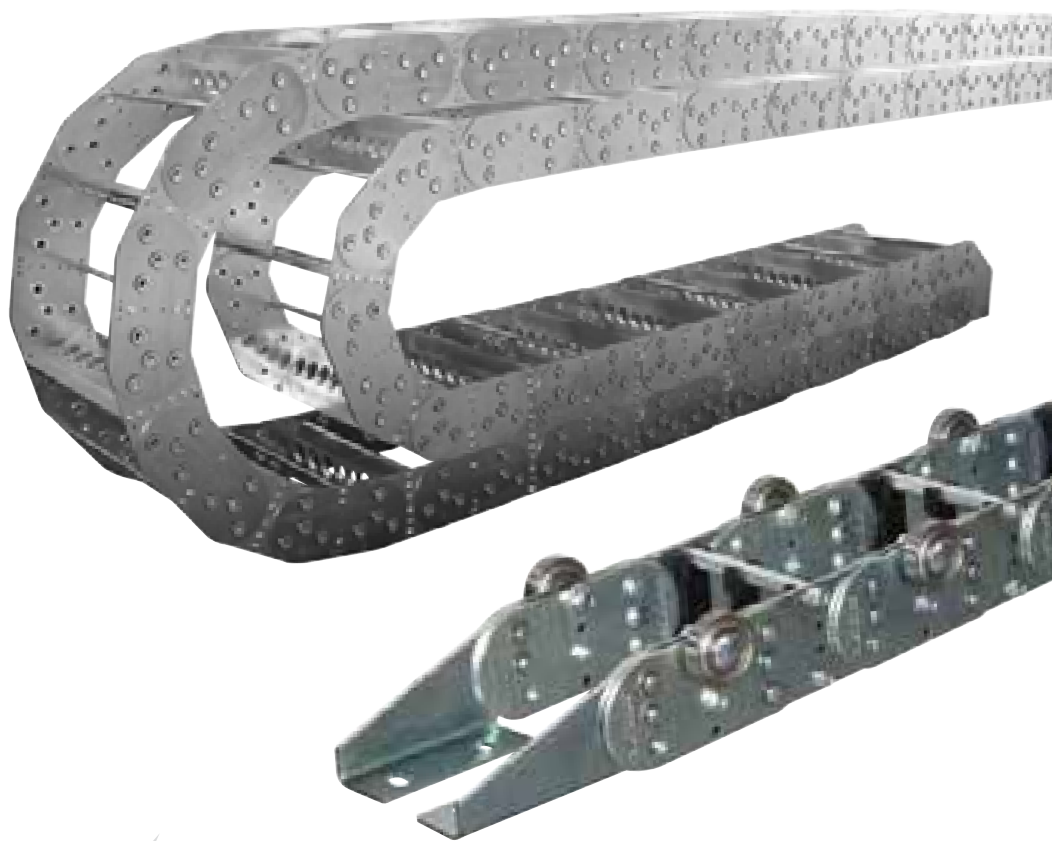


Steel Energy Guiding Chains

Program LZ



CONDUCTIX
wampfler

DELACHAUX GROUP





Program LZ: Double rotary AISI 316L stainless steel chain for a stacker/reclaimer application

Steel Energy Guiding Chains for Heavy Duty Applications

Conductix-Wampfler LZ steel chains are ideal for applications where users require a strong and resilient chain that will perform under very demanding conditions. Stainless steel grade 304 or 316L are available for environments with high operating temperatures and/or the presence of corrosive agents.

Our chains are built to conform to standard industrial dimensions making them interchangeable with most other manufacturers' chains. Our LZ chains provide equivalent or superior performance to any on the market.

We offer a full range of standard sizes and versions, and we can accommodate a wide range of customized solutions according to our customers' applications and needs.

The sideband design of our rugged chain features:

- Alternate male links composed of two double-thickness plates and female links composed of four single thickness links
- A bending radius consisting of two or three circular eyelets in the double thickness plates
- Reduced wear on the pins due to a deep hardening surface treatment
- **Guaranteed maximum strength; makes the chain self-supporting under most conditions**

It is possible to disassemble both the cross bars and the pins with a few simple operations. This makes installation fast and easy and simplifies maintenance operations.

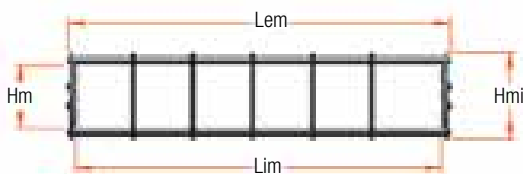
Primary applications for Conductix-Wampfler LZ steel chains:

- Steel mills
- Portal cranes or transfer cars in foundries and rolling mills
- Stacker/reclaimers
- Offshore installations
- Large milling and boring machine tools with travelling portals (gantry)
- Transport and construction machinery

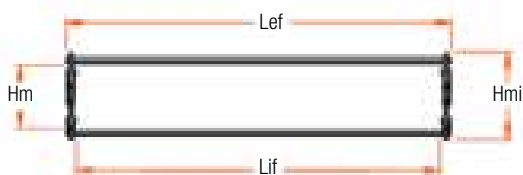


A complete range of steel energy guiding chains in standard sizes

Cross section view: Male Link, composed of two double-thickness plates



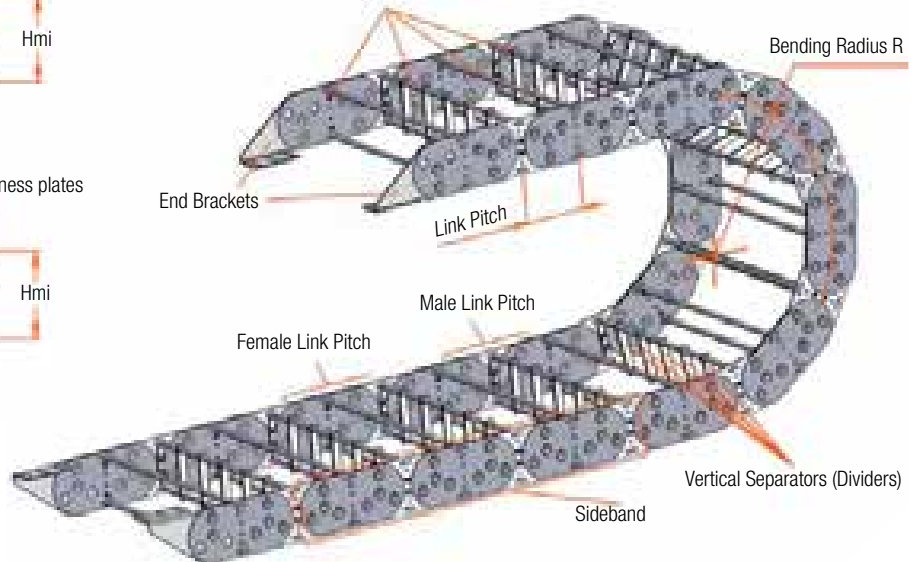
Cross section view: Female Link, composed of four single thickness plates



Hm = Cavity height Li, Lim, Lif = Cavity width
Hmi = Chain height Le, Lem, Lef = Chain width

$Le = \text{Max}(Lem; Lef)$ $Li = \text{min}(Lim; Lif)$	In general: $Le = Lef$ In general: $Li = Lim$
--	--

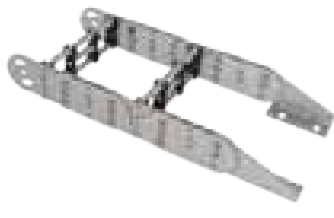


Frame Stays (Cross Bars) – Frame Stays mounted on the male links only as standard



Overview



Please see page 29 to configure the right chain for your specific requirements.

