Friction, Starting	**0.45**	
Drive Factor Cw, Starting	**0.33**	

Pulley and Shaft Dimensions		
Pulley Shell Diameter	**1600**	mm
Pulley Lagging Thickness	**12**	mm
Pulley Outside Diameter	**1624**	mm
Pulley Shaft Diameter at Hub	**450**	mm
Pulley Shaft Diameter at Brg	**420**	mm

Pulley and Belt Speed		
Motor Full Load Speed	**985**	rpm
Required Gearbox Ratio	**27.919**	:1
Selected Gearbox Ratio	**28**	:1
Required Pulley Speed	**35.28**	rpm
Calculated Pulley Speed for Reducer	**35.18**	rpm
Required Belt Speed	**3**	m/s
Calculated Belt Speed	**2.99**	m/s

Drive Inertia		
Motor Inertia	**30**	kg-m2
High Speed Coupling Inertia	**2**	kg-m2
High Speed Brake Disc Inertia	**0**	kg-m2
Flywheel Inertia	**500**	kg-m2
Gearbox Inertia (HSS)	**2**	kg-m2
Total Drive Inertia	**1068**	kg-m2
Total Drive Equivalent Mass	**1262579**	kg

Drive No.	2 Drive	
Drive Description	**Return**	
Load Share on Drive Pulley	**33**	%
Starting Torque Factor, Fully Loaded	**106**	%
Starting Torque Factor, Empty	**34**	%
Number of Motors on Drive Pulley	**1**	
Motor Description	**ABB SQ 690V Motor**	
Motor Power Rating	**1000**	kW
Motor Voltage	**690**	Volts
Gearbox Description	**Flender Helical Bevel Gear**	
Drive Efficiency	**95**	%

High Speed Coupling		
HS Coupling Make	**Falk**	
HS Coupling Model	**1120T**	
Low Speed Coupling		
LS Coupling Make	**Falk**	
LS Coupling Model	**1120G**	
Brake		
Brake Location	**None**	
Low Speed Brake Torque Input	**0**	kNm
Equiv HS Brake Torque	**0**	Nm
Holdback		
Static Analysis Runback Force Fv	**87877**	kN
Static Analysis Horizontal Force Fh	**832043**	kN
Calculated Holdback Torque	**N/A**	Nm
Holdback Required (Yes / No)	**No**	Fv>Fh/2
Holdback Torque 3 x Motor FLT	**812060**	Nm

Pulley No.	11	
Pulley Condition	**Moist**	
Pulley Lagging Type	**Ceramic**	
Belt Wrap Angle	**190**	º
Coefficient of Friction, Running	**0.35**	
Drive Factor Cw, Running	**0.46**	
Coefficient of Friction, Starting	**0.45**	
Drive Factor Cw, Starting	**0.29**	
Pulley and Shaft Dimensions		
Pulley Shell Diameter	**1600**	mm
Pulley Lagging Thickness	**12**	mm
Pulley Outside Diameter	**1624**	mm
Pulley Shaft Diameter at Hub	**380**	mm
Pulley Shaft Diameter at Brg	**360**	mm
Pulley and Belt Speed		
Motor Full Load Speed	**985**	rpm
Required Gearbox Ratio	**27.919**	:1
Selected Gearbox Ratio	**28**	:1
Required Pulley Speed	**35.28**	rpm
Calculated Pulley Speed for Reducer	**35.18**	rpm
Required Belt Speed	**3**	m/s
Calculated Belt Speed	**2.99**	m/s
Drive Inertia		
Motor Inertia	**30**	kg-m2
High Speed Coupling Inertia	**2**	kg-m2
High Speed Brake Disc Inertia	**0**	kg-m2
Flywheel Inertia	**500**	kg-m2
Gearbox Inertia (HSS)	**2**	kg-m2
Total Drive Inertia	**534**	kg-m2
Total Drive Equivalent Mass	**631289**	kg

Drive No.	3 Brake	
Drive Description	**Brake**	
Load Share on Drive Pulley	**0**	%
Starting Torque Factor, Fully Loaded	**100**	%
Starting Torque Factor, Empty	**100**	%
Number of Motors on Drive Pulley	**0**	
Motor Description	**Brake Only**	
Motor Power Rating	**0**	kW
Motor Voltage	**0**	Volts
Gearbox Description	**Brake Only**	
Drive Efficiency	**100**	%
High Speed Coupling		
HS Coupling Make	**Brake Only**	
HS Coupling Model		
Low Speed Coupling		
LS Coupling Make	**Brake Only**	
LS Coupling Model		
Brake		
Brake Location	**Low Speed**	
Low Speed Brake Torque Input	**70**	kNm
Equiv HS Brake Torque	**0**	Nm
Holdback		
Static Analysis Runback Force Fv	**87877**	kN
Static Analysis Horizontal Force Fh	**832043**	kN
Calculated Holdback Torque	**N/A**	Nm
Holdback Required (Yes / No)	**No**	Fv>Fh/2
Holdback Torque 3 x Motor FLT	**0**	Nm

