



**CONVEYOR CALCULATION  
METHOD - IS 11592, 2000**

Revision	0
JOB NO	
UNIT NO	0167

Conv. No.	Item	Unit	Symbol	Data				
1	Length along belt	m	L	420.000	Take-Up Type		VG TU	
2	Lift	m	H	20.800	Take up location from head pulley (length in m)		6.5	
3	Belt width	m	B	1.0	Take up location from head pulley (lift in m)		0	
4	Skirt width	m	b <sub>1</sub>	0.7	No. of Scrapers from head pulley to take-up pulley		2	
5	Capacity	TPH	T	240	No. of snub/bend pulley in between drive pulley and take up pulley		2	
6	Vol. Capacity	m <sup>3</sup> /s	Q	= T/3600.ρ 0.029	No. of tail/takeup pulley in between drive pulley and take up pulley		1	
7	Belt speed	m/s	v	2.50	Troughing Angle ( in Deg.)		35	
8	Bulk Density	t/m <sup>3</sup>	ρ	2.3				
9	Art. Friction coeff.	-	f	0.03				
10	Carr. Idler mass	Kg/m	m <sub>c</sub>	30.0				
11	Ret. Idler mass	Kg/m	m <sub>r</sub>	10.0				
12	Belt mass	Kg/m	m <sub>b</sub>	17.710				
13	Material mass	Kg/m	m <sub>G</sub>	= T.1000/3600.v 26.667				
14	Drive margin	%		20				
15	Drive efficiency	%		93				
16	Car.idler spacing	m	P <sub>c</sub>	1.000				
17	Drive pulley wrap angle	deg	φ	200				
18	Coeff.-friction ( pulley/belt)	-	μ	0.275				
19	Coeff.-friction ( idler/belt)	-	μ <sub>0</sub>	0.350				
20	Coeff.-friction ( material/belt)	-	μ <sub>1</sub>	0.600				
21	Coeff.-friction ( material/skirt)	-	μ <sub>2</sub>	0.600				
22	Coeff.-friction ( belt/scrapper)	-	μ <sub>3</sub>	0.650				
23	Pressure between belt & scrapper	N/m <sup>2</sup>	P	60000				
24	Belt thickness	m	t	0.015				
25	No. of scrappers	-	n <sub>s</sub>	4				
26	Acceleration Coefficient	-	ξ	1.6				
27	Slope angle	Deg	δ	14				
28	Cosine of Delta	-	cos δ	1.000				
29	Coefficient of Conv. Len	-	α	1.270				
30	Thickness of scrapper	m	-	0.020				
31	Skirt length	m	l <sub>sk</sub>	10.0				
32	Accl. Length at loading point	m	l <sub>a</sub>	=v <sup>2</sup> -v <sub>0</sub> <sup>2</sup> /2.g.μ <sub>1</sub> 0.531	<b>Pulley type</b>			
33	Shaft dia. Of pulley	m	d		Discharge/Tripper	Tail/Take up	Snub/Bend	Drive
34	Dia. Of pulley	m	D		0.16	0.125	0.11	0.16
35	No. of pulleys	-	n		0.5	0.4	0.4	0.5
36	Pulley weight	N	W <sub>p</sub>		1	2	6	1
					9430	8016	7073	9430



