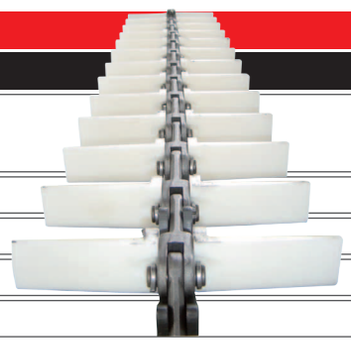
Chain calculations

Conveyor chain calculations

Chain speed in m/sec (v)

$$v = \frac{z \times t \times n}{60.000}$$

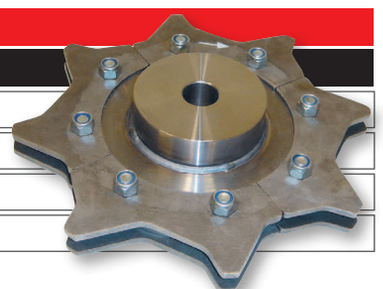


v	=	chain speed in m per sec
z	=	number of teeth
t	=	chain pitch (mm)
n	=	rotations per minute

Conveyor chain calculations

Capacity in kg per hour (Q)

$$Q = A \times v \times 3600 \text{ sec.}$$



Q	=	capacity in m3 per hour
A	=	trough width x layer height in m2
v	=	chain speed in m per sec

Conveyor chain calculations

Material weight on the chain in kg (mass1)

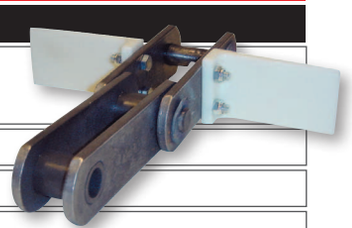
$$\text{Mass-1} = \frac{\text{tons per hour} \times \text{distance in meters}}{v \times 3{,}6}$$

Mass-1	=	material weight on the chain in kg
v	=	chain speed in m per sec

Conveyor chain calculations

Power in Kw (P)

$$P = \frac{(v \times \text{mass-1} \times \mu 1 + \text{mass-2} \times \mu 2) \times 9{,}81}{1.000}$$



P	=	power in Kw
v	=	chain speed in m per sec
mass-1	=	material weight on the chain in kg
µ1	=	friction between steel and the product (for a smooth-running product ca. 1,15)
mass-2	=	total chain weight in kg
µ2	=	friction between the steel bottom and the chain (for steel pushers approx. 0,25 and for plastic pushers approx. 0,15)

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Sprocket calculations

PITCH DIAMETER

z = number of teeth, n = chain pitch — Pitch diameter (in mm) = n x pitch of the chain