Pulley No.	14	
Pulley Condition	**Moist**	
Pulley Lagging Type	**Rubber**	
Belt Wrap Angle	**180**	º
Coefficient of Friction, Running	**0.25**	
Drive Factor Cw, Running	**0.84**	
Coefficient of Friction, Starting	**0.35**	
Drive Factor Cw, Starting	**0.5**	
Pulley and Shaft Dimensions		
Pulley Shell Diameter	**1250**	mm
Pulley Lagging Thickness	**12**	mm
Pulley Outside Diameter	**1274**	mm
Pulley Shaft Diameter at Hub	**280**	mm
Pulley Shaft Diameter at Brg	**260**	mm
Pulley and Belt Speed		
Motor Full Load Speed	**0**	rpm
Required Gearbox Ratio	**1**	:1
Selected Gearbox Ratio	**1**	:1
Required Pulley Speed	**0**	rpm
Calculated Pulley Speed for Reducer	**0**	rpm
Required Belt Speed	**3**	m/s
Calculated Belt Speed	**3**	m/s
Drive Inertia		
Motor Inertia	**0.01**	kg-m2
High Speed Coupling Inertia	**0**	kg-m2
High Speed Brake Disc Inertia	**0**	kg-m2
Flywheel Inertia	**0**	kg-m2
Gearbox Inertia (HSS)	**0**	kg-m2
Total Drive Inertia	**0.01**	kg-m2
Total Drive Equivalent Mass	**0**	kg

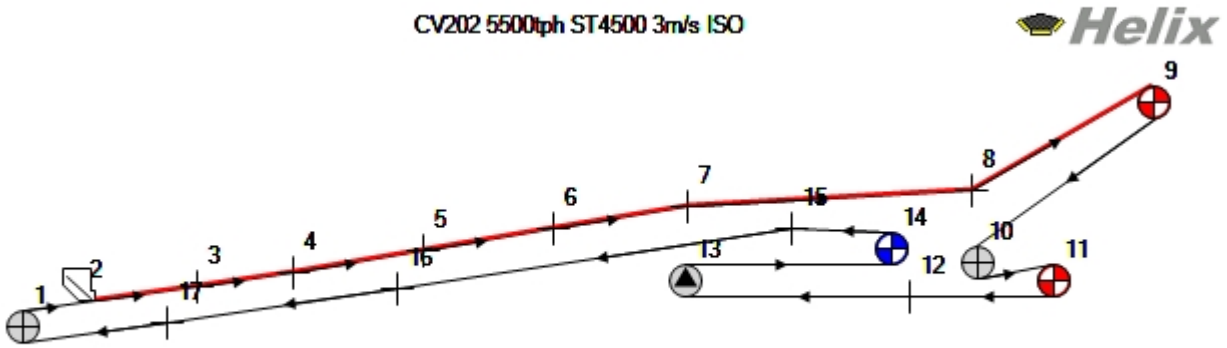
Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Drive Motor Details Report

Helix Technologies Pty Ltd

Project	ABC Iron Ore Mine	Client	ABC Mining Ltd
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



Drive No.	1 Drive	Pulley No.	9	
Drive Description	Head	Total Motor Power on Drive	2000	kW
Number of Motors on Drive Pulley	2	Absorbed Power at Pulley	1849.05	kW
Motor Category	ABB 690V	Drive Efficiency	95	%
Motor Description	ABB SQ 690V Motor	Absorbed Power at Motor	973.18	kW
Motor Power Rating	1000 kW	Motor Full Load Speed	985	rpm
Motor Voltage	690 Volts	Motor Full Load Torque	9695	Nm
Number of poles	6	Motor Full Load Current	996	Amps
Motor Frame Size	M3BP ???	Motor Efficiency @ Duty Point	97.13	%
Motor Shaft Diameter	100 mm	Motor Power Factor @ Duty Pt	0.84	
Motor Shaft Height	0 mm	Mass of Motor	4000	kg
Motor Inertia	30 kg-m2			

Drive No.	2 Drive	Pulley No.	11	
Drive Description	Return	Total Motor Power on Drive	1000	kW
Number of Motors on Drive Pulley	1	Absorbed Power at Pulley	910.74	kW
Motor Category	ABB 690V	Drive Efficiency	95	%
Motor Description	ABB SQ 690V Motor	Absorbed Power at Motor	958.67	kW
Motor Power Rating	1000 kW	Motor Full Load Speed	985	rpm
Motor Voltage	690 Volts	Motor Full Load Torque	9695	Nm
Number of poles	6	Motor Full Load Current	996	Amps
Motor Frame Size	M3BP ???	Motor Efficiency @ Duty Point	97.15	%
Motor Shaft Diameter	100 mm	Motor Power Factor @ Duty Pt	0.84	
Motor Shaft Height	0 mm	Mass of Motor	4000	kg
Motor Inertia	30 kg-m2			