	LZ92	LZ94	LZ95
Chain Series			

Chain Features




Link Pitch (mm)	65	95	125
Link outside height (mm)	50	70	94
Standard bending radius range (mm)	75 - 300	125 - 410	145 - 380
Standard (max) outside width range (mm)	70 - 395 (500)	101 - 401 (600)	106 - 406 (900)

Application Features

Maximum self support length $L_c/2$ (m per kg)*	3.5 at 30	5.5 at 40	5.5 at 100
Maximum speed (m/min)	40	35	30
Maximum acceleration (m/s^2)	5	5	4.5
Page	6	10	14

Program LZ97: Double-nested chain application with Type S frame stays (see page 23 for stay type descriptions)



LZ96	LZ97	LZ98
		
180	250	320
140	220	300
265 - 605	365 - 1075	500 - 1785
334 - 884 (1100)	Up to 1200	Up to 1400
8.0 at 150	7.3 at 350	9 at 350
30	20	15
3	2.5	2.5
18	22	26

* Calculated with an additional load of 50% of maximum.



Chain program LZ 98 with hoses: mounted and transported on its side by using a steel structure



Program LZ97 and LZ96 plus cables: Linear AISI 316L stainless steel chain for an offshore application



Program LZ94: Rotary application of chain, compliant with ATEX Zone 2

Steel Energy Guiding Chains Series LZ92

General Description



Heavy-duty small-size Energy Guiding Chain with steel sidebands and metal frame stays.
This chain can be specified in the ideal configuration to operate under extreme conditions.

Application parameters:

- Maximum speed: 40 m/min
- Maximum acceleration: 5 m/s²
- Working temperature:
 - 30° / +80° Frame stay Types N, A *
 - 50° / +150° Frame stay Type S *
 - 50° / +200° Frame stay Types G, Gr *

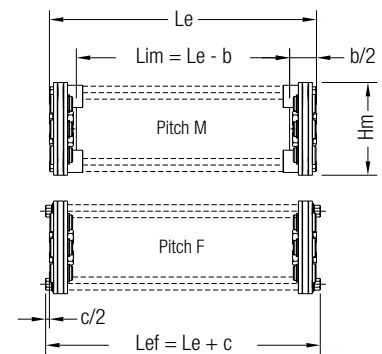
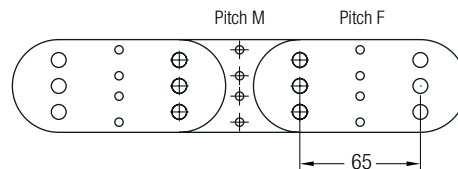
* See page 7 for descriptions of frame stay types

Sidebands

Sidebands are built up of alternating single-thickness and double-thickness links, connected by three pins for heavy-duty applications.

Available in the following materials:

- Galvanized steel
- AISI 304 stainless steel
- AISI 304 stainless steel (ATEX zone 2 compliant)



Sideband technical features	Sideband material	Galvanized steel	AISI 304 Stainless steel	AISI 316L Stainless steel
	Chain height Hm (mm):	50		
	Link pitch Lp (mm):	65		
Li* (mm):		Le - 31	Le - 30	

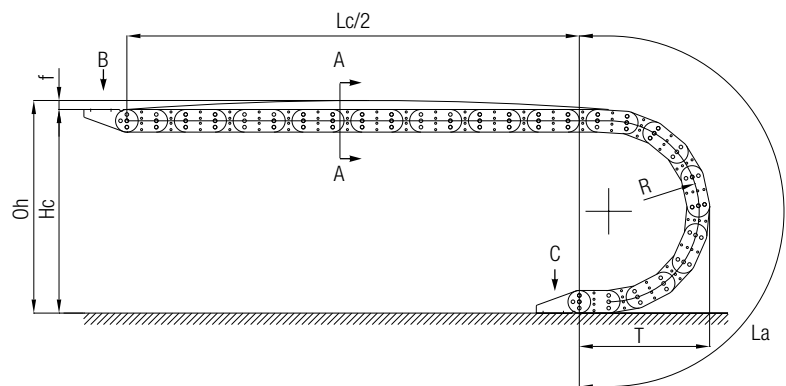
For standard configurations:

- c = 0, so Le = Lef;
- Li = Lim

* Dimension Li refers to type N configuration of the frame stays. For other configurations see table on page 7.

R (mm)	La (mm)	T (mm)	Hc (mm)
075	496	230	≥ 200
095	558	250	≥ 240
115	621	270	≥ 280
135	684	290	≥ 320
155	747	310	≥ 360
175 [^]	810	330	≥ 400
200	888	355	≥ 450
250 [^]	1045	405	≥ 550
300 [^]	1202	455	≥ 650
Custom	$\pi R + 4 \text{ links}$	$R + 2Lp + Hm/2$	$\geq 2R + Hm$

[^] = Available on request



The connecting height should be at least Hm/2 more than Hc. For circular movements, the chain can be equipped with customized reverse-bending radius links (Rbr).
f ≅ 21.1 mm/m (maximum pre-set of the chain when empty)

Steel Energy Guiding Chains Series LZ92

Sidebands

This self-support diagram refers to a chain self-weight (q_0) of 5.2 kg/m and cavity width of 39 mm.

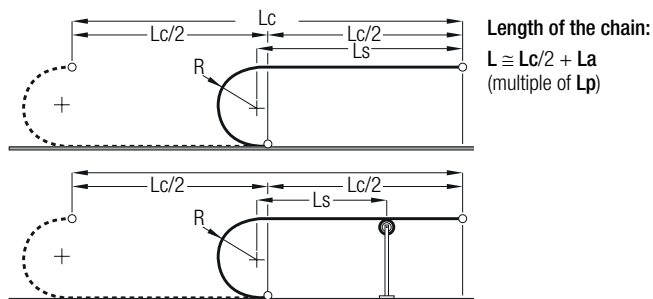
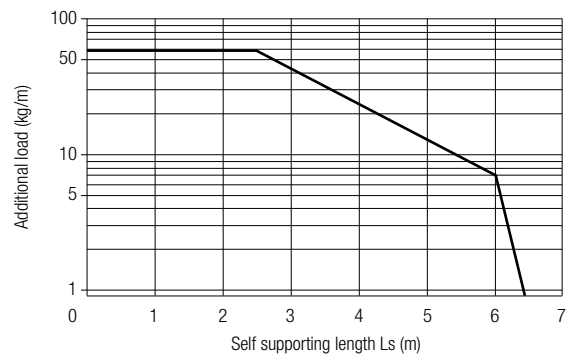


