VAV

Conveyor components and solutions

CONVEYOR CHAINS



There are two types of conveyor chains:

- √ Drop forged chain
- √ Double drag link chain DIN 8165-FV and DIN 8167-M
- √ Double drag link chain WH-series steel mill chain

VAV supplies different versions of both types and can deliver the optimum conveyor chain for any purpose.

The chains can be equipped with plastic, welded, or bent scrapers (or a combination).

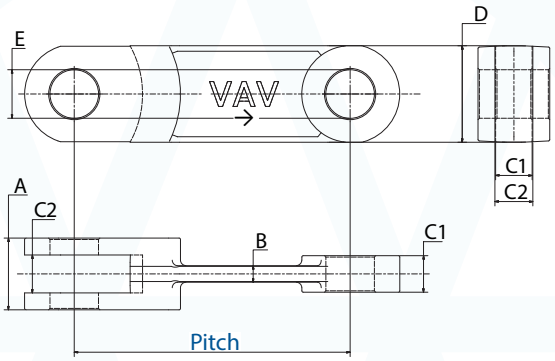
Supplier of spare parts
for the bulk handling industry



Drop forged chain

The drop forged chains supplied by VAV are made of heat treated high grade alloy steel. The links can be equipped with plastic flights and/or steel scrapers. The following table shows various types of drop forged chains ex stock, together with the respective breaking loads and core/surface hardness.

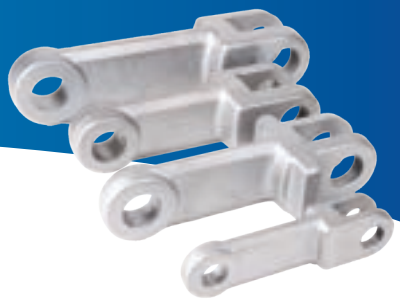






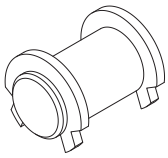
Drop forged chain (parameters in mm)								
Pitch	A	B	C1	C2	D	E	Breaking loads available ex stock	
							58 HRC Case hardened	Q&T 40 HRC
102	32	10	14	15	36	18	150 kN	
102	27	11	12	13	36	16		170 kN
102	30	8	13	13,5	36	14		140 kN
102	24	6	8	9	36	14	100 kN	
125	36	10	15	16	36	16		140 kN
142	42	13	19	20	50	25	250 kN	350 kN
142	54	16	25	26	50	25	300 kN	380 kN
142	62	15	29	30	50	25	350 kN	600 kN
150	36	13	15	16	50	25		200 kN
150	36	13	15	16	50	25		300 kN
150	36	13	15	16	50	25		400 kN
160	42	13	20	21	46	20		300 kN
160	50	14	25	26	50	25	300 kN	380 kN
175	62	15	29	30	50	25		600 kN
200	68	18	30	31	60	30	500 kN	
200	70	24	30	31	60	30		700 kN
250	70	20	30	33	70	32		750 kN
260	70	20	30	33	70	32	600 kN	

Materials: 20MnCr5, 42CrM04, Stainless steel 304/316, 1.4713. The breaking load depends on the choice of material.

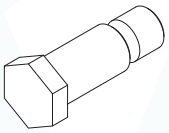


Pins

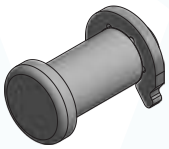
Pins are available in different executions and the following materials:
16MnCr5, 42CrMo4i, 1.4034i, 1.4122i, 1.4462, 1.4713. Other materials are available on request.