Drive No.	3 Brake	Pulley No.	14	
Drive Description	Brake	Total Motor Power on Drive	0	kW
Number of Motors on Drive Pulley	0	Absorbed Power at Pulley	0	kW
Motor Category		Drive Efficiency	100	%
Motor Description	Brake Only	Absorbed Power at Motor	NaN	kW
Motor Power Rating	0 kW	Motor Full Load Speed	0	rpm
Motor Voltage	0 Volts	Motor Full Load Torque		Nm
Number of poles	0	Motor Full Load Current		Amps
Motor Frame Size		Motor Efficiency @ Duty Point	999	%
Motor Shaft Diameter	0 mm	Motor Power Factor @ Duty Pt	999	
Motor Shaft Height	mm	Mass of Motor		kg
Motor Inertia	0.01 kg-m2			

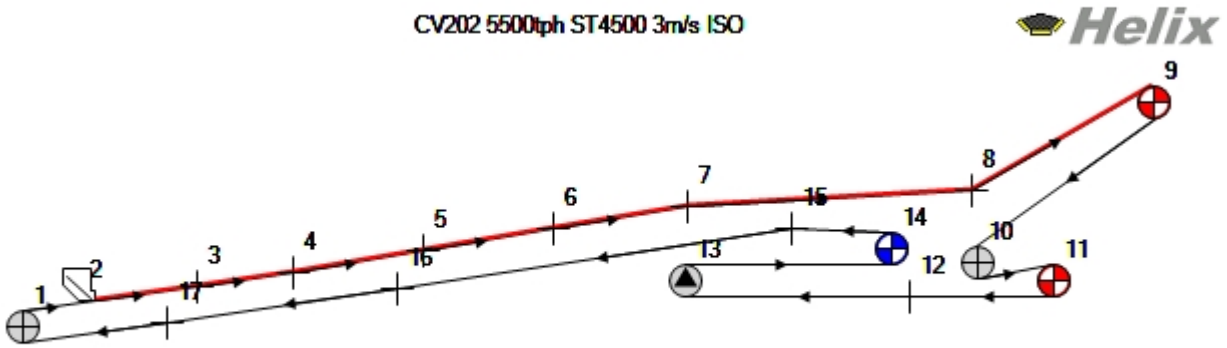
Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Drive Fluid Coupling Details Report

Helix Technologies Pty Ltd

Project	ABC Iron Ore Mine	Client	ABC Mining Ltd
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



Drive No. 1 Drive			Pulley No. 9		
Drive Description	**Head**		Coupling Size		
Number of Motors on Drive Pulley	**2**		Motor Power Rating	**1000**	kW
Selection Mode	**Manual**		Motor Full Load Speed	**985**	rpm
Coupling Category	**VVVF Drive**		Coupling Rated Slip	**0**	%
Coupling Description	**No Selection - Direct Drive**		Peak Torque %	**0**	% FLT
Coupling Power Rating	**0**	kW	Run-up Torque % (2 sec)	**0**	% FLT
Min. Required Ramping Time		sec	Coupling Output Speed	**985**	rpm
Max Starting Time	**0**	sec	Mass of Coupling	**0**	kg

Drive No. 2 Drive			Pulley No. 11		
Drive Description	**Return**		Coupling Size		
Number of Motors on Drive Pulley	**1**		Motor Power Rating	**1000**	kW
Selection Mode	**Auto**		Motor Full Load Speed	**985**	rpm
Coupling Category	**VVVF Drive**		Coupling Rated Slip	**0**	%
Coupling Description	**No Selection - Direct Drive**		Peak Torque %	**0**	% FLT
Coupling Power Rating	**0**	kW	Run-up Torque % (2 sec)	**0**	% FLT
Min. Required Ramping Time		sec	Coupling Output Speed	**985**	rpm
Max Starting Time	**0**	sec	Mass of Coupling	**0**	kg

Drive No. 3 Brake			Pulley No. 14		
Drive Description	**Brake**		Coupling Size		
Number of Motors on Drive Pulley	**0**		Motor Power Rating	**0**	kW
Selection Mode	**Manual**		Motor Full Load Speed	**0**	rpm
Coupling Category			Coupling Rated Slip	**0**	%
Coupling Description	**Brake Only**		Peak Torque %	**0**	% FLT
Coupling Power Rating		kW	Run-up Torque % (2 sec)	**0**	% FLT
Min. Required Ramping Time		sec	Coupling Output Speed	**0**	rpm
Max Starting Time	**30**	sec	Mass of Coupling		kg

Designers Comments

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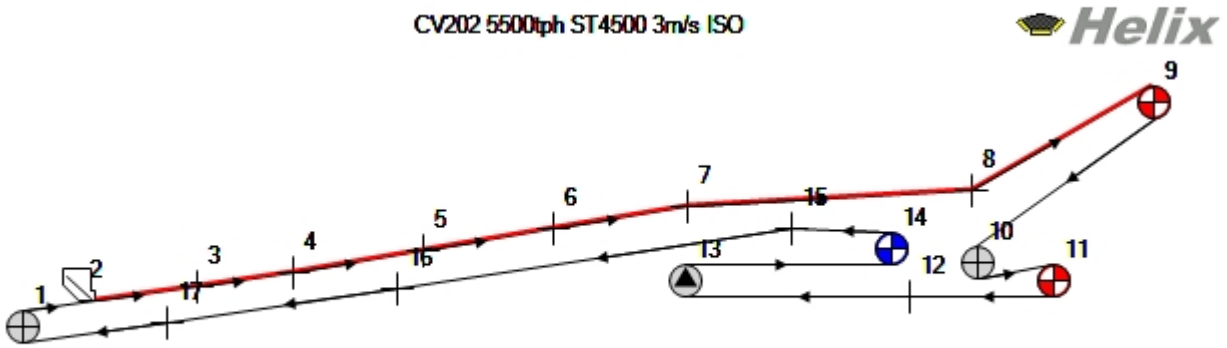
Drive Gearbox Details Report