Diagram base line calculated for stay configuration Type N
in width $Le = 70$ mm



Frame Stay Types

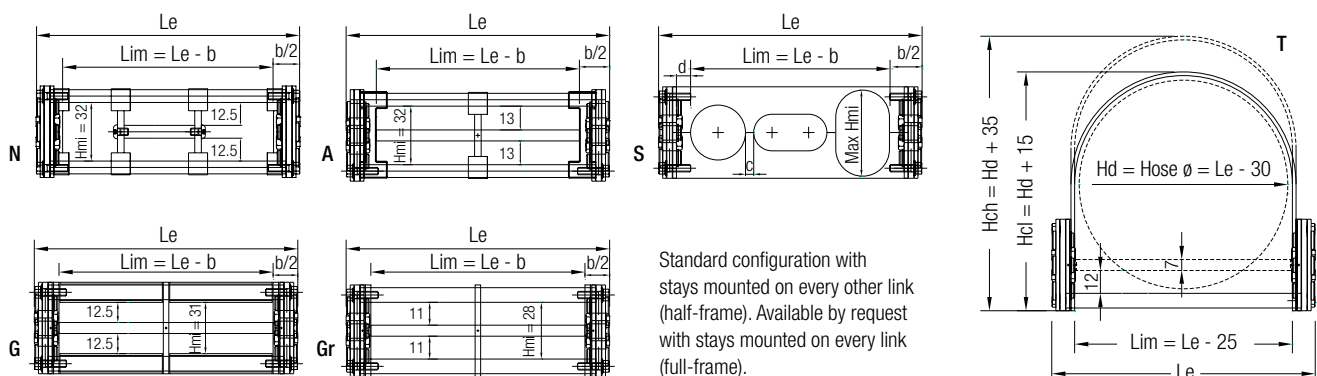
The LZ92 Series is available in several configurations, depending on the frame stay design:

- **Type N:** Extruded aluminum profile stays with hexagonal cross section, mounted with screws either outside or inside the radius
- **Type A:** Extruded aluminum profile stays with hexagonal cross section, mounted with screws on one side and accessible from the other side
- **Type S:** Two-part aluminum stays, with holes according to the customer's requirements
- **Type G:** Round profile steel stays
- **Type Gr:** Round profile steel stays with anti-friction rollers to keep vertical separators in place
- **Type T:** By request, we can design hose carriers with lower, screw-mounted aluminum profile with a rounded upper steel profile

Le (mm)	Type N		Type A		Type S		Type G		Type Gr	
	Li (mm)	Weight (kg/m)	Li (mm)	Weight (kg/m)	Li** (mm)	Weight (kg/m)	Li (mm)	Weight (kg/m)	Li (mm)	Weight (kg/m)
70	39	5.2	34	5.2	34	Custom	40	5.53	40	5.68
95	64	5.26	59	5.26	59	Custom	65	5.68	65	5.93
120	89	5.32	84	5.32	84	Custom	90	5.83	90	6.18
145	114	5.38	109	5.38	109	Custom	115	5.98	115	6.43
170	139	5.44	134	5.44	134	Custom	140	6.13	140	6.68
195	164	5.5	159	5.5	159	Custom	165	6.28	165	6.93
220	189	5.56	184	5.56	184	Custom	190	6.43	190	7.18
245	214	5.62	209	5.62	209	Custom	215	6.58	215	7.43
270	239	5.68	234	5.68	234	Custom	240	6.73	240	7.68
295	264	5.74	259	5.74	259	Custom	265	6.88	265	7.93
320	289	5.8	284	5.8	284	Custom	290	7.03	290	8.18
345	314	5.86	309	5.86	309	Custom	315	7.18	315	8.43
370	339	5.92	334	5.92	334	Custom	340	7.33	340	8.68
395	364	5.98	359	5.98	359	Custom	365	7.48	365	8.93
Custom*	Le - 31		Le - 36		Le - 36		Le - 30		Le - 30	
max Le (mm)	450		400		500		500		500	
Hmi (mm)	32		32		max Hmi = \varnothing max. = 36 mm		31		28	

* Table applies to galvanized steel and AISI 304 stainless steel. For AISI 316L stainless steel, see page 6

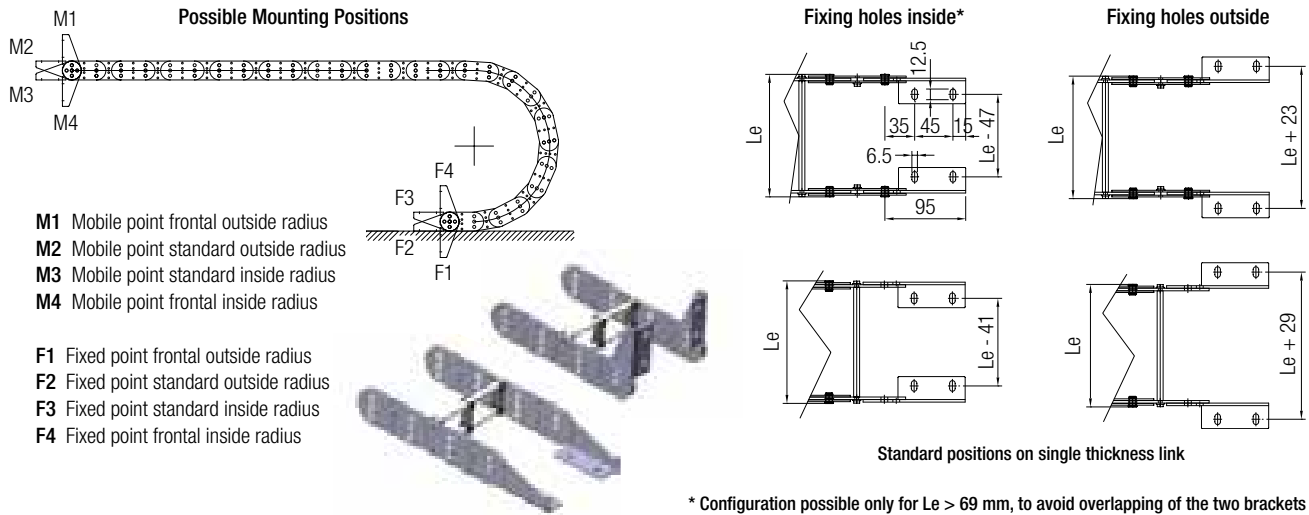
** Maximum usable width for hoses



Steel Energy Guiding Chains Series LZ92

End Brackets

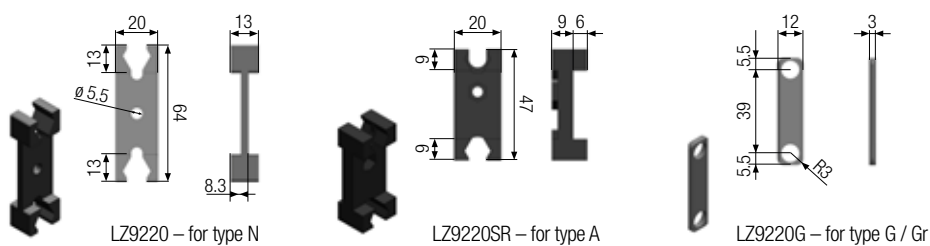
The end brackets are permanently mounted on the chain. They can be attached in varying positions on the chain. Unless specified otherwise, the brackets are fitted in M2 and F2 positions with fixing holes on the inside of the brackets.