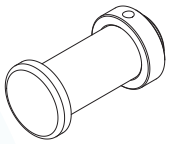
Circlips



hex pin with thread



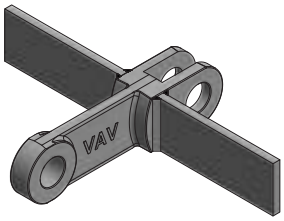
Head pin with circlips



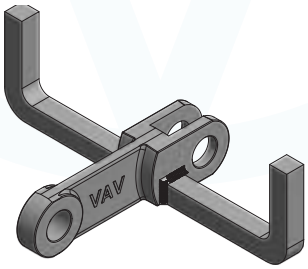
Head pin with
collar and dowel pin

Examples of drop forged chain with scrapers

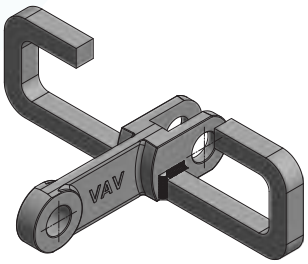
VAV can supply all kinds of scrapers. Whether it is horizontal, inclined or vertical transport, there is a special version for every type of transport and a solution for every capacity. Below you will find a number of examples of steel scrapers and plastic flights.



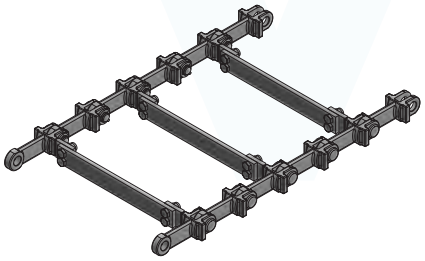
Horizontal transport



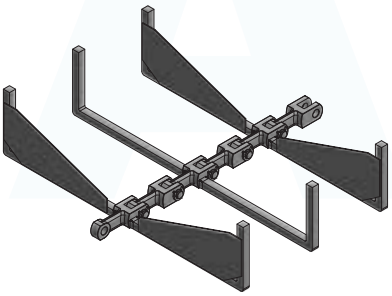
"U" scraper for
inclined transport



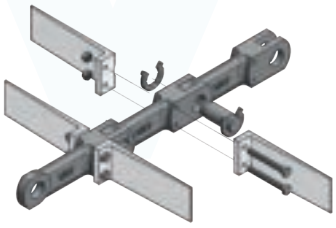
"O" scraper
for vertical transport



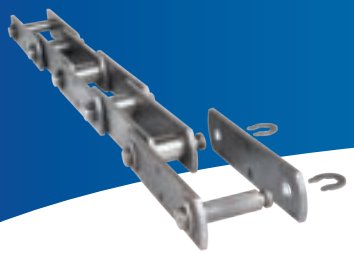
Double drop forged chain scraper



"U" scraper with welded plates



Easy to (dis)assemble
plastic flights



DIN-chains in stock

VAV does not recommend an "own" type of chain. Capacity, type of bulk material, situation on site, and price / quality ratio determine the advice of our technicians. That is why VAV stocks a large number of double drag link chains and sprockets in various sizes.

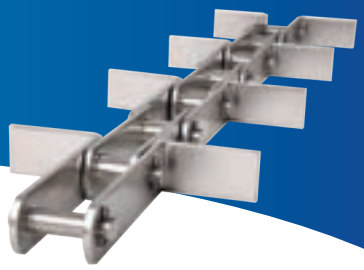
These chains can be custom-made, with a short delivery time, with plastic flights and/or steel welded scrapers. The standard pins are fitted with a circlip (unless otherwise stated). An overview of the chains available from stock can be found in the table below.