Helix Technologies Pty Ltd

Project	ABC Iron Ore Mine	Client	ABC Mining Ltd
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



Drive No. 1 Drive — Pulley No. 9

Drive Description	Head	
Number of Motors on Drive Pulley	2	
Selection Mode	Auto	
Gearbox Category	Flender	
Gearbox Description	Flender Helical Bevel Gear	
Type	Helical Bevel Gear	
Size	22	
Code	B3SH22	
Ratio	28	
Number of Stages	B3SH22	
Design Efficiency (Input)	95	%
Gearbox Actual Efficiency	93	%
Maximum Input Shaft Speed	1500	rpm
Minimum Input Shaft Speed	700	rpm
Input Shaft Diameter	130	mm
Output Shaft Diameter	320	mm
Gearbox Inertia		kg-m2

Motor Power Rating	1000	kW
Motor Full Load Speed	985	rpm
Motor Torque @ FL Speed	9695	Nm
Motor Torque at Pulley Speed	270692	Nm
Gearbox Rated Torque	439000	Nm
Service Factor Required	1.5	
Service Factor Calculated	1.62	
Plus Speed Selection Tolerance	5	%
Minus Speed Selection Tolerance	5	%
Fluid Coupling Slip	0	%
Required Gearbox Ratio	27.919	:1
Selected Gearbox Ratio	28	:1
Required Pulley Speed	35.28	rpm
Calculated Pulley Speed for Reducer	35.18	rpm
Required Belt Speed	3	m/s
Calculated Belt Speed	2.99	m/s
Mass of Gearbox	9240	kg

Drive No. 2 Drive — Pulley No. 11

Drive Description	Return	
Number of Motors on Drive Pulley	1	
Selection Mode	Auto	
Gearbox Category	Flender	
Gearbox Description	Flender Helical Bevel Gear	
Type	Helical Bevel Gear	
Size	22	
Code	B3SH22	
Ratio	28	
Number of Stages	B3SH22	
Design Efficiency (Input)	95	%
Gearbox Actual Efficiency	93	%
Maximum Input Shaft Speed	1500	rpm
Minimum Input Shaft Speed	700	rpm
Input Shaft Diameter	130	mm
Output Shaft Diameter	320	mm
Gearbox Inertia		kg-m2

Motor Power Rating	1000	kW
Motor Full Load Speed	985	rpm
Motor Torque @ FL Speed	9695	Nm
Motor Torque at Pulley Speed	270692	Nm
Gearbox Rated Torque	439000	Nm
Service Factor Required	1.5	
Service Factor Calculated	1.62	
Plus Speed Selection Tolerance	5	%
Minus Speed Selection Tolerance	5	%
Fluid Coupling Slip	0	%
Required Gearbox Ratio	27.919	:1
Selected Gearbox Ratio	28	:1
Required Pulley Speed	35.28	rpm
Calculated Pulley Speed for Reducer	35.18	rpm
Required Belt Speed	3	m/s
Calculated Belt Speed	2.99	m/s
Mass of Gearbox	9240	kg

Drive No. **3 Brake** Pulley No. **14**

Drive Description	**Brake**	
Number of Motors on Drive Pulley	**0**	
Selection Mode	**Manual**	
Gearbox Category		
Gearbox Description	**Brake Only**	
Type		
Size		
Code		
Ratio	**1**	
Number of Stages		
Design Efficiency (Input)	**100**	%
Gearbox Actual Efficiency		%
Maximum Input Shaft Speed	**0**	rpm
Minimum Input Shaft Speed	**0**	rpm
Input Shaft Diameter		mm
Output Shaft Diameter		mm
Gearbox Inertia	**0**	kg-m2