Vertical and Horizontal Separators

By request, the chain can be supplied with vertical and/or horizontal separators. These components are used to hold cables and hoses in the right position, which minimizes the stress of chain movement and avoids cable and hose twisting.

Stay Type	Vertical Separators Material, items, and thickness					Horizontal Separators ^{a)} Material and diameters (item LZ9222)		
	Material	Wall (mm)	Central (mm)	Material	Full Width	Partial Width		
N	Nylon	LZ9220	3.6	LZ9220	3.6	Aluminum	ø 6 mm ^{b)}	*10.79 x 7 mm
A		LZ9220SR	6.5	LZ9220	3.6			
S	Aluminum	//	Dmin = 12	//	Cmin = 4	//	//	//
G – Gr	Steel or Aluminum	LZ9220G	(2x) 3	LZ9220G	3	Aluminum	ø 6 mm ^{b)}	*10.79 x 7 mm



^{a)} For the remaining vertical clearance between horizontal separators, please refer to the cross section view on page 7

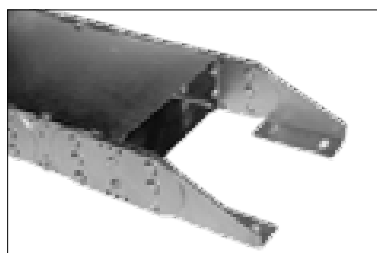
^{b)} Maximum distance between vertical separators: 80 mm

* Hexagonal profile

Steel Cover Sheets

By request, chains N, A, and S can be supplied with stainless steel cover sheets. These slide on special hooks attached to the sidebands of the chain and protect the cables from hot chips and/or shield them from radiation.

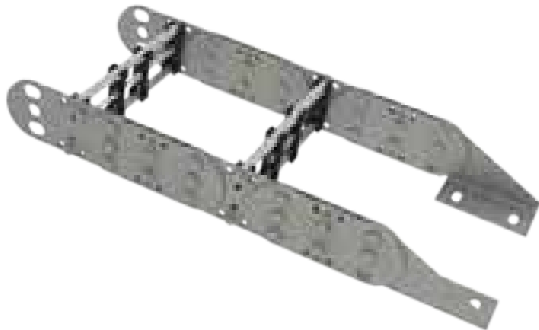
When steel covers are requested, the chain can be supplied with stays mounted on every other link (half-frame) only.





Steel Energy Guiding Chains Series LZ94

General Description



Heavy-duty small to medium-size Energy Guiding Chain with steel sidebands and metal frame stays. This chain can be specified in the ideal configuration to operate under extreme conditions.

Application parameters:

- Maximum speed: 35 m/min
- Maximum acceleration: 5 m/s²
- Working temperature:
 - 30° / +80° Frame stay Types N, A *
 - 50° / +150° Frame stay Type S *
 - 50° / +200° Frame stay Types G, Gr *

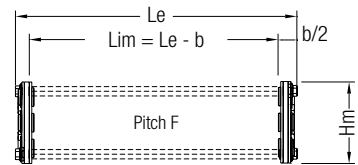
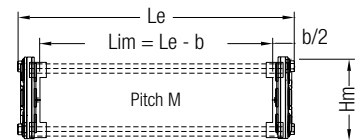
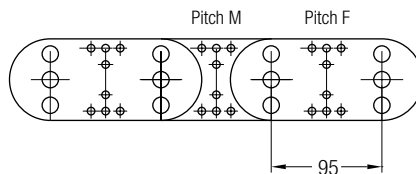
* See page 11 for descriptions of frame stay types

Sidebands

Sidebands are build up of alternating single-thickness and double-thickness links, connected by three pins for heavy-duty applications.

Available in the following materials:

- Galvanized steel
- AISI 304 stainless steel
- AISI 316L stainless steel (ATEX Zone 2 compliant)



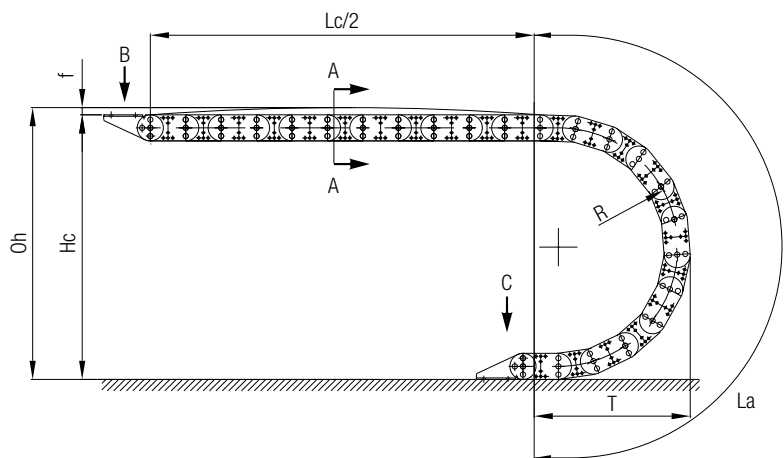
Sidebands technical features	Sidebands material	Galvanized steel	AISI 304 Stainless steel	AISI 316L Stainless steel
	Chain height Hm (mm):	70		
	Link pitch Lp (mm):	95		
	Li* (mm):	Le - 42	Le - 41	

For standard configurations:

- c = 0, so Le = Lef;
- Li = Lim

* Dimension Li refers to type N configuration of the frame stays. For other configurations see table on page 11.

R (mm)	La (mm)	T (mm)	Hc (mm)
125 [^]	773	350	≥ 320
140	820	365	≥ 350
170	914	395	≥ 410
200	1008	425	≥ 470
230	1102	455	≥ 530
260	1197	485	≥ 590
290	1291	515	≥ 650
320	1385	545	≥ 710
350 [^]	1480	575	≥ 770
410 [^]	1668	635	≥ 890
Custom	$\pi R + 4 \text{ links}$	$R + 2Lp + Hm/2$	≥ 2R + Hm



The connecting height should be at least $Hm/2$ more than Hc. For circular movements, the chain can be equipped with customized reverse-bending radius links (Rbr). $f \approx 10.86 \text{ mm/m}$ (maximum pre-set of the chain when empty)

[^] = Available by request

Steel Energy Guiding Chains Series LZ94

Sidebands

The self-support diagram refers to a chain self-weight (q_c) of 8.05 kg/m and cavity width of 59 mm.