VAV double drag link chain (parameters in mm) available from stock

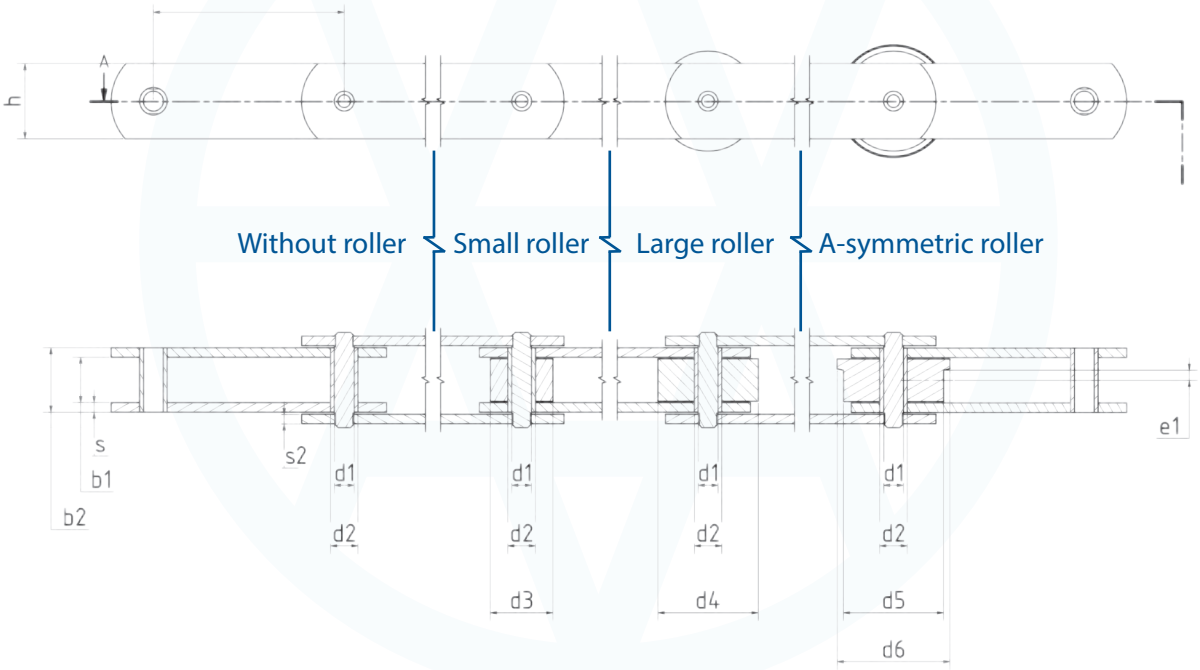
Pitch	Inner	Bush/pin	Plates	Breaking load
(p)	width (b1)	Ø (d1/d2)	(h x s)	in kN
66,27	28,5	**16 / 11	30 x 5	63
80	22	**18 / 12	30 x 4	63
80	25	20 / 14	35 x 5	90
80	25	*20 / 14	35 x 6	110
80	25	*20 / 14	35 x 8	110
80	30	22 / 16	40 x 6	112
80	35	30 / 20	50 x 8	180
100	22	18 / 12	30 x 4	63
100	25	20 / 14	35 x 5	90
125	25	20 / 14	35 x 5	90
125	30	22 / 16	40 x 6	112
125	32	**21 / 15	40 x 6	112
125	30	26 / 18	45 x 6	140
125	35	26 / 18	45 x 6	140
125	30	30 / 20	50 x 8	180
125	45	30 / 20	50 x 8	180
150	30	22 / 16	50 x 6	112
150	52	25 / 18	50 x 8	140
150	45	30 / 20	50 x 8	180
150	55	36 / 26	50 x 8	250
160	30	30 / 20	50 x 8	180
160	37	**25 / 18	50 x 7	160
160	45	30 / 20	50 x 8	180
160	55	36 / 26	60 x 10	250

* Splitpin execution
** Revited execution

DIN 8165 - FV

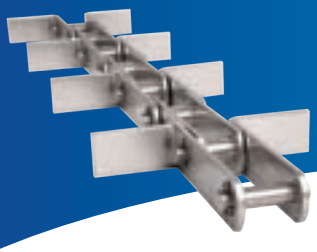


Double drag link chains according to DIN 8165 (FV) and DIN 8167 (M) are available with connecting pins in a circlip, split pin and riveted version. The steel scrapers can be L-shape bent, welded and / or bolted with plastic profiles. It is also possible to attache special VAV plastic scrapers on every outside link. The chains can also be fitted with rollers. Delivery in different materials, (inductive) hardened is possible on request.