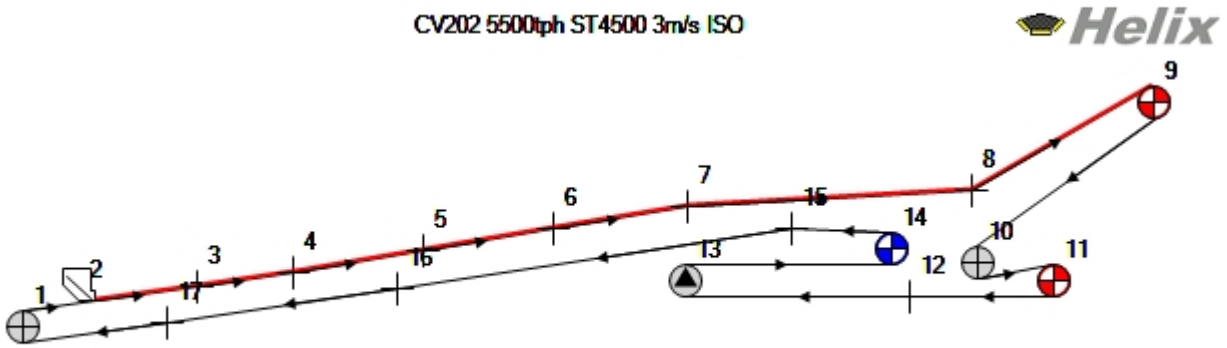
Motor Power Rating	**0**	kW
Motor Full Load Speed	**0**	rpm
Motor Torque @ FL Speed	**NaN**	Nm
Motor Torque at Pulley Speed	**NaN**	Nm
Gearbox Rated Torque	**0**	Nm
Service Factor Required	**1.5**	
Service Factor Calculated	**NaN**	
Plus Speed Selection Tolerance	**5**	%
Minus Speed Selection Tolerance	**5**	%
Fluid Coupling Slip	**0**	%
Required Gearbox Ratio	**1**	:1
Selected Gearbox Ratio	**1**	:1
Required Pulley Speed	**0**	rpm
Calculated Pulley Speed for Reducer	**0**	rpm
Required Belt Speed	**3**	m/s
Calculated Belt Speed	**3**	m/s
Mass of Gearbox		kg

Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Helix Technologies Pty Ltd

Project	ABC Iron Ore Mine	Client	ABC Mining Ltd
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



Drive / Brake No. 1 Drive — Pulley No. 9

Description	**Head**	
Load Share on Drive Pulley	**67**	**%**
Brake Category	**Svendborg BSFH 200**	
Brake Description	**No Brake on Drive**	
Caliper		
Number of Motors on Drive Pulley	**2**	

Brake Selection Input Data

Low Speed Brake Torque Input	**0**	kNm
Equiv HS Brake Torque	**0**	Nm
Design Braking Torque Input	**0**	Nm
Selected Brake's Torque Rating	**0**	Nm
Design Stopping Time	**10.0**	sec
Consecutive No of Stops	**3**	
Average No of Stops	**6**	
Ambient Temperature	**40**	deg C
Disc Temperature after stops	**0**	deg C

Brake Location	**None**	
Disc Material	**Mild Steel**	
Disc Diameter	**0**	mm
Disc Thickness	**0**	mm
Co-eff of Friction (Pad-Disc)	**0.4**	
Caliper Clamping Force Minimum	**0**	N
Caliper Clamping Force Maximum	**0**	N
Pad offset Width W	**0**	mm
Maximum Air Gap	**0**	mm
Recommended working airgap is 1mm		
Disc Initial Speed	**0**	rpm
Disc Moment of Inertia	**0.0**	kg-m2
Required Gearbox Ratio	**27.919**	**: 1**
Drive Efficiency	**95**	**%**
Mass of Caliper	**0**	kg
Brake Caliper Price	**$0.00**	

Drive / Brake No. 2 Drive — Pulley No. 11

Description	**Return**	
Load Share on Drive Pulley	**33**	**%**
Brake Category	**Svendborg BSFH 200**	
Brake Description	**No Brake on Drive**	
Caliper		
Number of Motors on Drive Pulley	**1**	

Brake Selection Input Data

Low Speed Brake Torque Input	**0**	kNm
Equiv HS Brake Torque	**0**	Nm
Design Braking Torque Input	**0**	Nm
Selected Brake's Torque Rating	**0**	Nm
Design Stopping Time	**10.0**	sec
Consecutive No of Stops	**3**	
Average No of Stops	**6**	
Ambient Temperature	**40**	deg C
Disc Temperature after stops	**0**	deg C

Brake Location	**None**	
Disc Material	**Mild Steel**	
Disc Diameter	**0**	mm
Disc Thickness	**0**	mm
Co-eff of Friction (Pad-Disc)	**0.4**	
Caliper Clamping Force Minimum	**0**	N
Caliper Clamping Force Maximum	**0**	N
Pad offset Width W	**0**	mm
Maximum Air Gap	**0**	mm
Recommended working airgap is 1mm		
Disc Initial Speed	**0**	rpm
Disc Moment of Inertia	**0.0**	kg-m2
Required Gearbox Ratio	**27.919**	**: 1**
Drive Efficiency	**95**	**%**
Mass of Caliper	**0**	kg
Brake Caliper Price	**$0.00**	

Drive / Brake No. **3 Brake** Pulley No. **14**

Description	**Brake**	
Load Share on Drive Pulley	**0**	**%**
Brake Category	**Svendborg BSFH 500**	
Brake Description	**Svendborg**	
Caliper	**BSFH 522**	
Number of Motors on Drive Pulley	**0**	

Brake Selection Input Data

Low Speed Brake Torque Input	**70**	kNm
Equiv HS Brake Torque	**0**	Nm
Design Braking Torque Input	**70000**	Nm
Selected Brake's Torque Rating	**70717**	Nm
Design Stopping Time	**20.0**	sec
Consecutive No of Stops	**3**	
Average No of Stops	**6**	
Ambient Temperature	**45**	deg C
Disc Temperature after stops	**104**	deg C