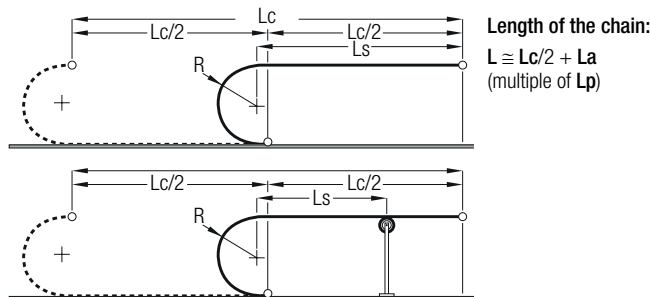
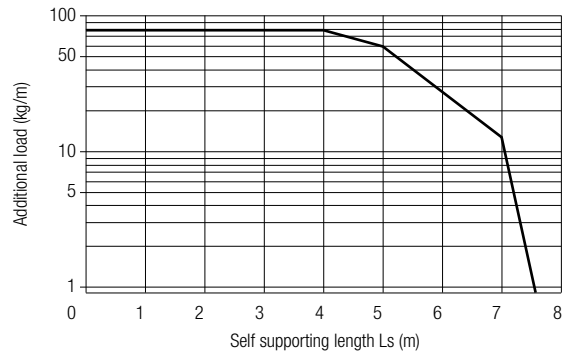


Diagram base line calculated for the N stay configuration
in width $Le = 101$ mm



Frame Stay Types

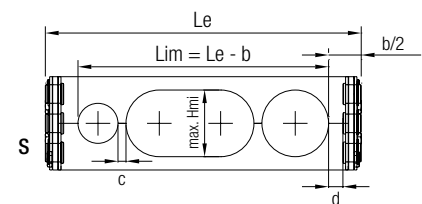
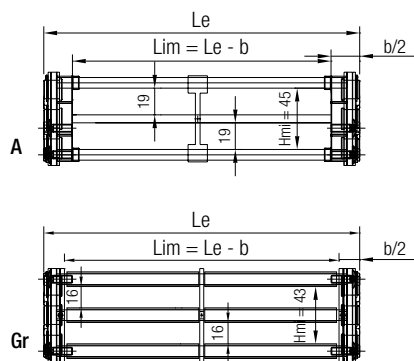
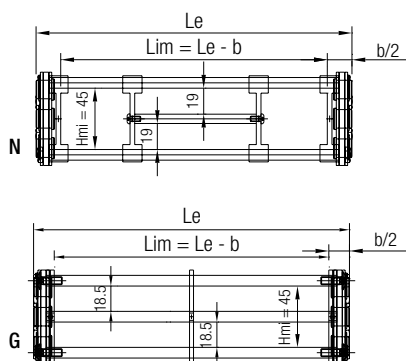
The LZ94 Series is available in several configurations, depending on the frame stay design:

- **Type N:** Extruded aluminum profile stays with hexagonal cross section, mounted with screws either outside or inside the radius
- **Type A:** Extruded aluminum profile stays with hexagonal cross section, mounted with screws on one side and accessible from the other side
- **Type S:** Two-parts aluminum stays, with holes according to our customer's requirements
- **Type G:** Round profile steel stays
- **Type Gr:** Round profile steel stays with anti-friction rollers to keep vertical separators in place
- **Type T:** By request, we can design hose carriers with lower, screw-mounted aluminum profiles with a rounded upper steel profile

Le (mm)	Type N		Type A		Type S		Type G		Type Gr	
	Li (mm)	Weight (kg/m)	Li (mm)	Weight (kg/m)	Li** (mm)	Weight (kg/m)	Li (mm)	Weight (kg/m)	Li (mm)	Weight (kg/m)
101	59	8.05	52	8.05	59	Custom	64	8.31	64	8.72
126	84	8.09	77	8.09	84	Custom	89	9	89	9.41
151	109	8.13	102	8.13	109	Custom	114	9.69	114	10.1
176	134	8.82	127	8.82	134	Custom	139	10.38	139	10.79
201	159	9.51	152	9.51	159	Custom	164	11.07	164	11.48
226	184	10.2	177	10.2	184	Custom	189	11.76	189	12.17
251	209	10.89	202	10.89	209	Custom	214	12.45	214	12.86
276	234	11.58	227	11.58	234	Custom	239	13.14	239	13.55
301	259	12.27	252	12.27	259	Custom	264	13.83	264	14.24
326	284	12.96	277	12.96	284	Custom	289	14.52	289	14.93
351	327	13.65	320	13.65	327	Custom	314	15.21	314	15.62
376	334	14.34	327	14.34	334	Custom	339	15.9	339	16.31
401	359	15.03	352	15.03	359	Custom	364	16.59	364	17
Custom*	Le - 42		Le - 49		Le - 49		Le - 37		Le - 37	
max. Le (mm)	500		450		600		600		600	
Hmi (mm)	46		46		max. Hmi = \varnothing max. = 45 mm		46		43	

* Table applies to galvanized and AISI 304 stainless steel. For AISI 316L stainless steel, see page 10

** Maximum usable width for hoses

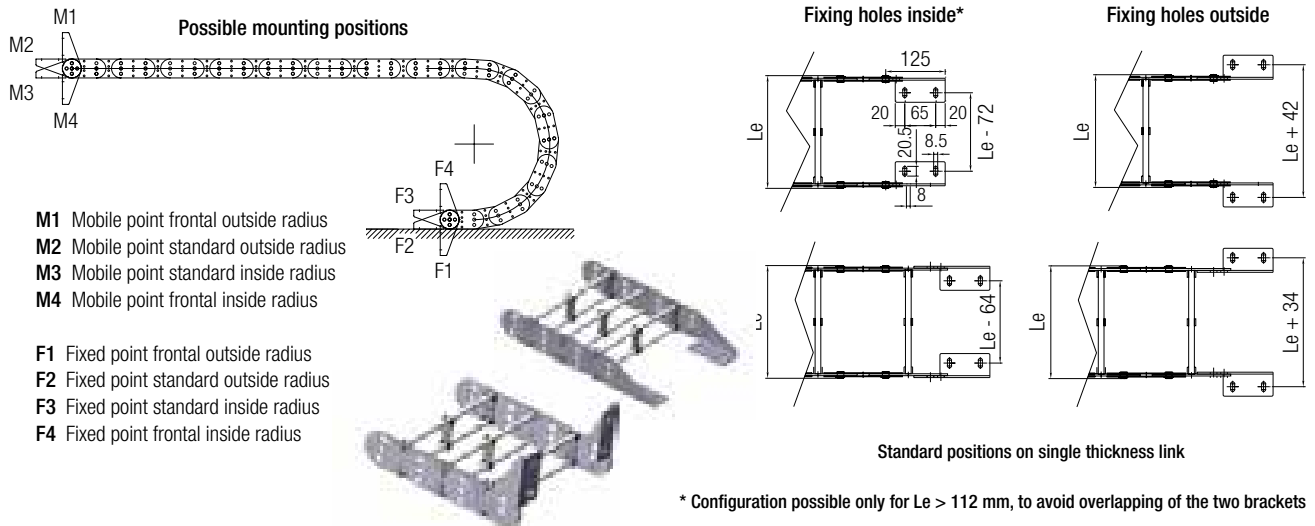


Standard configuration with stays mounted on every other link (half frame). Available on request with stays mounted on every link (full frame).

Steel Energy Guiding Chains Series LZ94

End Brackets

The end brackets are permanently mounted on the chain. They can be attached in varying positions on the chain. Unless specified otherwise, the brackets are fitted in M2 and F2 positions with fixing holes on the inside of the brackets.