DIN 8165 - FV - Double drag link chain (parameters in mm)										
Breaking load in kN	63	90	112	140	180	250	315	400	500	630
Inner width (b1)	22	25	30	35	45	55	65	70	80	90
Bush Ø (d2)	18	20	22	26	30	36	42	44	50	56
Pin Ø (d1)	12	14	16	18	20	26	30	32	36	42
Plate height (h)	30	35	40	45	50	60	70	70	80	100
Plate thickness (s)	4	5	6	6	8	8	10	12	12	12
Small roller (d3)	26	30	32	36	42	50	60	60	70	80
Large roller (d4)	40	48	55	60	70	80	90	100	110	120
A-symmetric (d5/d6)	50/60	63/73	72/87	80/95	100/120	125/145	140/170	150/185	160/195	170/210
Angle acc. DIN	30x4	40x5	40x6	50x7	50x7	65x7	70x9	70x11	80x12	100x12

Available in pitch (p): 40 - 50 - 63 - 80 - 100 - 125 - 135 -150 - 160 - 200 - 250 mm.
Other sizes and materials are available on request.



DIN 8167 - M

DIN 8167 - M - Double drag link chain (parameters in mm)									
Breaking load in kN	56	80	112	160	224	315	450	630	900
Inner width (b1)	24	28	32	37	43	48	56	66	78
Bush Ø (d2)	15	18	21	25	30	36	42	50	60
Pin Ø (d1)	10	12	15	18	21	25	30	36	44
Plate height (h)	30	35	40	50	60	70	80	100	120
Plate thickness (s)	4	5	6	7	8	10	12	14	16
Small roller (d3)	21	25	30	36	42	50	60	70	85
Large roller (d4)	42	50	60	70	85	100	120	140	170
A-symmetric (d5/d6)	42/50	50/60	60/70	70/85	85/100	100/120	120/140	140/170	170/210
Angle acc. DIN	40x4	40x4	50x6	50x6	60x8	70x9	70x9	100x12	120x15

Available in pitch (p): 40 - 50 - 63 - 80 - 100 - 125 - 135 -150 - 160 - 200 - 250 mm.
Other sizes and materials are available on request.

Pins

Pins are available various executions and in materials:
16MnCr5, 42CrMo4i, 1.4034i, 1.4122i, 1.4462, 1.4713. Other materials on request.



Circlips



Split pins



Circlip - revited



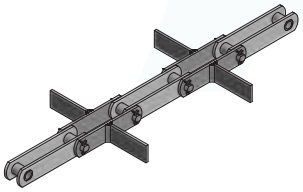
Split pin - head pin

Examples of double drag link chain with scrapers

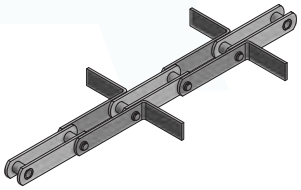
Double drag link chain can be produced in various executions. Outer links can be bent in L-shape scrapers or provided with plastic flights. Internal and external links can be provided with welded scrapers. Of course, a combination is possible.



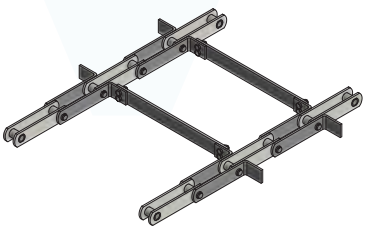
With plastic scrapers



T-shape welded



L-shape bended

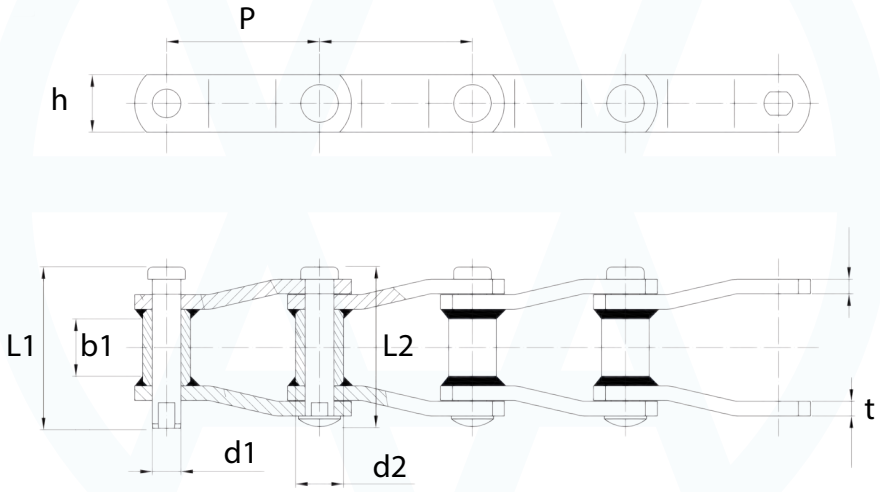


Double strand
with cross bar

WH-series



WH-type is a welded steel mill chain with cranked links. It has a higher strength and lower wear rate. Commonly found in wood and paper industry. With a wide range of attachments the ideal chain for transport with demanding conditions.