z	n	z	n	z	n	z	n	z	n
6	2,0000	46	14,6537	86	27,3807	126	40,1112	166	52,8426
7	2,3048	47	14,9717	87	27,6990	127	40,4295	167	53,1609
8	2,6131	48	15,2898	88	28,0172	128	40,7478	168	53,4792
9	2,9238	49	15,6079	89	28,3355	129	41,0660	169	53,7975
10	3,2361	50	15,9260	90	28,6537	130	41,3843	170	54,1158
11	3,5495	51	16,2441	91	28,9720	131	41,7026	171	54,4341
12	3,8637	52	16,5622	92	29,2902	132	42,0290	172	54,7524
13	4,1786	53	16,8803	93	29,6084	133	42,3392	173	55,0707
14	4,4940	54	17,1984	94	29,9267	134	42,6574	174	55,3889
15	4,8097	55	17,5166	95	30,2449	135	42,9757	175	55,7072
16	5,1258	56	17,8347	96	30,5632	136	43,2940	176	56,0255
17	5,4422	57	18,1529	97	30,8815	137	43,6123	177	56,3438
18	5,7588	58	18,4710	98	31,1997	138	43,9306	178	56,6621
19	6,0755	59	18,7892	99	31,5180	139	44,2488	179	56,9804
20	6,3925	60	19,1073	100	31,8362	140	44,5671	180	57,2987
21	6,7095	61	19,4255	101	32,1545	141	44,8854	181	57,6170
22	7,0267	62	19,7437	102	32,4727	142	45,2037	182	57,9353
23	7,3439	63	20,0619	103	32,7910	143	45,5220	183	58,2536
24	7,6613	64	20,3800	104	33,1093	144	45,8402	184	58,5719
25	7,9787	65	20,6982	105	33,4275	145	46,1585	185	58,8902
26	8,2962	66	21,0164	106	33,7458	146	46,4768	186	59,2085
27	8,6138	67	21,3346	107	34,0641	147	45,7951	187	59,5267
28	8,9314	68	21,6528	108	34,3823	148	47,1134	188	59,8450
29	9,2491	69	21,9710	109	34,7006	149	47,4317	189	60,1634
30	9,5668	70	22,2892	110	35,0188	150	47,7500	190	60,4817
31	9,8845	71	22,6074	111	35,3371	151	48,0683	191	60,7999
32	10,2023	72	22,9256	112	35,6554	152	48,3865	192	61,1182
33	10,5201	73	23,2438	113	35,9737	153	48,7048	193	61,4366
34	10,8380	74	23,5620	114	36,2919	154	49,0231	194	61,7549
35	11,1558	75	23,8802	115	36,6102	155	49,3414	195	62,0732
36	11,4737	76	24,1984	116	36,9285	156	49,6597	196	62,3915
37	11,7916	77	24,5167	117	37,2467	157	49,9780	197	62,7097
38	12,1096	78	24,8349	118	37,565	158	50,2963	198	63,0279
39	12,4275	79	25,1531	119	37,8833	159	50,6146	199	63,3464
40	12,7455	80	25,4713	120	38,2015	160	50,9329	200	63,6646
41	13,0635	81	25,7896	121	38,5198	161	51,2511	201	63,9829
42	13,3815	82	26,1078	122	38,8381	162	51,5694	202	64,3012
43	13,6995	83	26,426	123	39,1564	163	51,8877	203	64,6195
44	14,0176	84	26,7443	124	39,4746	164	52,2060	204	64,9378
45	14,3356	85	27,0625	125	39,7929	165	52,5243	205	65,2562

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Specific weights

The following specific weights (sw) are frequently used for calculations in conjunction with elevators, screw conveyors, and chain conveyors.

Specific weight (in g/cm3)					
product	sw				
aloin	1,700	earth	1,600	peat	0,410
aluminum	2,800	egg powder	0,250	peat mulch	0,230
amaril	4,000			pit coal	0,860
anthracite	1,700	fish meal	0,900	potatoes, in bulk	0,800
asbestos	2,800	flax seed	0,720	pulp	1,100
ash	0,900	flower, loose	0,500		
		fly ash	1,000	resin	1,070
baking powder	0,900			rye, in bulk	0,780
barley, in bulk	0,690	gaged mortar	1,900		
basalt	3,000	grain	0,750	salt	1,100
bauxite	2,550	granite	2,800	sand	1,600
bitumen	1,500	graphite	2,300	sandstone	2,500
blast furnace slag	2,800			sawdust	0,600
boiler slag	1,000	hard rock	2,700	shale	2,800
brick	1,500	hay	0,120	shingle	1,650
broken stone	1,700	hemp fibers	1,500	soda, heavy	0,900
bronze	8,800	hops	0,560	straw	0,045
brown coal	0,780			sugar	1,600
buckwheat, in bulk	0,810	kitchen salt	2,160		
				talc	2,700
cement	1,600	lime, caustic	1,300	turnips, in bulk	0,650
cement root	2,100	lime mortars	1,700		
chalk	2,600	lime stone	2,800	wheat, in bulk	0,800
charcoal	0,400	lime, slaked	1,400	wool	1,320
clay	1,600	linseed, broken	0,500		
clinkers	2,000	loam	1,600		
coffee, green	0,510				
cokes	0,600	marble	2,700		
concrete	2,400				
cork	0,350	oats, in bulk	0,500		
corn	0,750	ore, crude	2,200		
cottonseeds	0,400	ore, fine	2,800		
domestic waste	0,700				

The above-mentioned specific weights are measured in dry condition.

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