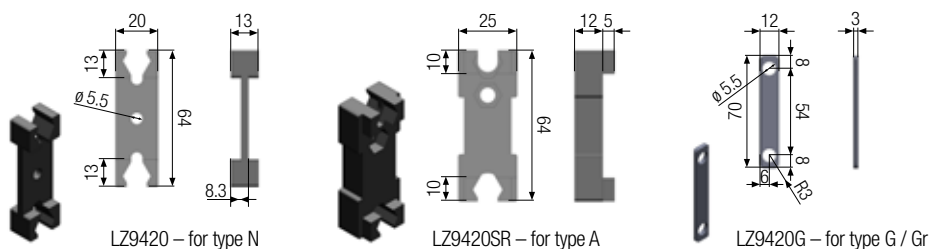
- M1** Mobile point frontal outside radius
- M2** Mobile point standard outside radius
- M3** Mobile point standard inside radius
- M4** Mobile point frontal inside radius

- F1** Fixed point frontal outside radius
- F2** Fixed point standard outside radius
- F3** Fixed point standard inside radius
- F4** Fixed point frontal inside radius

Vertical and Horizontal Separators

By request, the chain can be supplied with vertical and/or horizontal separators. These components are used to hold cables and hoses in the right position to minimize the stress from chain movement and to avoid twisting the cables or hoses.

Stays Config.	Vertical separators Material, Items and thickness					Horizontal separators ^{a)} Material and diameters (item LZ9422)		
	Material	Wall	(mm)	Central	(mm)	Material	Full Width	Partial Width
N	Nylon	LZ9420	3.6	LZ9420	3.6	Aluminum	ø 6 mm ^{b)}	*10.79 x 7 mm
A		LZ9420SR	6.5	LZ9420	3.6			
S	Aluminum	//	Dmin = 12	//	Cmin = 4	//	//	//
G – Gr	Steel or Aluminum	LZ9420G	(2x) 3	LZ9420G	3	Aluminum	ø 6 mm ^{b)}	*10.79 x 7 mm



^{a)} For the remaining vertical clearance between horizontal separators please refer to the cross section view on page 11

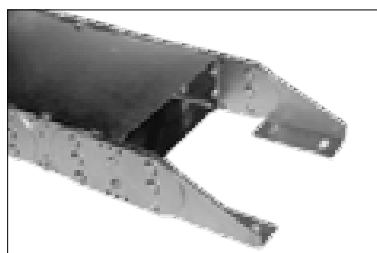
^{b)} Maximum distance between vertical separators: 80 mm

* Hexagonal profile

Steel Cover Sheets

By request, chains N, A, and S can be supplied with stainless steel cover sheets. These slide on special hooks attached to the sidebands of the chain and protect the cables from hot chips and/or shield them from radiation.

When steel covers are requested, the chain can be supplied with stays mounted on every other link (half-frame) only.





Steel Energy Guiding Chains Series LZ95

General Description



Heavy-duty medium-size Energy Guiding Chain with steel sidebands and metal frame stays. This chain can be specified in the ideal configuration to operate under extreme conditions.

Application parameters:

- Maximum speed: 30 m/min
- Maximum acceleration: 4.5 m/s²
- Working temperature:
 - 30° / +80° Frame stay Types N, A, R *
 - 50° / +150° Frame stay Type S *
 - 50° / +200° Frame stay Types G, Gr *

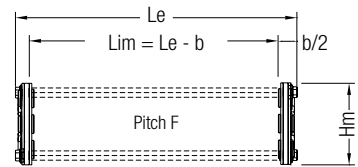
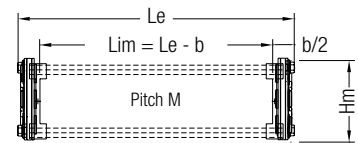
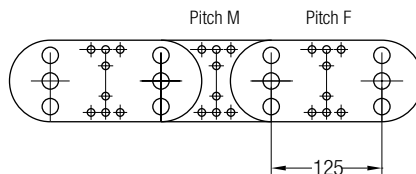
* See page 15 for descriptions of frame stay types

Sidebands

Sidebands are build up of alternating single-thickness and double-thickness links, connected by three pins for heavy-duty applications.

Available in the following materials:

- Galvanized steel
- AISI 304 stainless steel
- AISI 316L stainless steel (ATEX Zone 2 compliant)



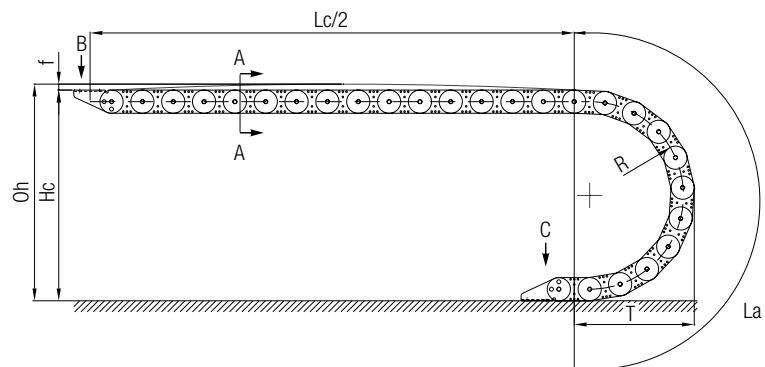
Sidebands technical features	Sidebands material	Galvanized steel	Stainless steel AISI 304	Stainless steel AISI 316L
	Chain height H_m (mm):	94		
	Link pitch L_p (mm):	125		
	L_i^* (mm):	$Le - 45$	$Le - 44$	

For standard configurations:

- $c = 0$, so $Le = L_{ef}$;
- $Li = Lim$

* Dimension L_i refers to type N configuration of the frame stays. For other configurations see table on page 15.

R (mm)	La (mm)	T (mm)	Hc (mm)
145	955	442	≥ 384
180 [^]	1065	477	≥ 454
220	1191	517	≥ 534
260	1317	557	≥ 614
300	1442	597	≥ 694
340	1568	637	≥ 774
380	1694	677	≥ 854
420 [^]	1819	717	≥ 934
460 [^]	1944	757	≥ 1014
500 [^]	2070	797	≥ 1094
540 [^]	2196	837	≥ 1174
600 [^]	2384	897	≥ 1294
Custom	$\pi R + 4 \text{ links}$	$R + 2L_p + H_m/2$	$\geq 2R + H_m$



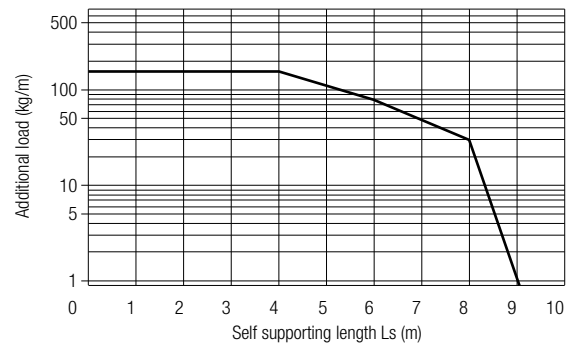
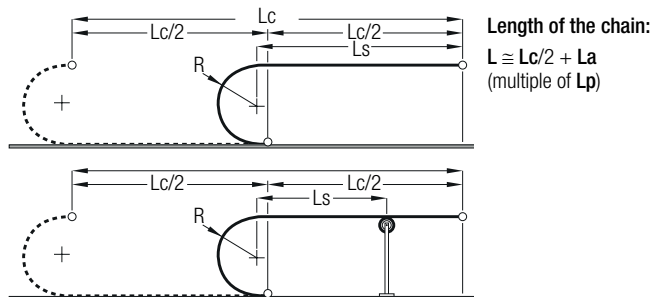
The connecting height should be at least $H_m/2$ more than H_c . For circular movements, the chain can be equipped with customized reverse-bending radius links (Rbr). $f \cong 18.2 \text{ mm/m}$ (maximum pre-set of the chain when empty)

Steel Energy Guiding Chains Series LZ95

Sidebands

The self-support diagram refers to a chain self-weight (q_c) of 12.2 kg/m and cavity width of 61 mm.