Double drag link chain WH series (parameters in mm)						
Chain	Pitch	Plates	Inner width	Bush / Pin	Length pin	Breaking-
Serie	P	h x t	b1	d1 / d2	L1 / L2	load in kN
WH78	66,27	28,4 x 6,4	28,4	22,9 / 12,78	79,3 / 73,0	117,5
WH82	78,10	31,8 x 6,4	31,8	31,50 / 14,35	86,0 / 80,0	144,3
WH106	152,40	38,1 x 9,7	41,2	37,10 / 19,13	111,0 / 103,0	247,0
WH110	152,40	38,1 x 9,7	46,7	32,00 / 19,13	115,5 / 107,7	247,0
WH111	120,90	38,1 x 9,7	57,2	37,10 / 19,13	124,5 / 116,8	247,0
WH124	101,60	38,1 x 9,7	41,2	37,10 / 19,13	110,0 / 103,0	247,0
WH124H	103,20	50,8 x 12,7	41,2	41,70 / 22,30	133,0 / 131,6	391,4
WH132	153,67	50,8 x 12,7	76,2	44,70 x 25,48	162,20 / 151,0	415,9
WH150	153,67	63,5 x 12,7	73,0	44,45 x 25,40	162,2 / 151,0	682,0
WH155	153,67	63,5 x 12,7	73,0	44,45 x 28,57	176,0 / 164,0	902,0
WH157	153,67	63,5 x 15,9	76,2	44,45 x 28,57	176,0 / 164,0	902,0

Sprockets



Sprockets for double drag link chain

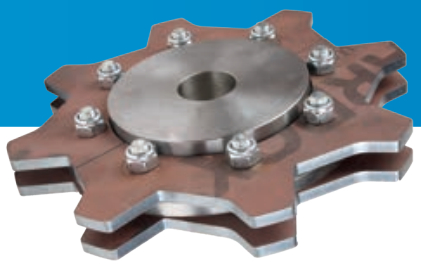
Sprockets are with or without teeth (return sprockets) and wear-resistant due to the hardening on the teeth. These sprockets have a symetrical hub and are divisible, making them easy to (dis) assemble. The following versions are available ex stock. Different dimensions are possible on request.

Sprockets for double drag link chain available ex stock (parameters in mm)					
Pitch	Inner width	Bush Ø	Pitch Ø (p x n)		
			6 teeth	8 teeth	7 teeth
63	22	18	126,00	164,63	x
80	22	18	160,00	209,05	x
100	22	18	200,00	261,31	x
125	25 / 30 / 35 / 45	20 / 22 / 26 / 30	250,00	326,64	x
150	30 / 45	22 / 30	x	x	345,71
160	30 / 45	30	320,00	418,10	x

Pitch diameter calculation									
z = number of teeth, n = conversion factor									
Pitch Ø (in mm) = Pitch of the chain x n									
z	n	z	n	z	n	z	n	z	n
6	2,0000	9	2,9238	12	3,8637	15	4,8097	18	5,7588
7	2,3048	10	3,2361	13	4,1786	16	5,1258	19	6,0755
8	2,6131	11	3,5495	14	4,4940	17	5,4422	20	6,3925