Brake Location	**Low Speed**	
Disc Material	**Mild Steel**	
Disc Diameter	**1200**	mm
Disc Thickness	**30**	mm
Co-eff of Friction (Pad-Disc)	**0.4**	
Caliper Clamping Force Minimum	**220000**	N
Caliper Clamping Force Maximum	**240000**	N
Pad offset Width W	**220**	mm
Maximum Air Gap	**3**	mm
Recommended working airgap is 1mm		
Disc Initial Speed	**45**	rpm
Disc Moment of Inertia	**47.94**	kg-m2
Required Gearbox Ratio	**1**	**: 1**
Drive Efficiency	**100**	**%**
Mass of Caliper	**380**	kg
Brake Caliper Price	**$0.00**	

Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Helix Technologies Pty Ltd

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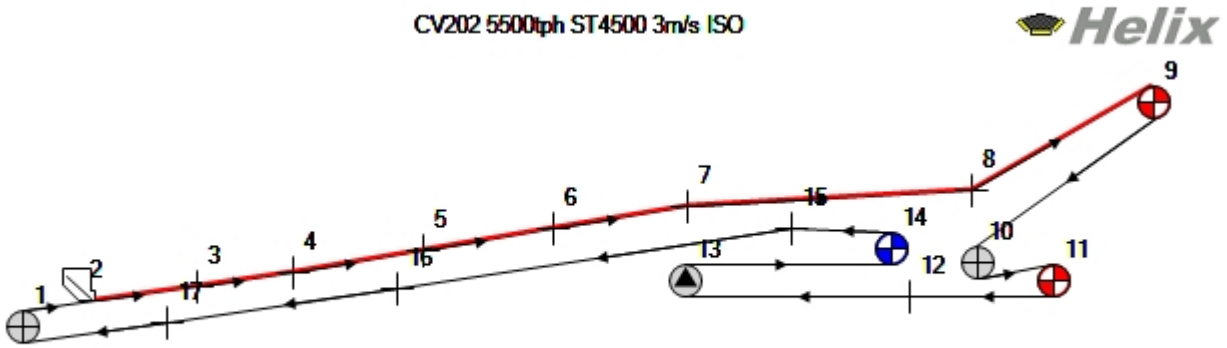
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



Drive No.	1 Drive	
Drive Description	**Head**	
Load Share on Drive Pulley	**67**	**985**
Starting Torque Factor, Fully Loaded	**106**	**%**
Starting Torque Factor, Empty	**34**	**%**
Number of Motors on Drive Pulley	**2**	
Drive Efficiency	**95**	**%**

Pulley No.	9	
Motor Power Rating	**1000**	kW
Motor Full Load Speed	**985**	rpm
Motor Torque @ FL Speed	**9695**	Nm
Motor Torque at Pulley Speed	**270692**	Nm
Pulley Shaft Diameter at Brg	**420**	mm

High Speed Coupling

HS Coupling Category	**Falk SteelFlex Grid**	
HS Coupling Make	**Falk**	
HS Coupling Model	**1120T**	
Coupling Type	**Grid**	
Coupling Torque Rating	**13700**	Nm
Service Factor Required	**1.5**	
Service Factor Calculated	**0.71**	
Maximum Shaft Bore	**140**	mm
Minimum Shaft Bore	**0**	mm
Maximum Rotation Speed	**2025**	rpm
High Speed Coupling Inertia	**0**	kg-m2
Drawing Number		
High Speed Coupling Mass	**81.2**	kg
High Speed Coupling Price	**0**	

Low Speed Coupling

LS Coupling Category	**Falk G82**	
LS Coupling Make	**Falk**	
LS Coupling Model	**1120G**	
Coupling Type	**Rigid Flanged**	
Coupling Torque Rating	**556756**	Nm
Service Factor Required	**1.5**	
Service Factor Calculated	**0.71**	
Maximum Shaft Bore	**482.6**	mm
Minimum Shaft Bore	**152.4**	mm
Maximum Rotation Speed	**1200**	rpm
Low Speed Coupling Inertia	**0**	kg-m2
Drawing Number		
Low Speed Coupling Mass	**2055**	kg
Low Speed Coupling Price	**0**	

Fluid Coupling

☑ Direct Drive

Fluid Coupling	**No Selection - Direct Drive**
Fluid Coupling Size	

Drive No.	2 Drive	
Drive Description	Return	
Load Share on Drive Pulley	33	985
Starting Torque Factor, Fully Loaded	106	%
Starting Torque Factor, Empty	34	%
Number of Motors on Drive Pulley	1	
Drive Efficiency	95	%

Pulley No.	11	
Motor Power Rating	1000	kW
Motor Full Load Speed	985	rpm
Motor Torque @ FL Speed	9695	Nm
Motor Torque at Pulley Speed	270692	Nm
Pulley Shaft Diameter at Brg	360	mm

High Speed Coupling		
HS Coupling Category	Falk SteelFlex Grid	
HS Coupling Make	Falk	
HS Coupling Model	1120T	
Coupling Type	Grid	
Coupling Torque Rating	13700	Nm
Service Factor Required	1.5	
Service Factor Calculated	1.41	
Maximum Shaft Bore	140	mm
Minimum Shaft Bore	0	mm
Maximum Rotation Speed	2025	rpm
High Speed Coupling Inertia	0	kg-m2
Drawing Number		
High Speed Coupling Mass	81.2	kg
High Speed Coupling Price	0	