Diagram base line calculated for style Type N
in width $Le = 106$ mm



Frame Stay Types

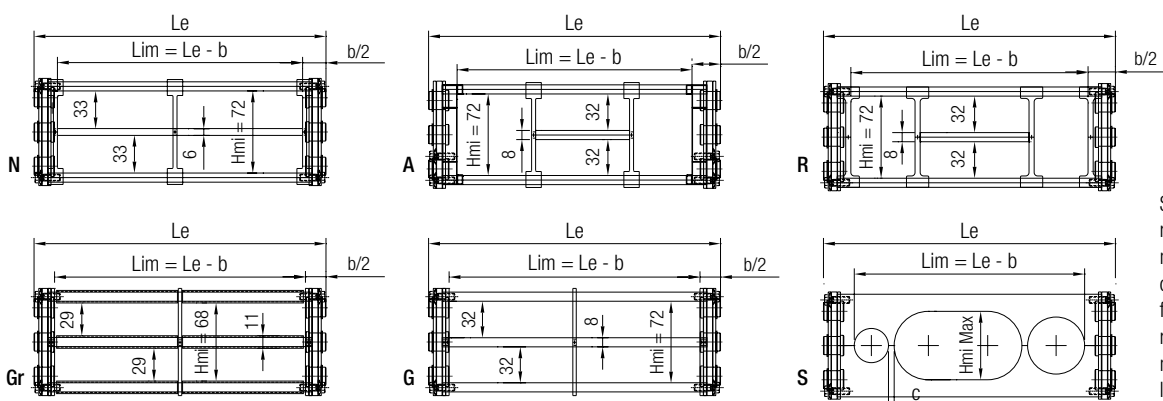
The LZ95 Series is available in several configurations, depending on the frame stay design:

- **Type N:** Extruded aluminum profile stays with hexagonal cross section, mounted with screws either outside or inside the radius
- **Type A:** Extruded aluminum profile stays with hexagonal cross section, mounted with screws on one side and accessible from the other side
- **Type R:** Extruded aluminum profile stays, reinforced and with a massive 70 x 9 mm cross section, mounted with two pairs of screws either outside or inside the radius
- **Type S:** Two-parts aluminum stays, with holes according to our customer's requirements
- **Type G:** Round profile steel stays
- **Type Gr:** Round profile steel stays with anti-friction rollers to keep vertical separators in place
- **Type T:** By request, we can design hose carriers with lower, screw-mounted aluminum profiles with a rounded upper steel profile

Le (mm)	Type N		Type A		Type R		Type S		Type G		Type Gr	
	Li (mm)	Weight (kg/m)	Li (mm)	Weight (kg/m)	Li (mm)	Weight (kg/m)	Li** (mm)	Weight (kg/m)	Li (mm)	Weight (kg/m)	Li (mm)	Weight (kg/m)
106	61	12.2	51	12.2	53	13.4	41	Custom	70	12.59	70	12.99
131	86	12.23	76	12.23	78	13.65	66	Custom	95	12.72	95	13.2
156	111	12.3	101	12.3	103	13.90	91	Custom	120	12.84	120	13.42
181	136	12.37	126	12.37	128	14.15	116	Custom	145	12.96	145	13.64
206	161	12.44	151	12.44	153	14.40	141	Custom	170	13.09	170	13.85
231	186	12.51	176	12.51	178	14.65	166	Custom	195	13.21	195	14.07
256	211	12.58	201	12.58	203	14.90	191	Custom	220	13.33	220	14.28
281	236	12.65	226	12.65	228	15.15	216	Custom	245	13.46	245	14.5
306	261	12.72	251	12.72	253	15.40	241	Custom	270	13.58	270	14.77
331	286	12.79	276	12.79	278	15.65	266	Custom	295	13.70	295	14.93
356	311	12.86	301	12.86	303	15.90	291	Custom	320	13.83	320	15.15
381	336	12.93	326	12.93	328	16.15	316	Custom	345	13.95	345	15.36
406	361	13	351	13	353	16.40	341	Custom	370	14.07	370	15.58
Custom*	Le - 45		Le - 55		Le - 53		Le - 65		Le - 36		Le - 36	
max Le (mm)	700		650		850		850		900		900	
Hmi (mm)	72		72		72		max Hmi = ø max. = 52 mm		72		68	

* Table applies to galvanized steel and AISI 304 steel. For AISI 316 L stainless steel, see page 14

** Maximum usable width for hoses

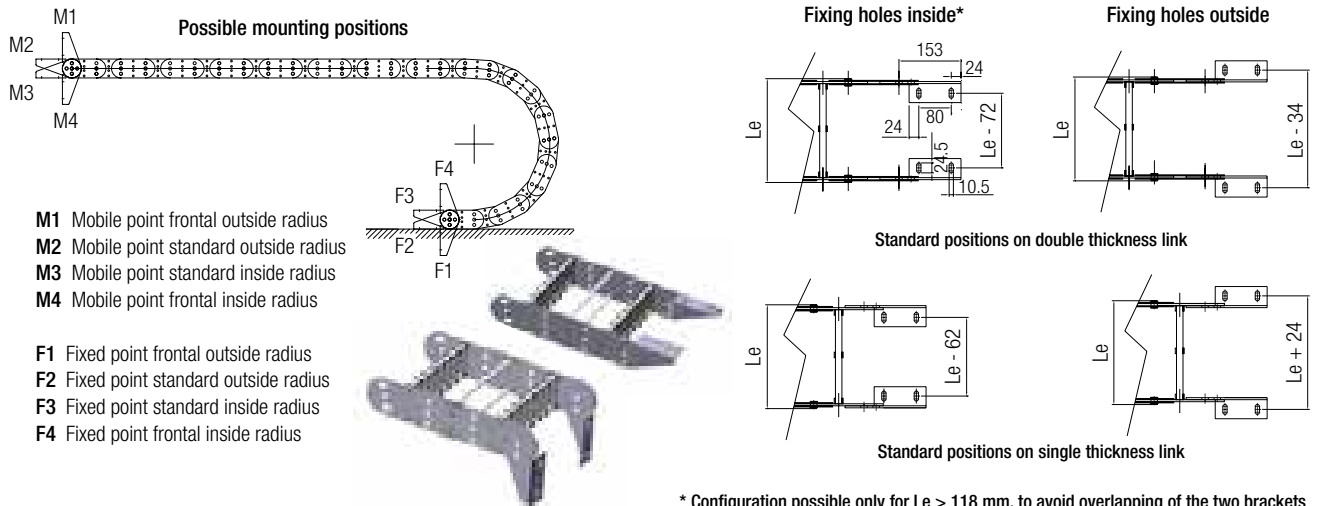


Standard configuration with stays mounted on every other link (half frame). Available by request with stays mounted on every link (full frame).