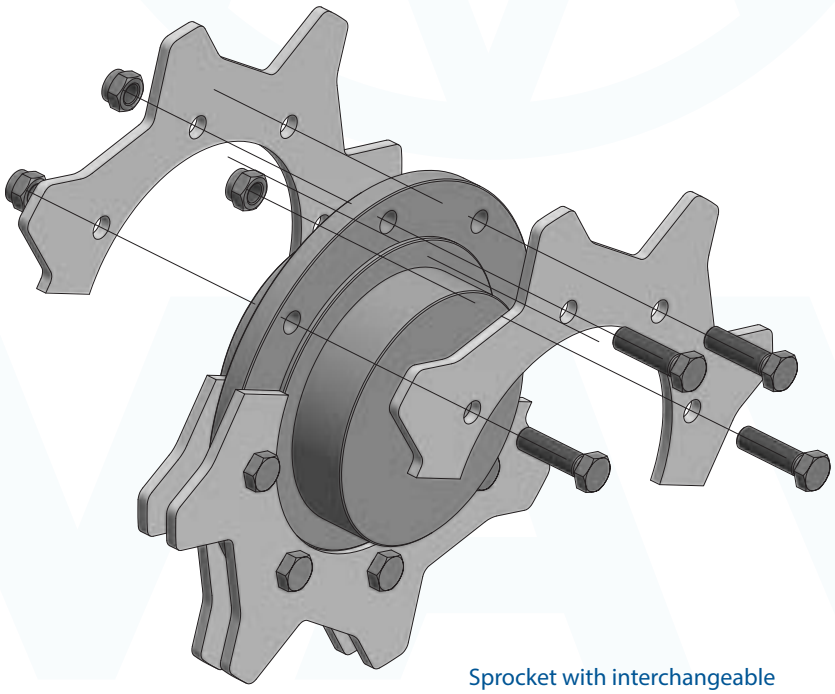
Sprockets from VAV are divisible, for quick (dis) assembly.



Sprockets for drop forged chain

Sprockets for drop forged chain consist of a body with symmetrical hub and interchangeable teeth segments. This has the advantage that, when the sprockets wear out, only the wear-resistant teeth segments need to be replaced. Sprockets can be made to your specifications on request. The following versions are available ex stock.

Sprockets for drop forged chain available ex stock (parameters in mm)					
Pitch	Pitch Ø / number of segments per complete set				
	6 teeth	7 teeth	8 teeth	9 teeth	10 teeth
102	Ø 204,00 / 4	Ø 235,09 / 4	Ø 265,49 / 4	Ø 298,23 / 4	Ø 330,08 / 4
125	Ø 250,00 / 4	Ø 288,10 / 4	Ø 326,64 / 4	Ø 365,48 / 4	Ø 404,51 / 4
142	Ø 284,00 / 4	Ø 327,28 / 4	Ø 371,06 / 8	Ø 415,18 / 6	Ø 459,52 / 4
150	Ø 300,00 / 6	Ø 345,71 / 4	Ø 391,97 / 8	Ø 438,57 / 4	Ø 485,42 / 10
160	Ø 320,00 / 4	Ø 368,76 / 4	Ø 418,10 / 8	Ø 467,81 / 4	Ø 517,77 / 4
200	Ø 400,00 / 4	Ø 460,95 / 4	Ø 522,62 / 8	Ø 584,76 / 4	Ø 647,21 / 4



Sprocket with interchangeable teeth segments (8 teeth)

VAV plastic flights



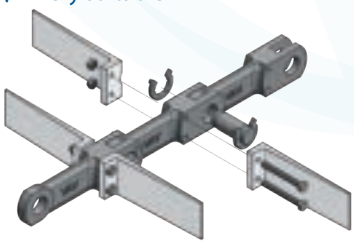
VAV plastic flights are made of flexible and durable Nylon. Because the chain runs on the plastic flights, there is no steel on steel contact. This is energy-saving, noise-reducing and cost-saving. In addition, they are easy to (dis)assemble and wear/guiding rails become unnecessary. There are several types available: the standard Nylon, heat resistant Zytel, Fiberglass reinforced, FDA quality and a detectable version.