Low Speed Coupling		
LS Coupling Category	Falk G82	
LS Coupling Make	Falk	
LS Coupling Model	1120G	
Coupling Type	Rigid Flanged	
Coupling Torque Rating	556756	Nm
Service Factor Required	1.5	
Service Factor Calculated	1.41	
Maximum Shaft Bore	482.6	mm
Minimum Shaft Bore	152.4	mm
Maximum Rotation Speed	1200	rpm
Low Speed Coupling Inertia	0	kg-m2
Drawing Number		
Low Speed Coupling Mass	2055	kg
Low Speed Coupling Price	0	

Fluid Coupling

☑ Direct Drive

Fluid Coupling	No Selection - Direct Drive
Fluid Coupling Size	

Drive No.	3 Brake	
Drive Description	Brake	
Load Share on Drive Pulley	0	0
Starting Torque Factor, Fully Loaded	100	%
Starting Torque Factor, Empty	100	%
Number of Motors on Drive Pulley	0	
Drive Efficiency	100	%

Pulley No.	14	
Motor Power Rating	0	kW
Motor Full Load Speed	0	rpm
Motor Torque @ FL Speed	NaN	Nm
Motor Torque at Pulley Speed	NaN	Nm
Pulley Shaft Diameter at Brg	260	mm

High Speed Coupling		
HS Coupling Category		
HS Coupling Make	Brake Only	
HS Coupling Model		
Coupling Type		
Coupling Torque Rating	0	Nm
Service Factor Required	0	
Service Factor Calculated	NaN	
Maximum Shaft Bore	0	mm
Minimum Shaft Bore	0	mm
Maximum Rotation Speed	0	rpm
High Speed Coupling Inertia	0	kg-m2
Drawing Number		
High Speed Coupling Mass	0	kg
High Speed Coupling Price	0	

Low Speed Coupling		
LS Coupling Category		
LS Coupling Make	Brake Only	
LS Coupling Model		
Coupling Type		
Coupling Torque Rating	0	Nm
Service Factor Required	0	
Service Factor Calculated	NaN	
Maximum Shaft Bore	0	mm
Minimum Shaft Bore	0	mm
Maximum Rotation Speed	0	rpm
Low Speed Coupling Inertia	0	kg-m2
Drawing Number		
Low Speed Coupling Mass	0	kg
Low Speed Coupling Price	0	

Fluid Coupling

☑ Direct Drive

Fluid Coupling	Brake Only
Fluid Coupling Size	

Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low

Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Helix Technologies Pty Ltd

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Station / Sectio								Calculated		Selected			
Station	Description	Shaft Length mm	Wrap Angle deg	T1 Run kN	T2 Run kN	Resul-tant Force kN	T1 Start kN	Defl. Dia mm	Dt. Dia mm	Shaft Dia mm	Brg Dia mm	Brg Ctrs mm	Shaft Mass kg
1	Tail	3360	180.0	314.4	317.2	0.6	328.0	294.8	285.6	300	300	2600	1864
9	Drive	3600	178.0	1119.3	510.1	0.8	1214.1	373.6	410.5	450	420	2600	4495
10	Snub	3420	182.0	505.9	510.4	0.6	571.1	332.0	334.6	340	340	2600	2437
11	Drive	3500	190.0	511.3	211.0	0.8	576.6	304.6	346.6	380	360	2600	3116
13	Takeup	3260	180.0	210.8	212.8	0.6	210.8	266.7	250.0	280	260	2600	1576
14	Brake	3260	180.0	219.5	221.6	0.6	219.7	269.5	253.4	280	260	2600	1576

Designers Comments

* Denotes manual pulley shaft dimensions entered

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

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Station / Sectio

Station	Description	Shell Dia mm	Lagging mm	Face Width mm	Shaft Length mm	Brg Ctrs mm	Shaft Dia mm	Brg Dia mm	Wrap Angle deg	Pulley Speed rpm	Pulley & Shaft Mass kg	Mom of Inertia kgm2
1	Tail	1250	12	2000	3360	2600	300	300	180.0	45.0	4822	880.0
9	Drive	1600	12	2000	3600	2600	450	420	178.0	35.3	9478	2415.3
10	Snub	1250	12	2000	3420	2600	340	340	182.0	45.0	5370	894.3
11	Drive	1600	12	2000	3500	2600	380	360	190.0	35.3	8164	2357.8
13	Takeup	1250	12	2000	3260	2600	280	260	180.0	45.0	4545	874.5
14	Brake	1250	12	2000	3260	2600	280	260	180.0	45.0	4545	874.5