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37	Main resistance	N	R	=f.L.g(m <sub>c</sub> +m <sub>r</sub> +(2m <sub>b</sub> +m <sub>g</sub> )/cosδ) or α.f.L.g(mc+mr+(2mb+mG)/cosδ)	16025.526				
38	Resistance - accl. area	N	R <sub>a</sub>	=Q.1000.p.(v-v <sub>0</sub> )	166.667				
39	Resistance - skirt in accln area	N	R <sub>ska</sub>	=μ <sub>2</sub> .Q <sup>2</sup> .1000.p.g.la/((v+v <sub>0</sub> )/2) <sup>2</sup> .b. <sup>2</sup>	8.696				
40	Wrap resistance	N	R <sub>w</sub>	=9.B.(140+0.01.Tav/B).t/D	1507.739	137.067	342.668	1028.004	137.067
41	Pulley bearing resistance	N	R <sub>b</sub>	=0.005.(d/D).R <sub>v</sub>	961.882	118.614	231.667	611.601	118.614
42	Secondary resistance	N	R <sub>s</sub>	=SL.NO.38+39+40+41	2644.983				
43	Resistance due to idler tilt	N	R <sub>i</sub>	= 0	0.000				
44	Resistance - skirt	N	R <sub>sk</sub>	=μ <sub>2</sub> .Q <sup>2</sup> .1000.p.g.lsk/(v <sup>2</sup> .b. <sup>2</sup> )	40.946				
45	Resistance - scrapper	N	R <sub>bc</sub>	=0.02.B.P.μ3.n <sub>s</sub>	3120.000				
46	Resistance - discharge plough	N	R <sub>p</sub>	= 0	0.000				
47	Special resistance	N	R <sub>sp</sub>	= SL.NO. 43+44+45+46	3160.946				
48	Lift resistance	N	R <sub>l</sub>	=m <sub>G</sub> .H.g	5441.280				
49	Peripheral force on drive pulley	N	T <sub>E</sub>	= SL. NO. 37+42+47+48 OR =SL. NO. 37+47+48	24627.752				
50	Slack side tension (calculated)	N	T <sub>2</sub>	=T <sub>E</sub> .ξ / (e <sup>μ</sup> .φ-1)	24451.753				
51	Tight side tension (calculated)	N	T <sub>1</sub>	=SL. NO. 50+51	49079.505				
52	Average tension	N	T <sub>av</sub>	=(49 + 50)/2	36765.629				
53	-	N	T <sub>1</sub> + T <sub>2</sub>		73531.258				
54	-	N <sup>2</sup>	(T <sub>1</sub> + T <sub>2</sub> ) <sup>2</sup>		5406845946.285				
55	-	N <sup>2</sup>	(T <sub>1</sub> + T <sub>2</sub> ) <sup>2</sup> + W <sub>p</sub> <sup>2</sup>		5495770846.285				
56	-	N	R <sub>v</sub>	=SL. NO. 55*0.5	74133.466				
57	Belt Power	KW	P <sub>DP</sub>	=T <sub>E</sub> .v/1000	61.569				
58	Drive pulley resistance	N		=DRIVE PULLEY WRAP RESISTANCE + DRIVE PULLEY BEARING RESISTANCE	255.681				
59	Absorbed power	KW	P <sub>A</sub>	=P <sub>DP</sub> +(SL. NO. 58.v/1000)	62.209				
60	Min. Motor rating	KW	P <sub>M</sub>	=P <sub>A</sub> (100+SL. NO. 14)/SL. NO. 15	80.269				
61	Take up tension	KN	T <sub>tk</sub>		26.898				
62	Min tension	KN	T <sub>min</sub>		3				
63	<b>OUTPUT RESULTS</b>								
64	Tight side tension(starting)	KN	T <sub>1</sub>	=T <sub>2</sub> +T <sub>E</sub> x Acceleration factor(sl no-27)	63.856				
65	Slack side tension(starting)	KN	T <sub>2</sub>		24.452				
66	Tight side tension(runing)	KN	T <sub>1</sub>	=T <sub>2</sub> +T <sub>E</sub>	49.080				
67	Slack side tension(runing)	KN	T <sub>2</sub>		24.452				
68	Tail tension	KN	T <sub>1</sub>		29.597				
69	Take up Tension	KN	T <sub>tk</sub>		26.898				
70	Effective tension	KN	T <sub>e</sub>		24.628				
71	Consumed KW	KW			66.891				
72	Min. Motor rating	KW	P <sub>M</sub>		80.269				
73	Selected motor	KW	PM		90.0				