Characteristics of VAV plastic flights					
Type	**Standard**	**Fiberglass**	**FDA-quality**	**Zytel**	**Detectable**
Colour	white	white	white	red	blue
Noise reducing	√ √	√	√ √	√ √	√ √
Flexible (will bend back)	√ √		√ √	√	√ √
Detectable					√ √
FDA quality			√ √		√ √
Temperature resistance	-20 - +70 °C	-20 - +70 °C	-20 - +70 °C	80 - +110 °C	-20 - +70 °C

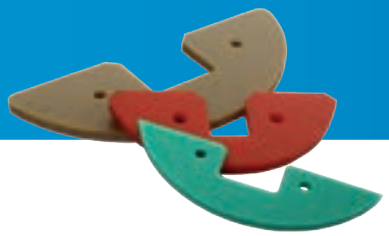
√ = suitable, √ √ = very suitable





Plastic flights (parameters in mm)			
Length x height	Cc. distance	Drop forged chain	Double drag link chain
	of the holes	pitch*	pitch/plates*
117 x 45	20	102 125, 160	80, 100, 125/35x5
137 x 45	20	102, 125, 160	80, 100, 125/35x5
180 x 45	20	102, 125, 160	80, 100, 125/35x5
162 x 55	25	-	125/40x6, 125/45x6
112 x 58	30	142, 150	125, 150, 160/50x8, 150/50x6
162 x 58	30	142, 150	125, 150, 160/50x8, 150/50x6
212 x 58	30	142, 150	125, 150, 160/50x8, 150/50x6
262 x 58	30	142, 150	125, 150, 160/50x8, 150/50x6
300 x 58	30	142, 150	125, 150, 160/50x8, 150/50x6

* VAV chain in stock

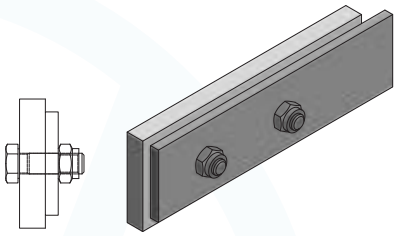


Plastic profiles

Plastic profiles can be produced in various types of materials, such as: PE (polyethylene), Nylon or PU (polyurethane). These can be used as a scraper or as a flight. The profiles can be custom-made. Below a number of examples.

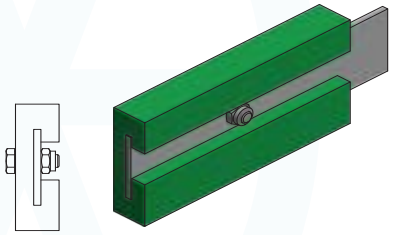
Profile A

Profile A - Plastic flight assembled on the steel scraper.



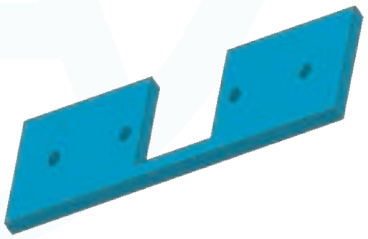
Profile C

Profiel C - Plastic scraper which can be pushed over the steel scrapers



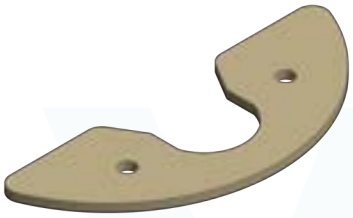
Bridge-profile

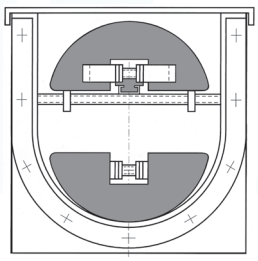
The “bridge” profile is assembled on the steel scrapers. The plastic runs under the chain and ensures less residue.

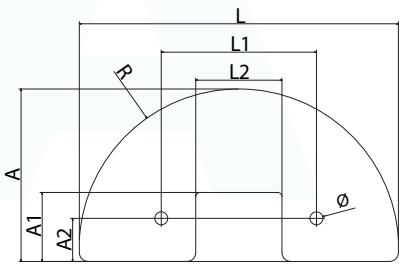


“Half moon” profile

The so-called “half-moon” profile is assembled on the steel scrapers.