Designers Comments

* Denotes manual pulley dimensions entered

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Conveyor Pulley Dimensions

Helix Technologies Pty Ltd

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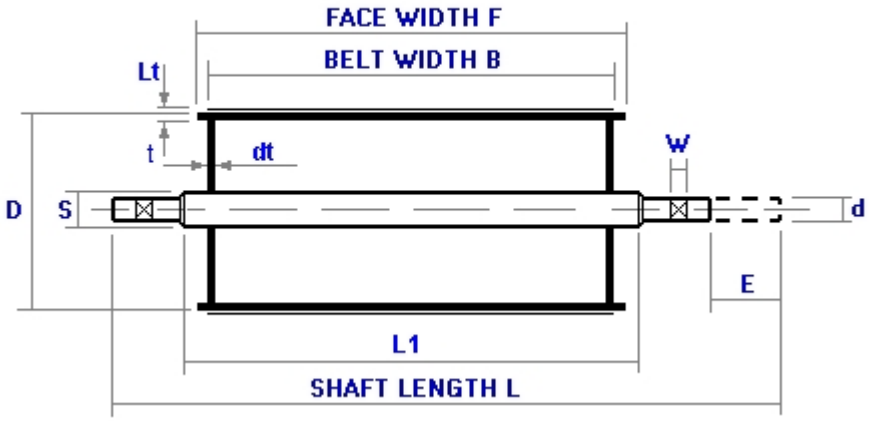


Station / Sectio

Station	Description	Shell Dia mm	Lagging mm	OD mm	Face Width mm	Shaft Length mm	Brg Ctrs mm	Shaft Dia mm	Brg Dia mm	Belt Width mm	Pulley & Shaft Mass kg	Mom of Inertia kgm2
1	Tail	1250	12	1274	2000	3360	2600	300	300	1800	4822	880.0
9	Drive	1600	12	1624	2000	3600	2600	450	420	1800	9478	2415.3
10	Snub	1250	12	1274	2000	3420	2600	340	340	1800	5370	894.3
11	Drive	1600	12	1624	2000	3500	2600	380	360	1800	8164	2357.8
13	Takeup	1250	12	1274	2000	3260	2600	280	260	1800	4545	874.5
14	Brake	1250	12	1274	2000	3260	2600	280	260	1800	4545	874.5

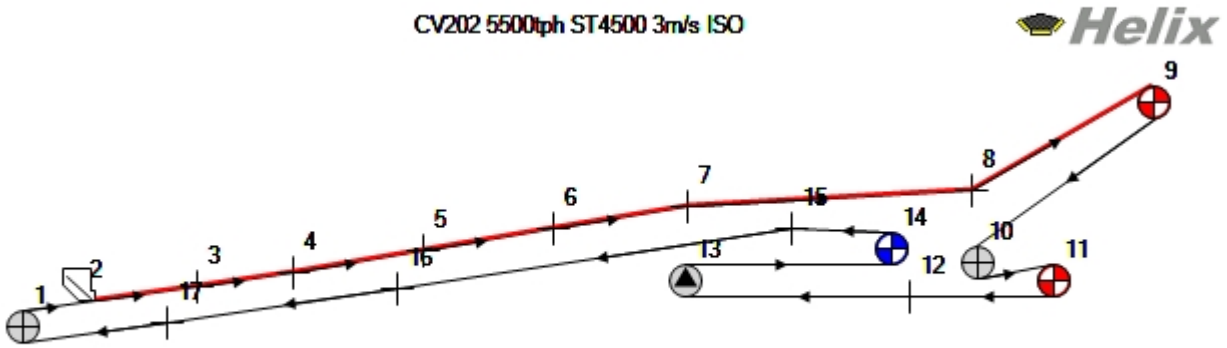
Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.

Conveyor Pulleys Data Sheet

Helix Technologies Pty Ltd

Project	ABC Iron Ore Mine	Client	ABC Mining Ltd
Project No.	PO 56414	Prepared By	P. Burrow
Conveyor No.	CV202 5500tph ST4500 3m/s ISO	Design Date	26 September 2011



Station / Sectio

Station	Description	Shell Dia mm	Lagging mm	Face Width mm	Brg Ctrs mm	Drive Power kW	Wrap Angle deg	Pulley Speed rpm	T1 Run kN	T2 Run kN	T1 Start kN	T2 Start kN
1	Tail	1250	12	2000	2600		180.0	45.0	314.38	317.24	350.09	352.71
									Running Full		Braking Empty	
9	Drive	1600	12	2000	2600	2000	178.0	35.3	1119.31	510.09	1214.12	575.17
									Running Full		Starting Full	
10	Snub	1250	12	2000	2600		182.0	45.0	505.87	510.38	571.09	575.64
									Running Full		Starting Full	
11	Drive	1600	12	2000	2600	1000	190.0	35.3	511.34	211.0	576.62	256.85
									Running Full		Starting Full	
13	Takeup	1250	12	2000	2600		180.0	45.0	210.84	212.81	210.84	212.85
									Running Full		Starting Full	
14	Brake	1250	12	2000	2600	0	180.0	45.0	219.54	221.57	218.68	330.38
									Running Full		Braking Empty	

Designers Comments

Conveyor CV202 at 5500tph 3m/s with 1800 wide belt. 3 x 1000kW 6 pole drives each fitted with 500kgm2 Flywheel. 70kNm Low Speed Brake after takeup. Idler Spacing 1.25m carry and 5.0m return average.