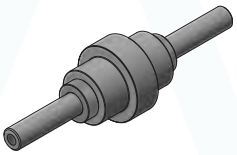
Accessories

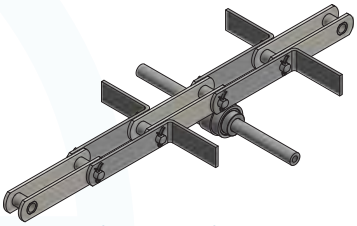


VAV CirclipMaster

Circlips are an ideal way to secure the pin of a chain. The disadvantage is that they are difficult to disassemble. That is why VAV has developed the CirclipMaster. A hydraulic, hand-operated tool, applicable to circlips of various types of conveyor chain. The VAV CirclipMaster makes it possible to release circlips quickly, simple and safe from the pin.

Idler

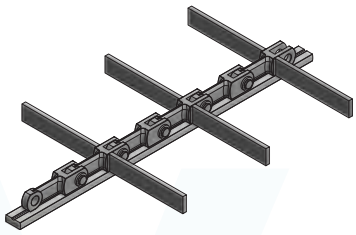




VAV supplies idlers according to your specifications. The idlers can be made of plastic (for example PE1000 or Nylon) or steel (optional hardened). The idlers can be equipped with ball bearings. The axe can be fitted with internal or external thread.

Idler in plastic or steel (parameters in mm)			
Inner width chain	Roller Ø	Shaft Ø	Internal thread
25	50/60	20	M10x25
30	50/60	20	M10x25
35	50/60	20	M10x25
45	60/70	20	M10x25

Wear-guiding rails



Wear-guiding rails for drop forged chain are available in Manganese steel (X120Mn12). The rails are provided with a guiding groove, for the ideal guidance of the drop forged chain.

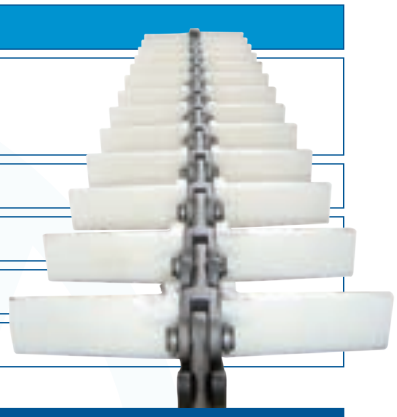
Wear-guiding rails from material X120Mn12 (1.3401)			
Size (mm)	Length (meter)	Delivery	Weight (kg/m)
35 x 10	2,95 - 3,10	Stock	2,60
50 x 10	2,95 - 3,20	Stock	3,75
50 x 20	2,95 - 3,20		7,67
60 x 10	2,95 - 3,20	Stock	4,54
70 x 10	2,95 - 3,20		5,32
70 x 20	2,95 - 3,20	Stock	10,81

Chain calculations

Conveyor chain calculations

Chain speed in m/sec (v)

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



v	=	chain speed in meters per second
z	=	number of teeth
p	=	chain pitch
n	=	rotations per minute

Conveyor chain calculations

Capacity in m^3 per hour (Q)

$$Q = A \times v \times 3.600 \text{ sec.}$$

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

Conveyor chain calculations

Material weight on the chain in kg ($mass_1$)

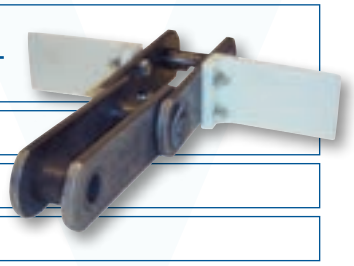
$$Mass_1 = \frac{\text{tons per hour} \times \text{distance in meters}}{v \times 3,6}$$

$Mass_1$	=	material weight on the chain in kg
v	=	chain speed in meters per second

Conveyor chain calculations

Power in Kw (P)

$$P = \frac{(v \times mass_1 \times \mu_1 + mass_2 \times \mu_2) \times 9,81}{1.000}$$



P	=	power in Kw
v	=	chain speed in m per sec
$mass_1$	=	material weight on the chain in kg
μ_1	=	friction between steel and the product (for a smooth-running product ca. 1,15)
$mass_2$	=	total chain weight in kg
μ_2	=	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

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	product	sw	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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