Steel Energy Guiding Chains Series LZ95

End Brackets

End brackets are permanently mounted on the chain. They can be attached in various positions on the chain. Unless specified otherwise, the brackets are fitted in the M2 and F2 positions with fixing holes on the inside of the brackets.

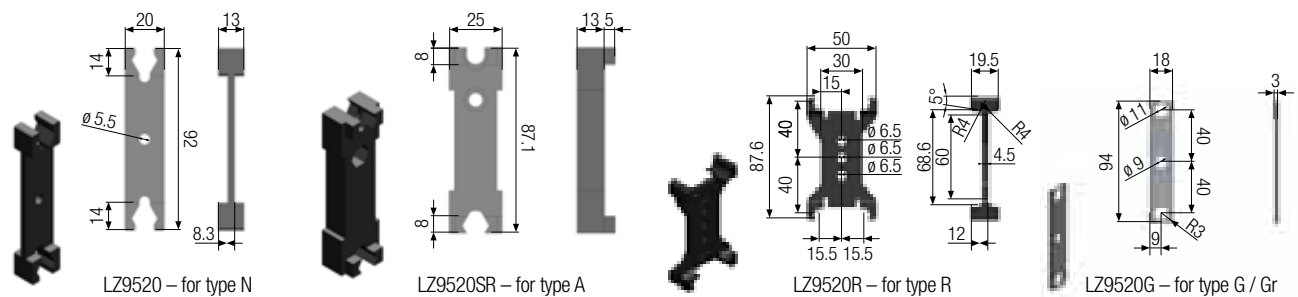


* Configuration possible only for $Le > 118$ mm, to avoid overlapping of the two brackets

Vertical and Horizontal Separators

By request, the chain can be supplied with vertical and/or horizontal separators. These components are used to hold cables and hoses in the right position. This minimizes the stress from chain movement and to avoid twisting the cables and hoses.

Frame Stay Config	Vertical separators Material, Items and thickness				Horizontal separators ^{a)} Material and diameters (item LZ9522)			
	Material	Wall (mm)	Central (mm)	Material	Full Width	Partial Width		
N	Nylon	LZ9520	3.6	LZ9520	Aluminum	\varnothing 6 mm ^{b)}	*10.79 x 7 mm	
A		LZ9520SR	6.5	LZ9520				
R		LZ9520R	5	LZ9520R				
S	Aluminum	//	Dmin = 12	//	Cmin = 4	//	//	
G – Gr	Steel or Aluminum	LZ9520G	(2x) 3	LZ9520G	3	Aluminum	\varnothing 8 mm ^{c)}	*12.15 x 8 mm

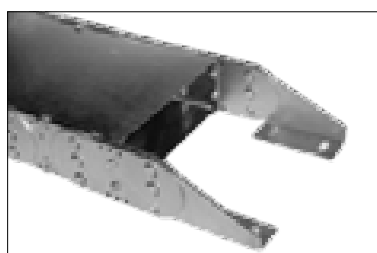


^{a)} for the remaining vertical clearance between horizontal separators please refer to the cross section view on page 15 ^{b)} maximum distance between vertical separators: 80 mm ^{c)} maximum distance between vertical separators: 100 mm * hexagonal profile

Steel Cover Sheets

By request, chains N, A, and S can be supplied with stainless steel cover sheets. These slide on special hooks attached to the sidebands of the chain and protect the cables from hot chips and/or shield them from radiation.

When steel covers are requested, the chain can be supplied with stays mounted on every other link (half-frame) only.





Steel Energy Guiding Chains Series LZ96

General Description



Heavy-duty medium- large-size Energy Guiding Chain with steel sidebands and metal frame stays. This chain can be specified in the ideal configuration to operate under extreme conditions.

Application parameters:

- Maximum speed: 30 m/min
- Maximum acceleration: 3 m/s²
- Working temperature:
 - 30° / +80° Frame Stay Types R and C *
 - 50° / +150° Frame Stay Type S *
 - 50° / +200° Frame Stay Types G and Gr *

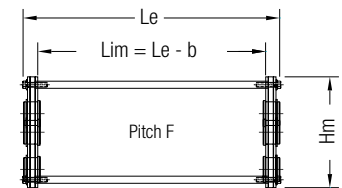
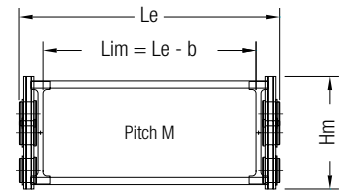
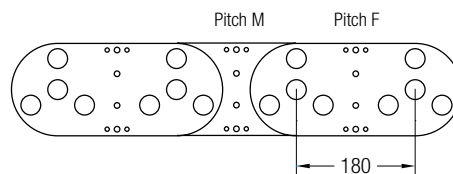
* See page 19 for descriptions of frame stay types

Sidebands

Sidebands are build up of alternating single-thickness and double-thickness links, connected by four pins for heavy-duty applications.

Available in the following materials:

- Galvanized steel
- AISI 304 stainless steel
- AISI 316L stainless steel (ATEX Zone 2 compliant)



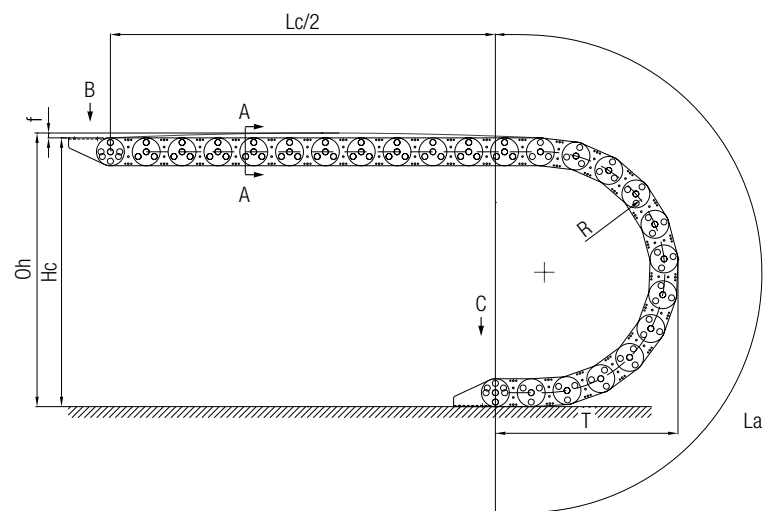
Sidebands technical features	Sidebands material	Galvanized steel	Stainless steel AISI 304	Stainless steel AISI 316L
	Chain height Hm (mm):	140		
	Link pitch Lp (mm):	180		
	L ⁱ * (mm):	Le - 63	Le - 62	

For standard configurations:

- c = 0, so Le = Lef;
- Li = Lim

* Dimension Li refers to type N configuration of the frame stays. For other configurations see table on page 19.

R (mm)	La (mm)	T (mm)	Hc (mm)
265	1552	695	≥ 670
320	1725	750	≥ 780
375	1898	805	≥ 890
435	2087	865	≥ 1010
490	2259	920	≥ 1120
605	2620	1035	≥ 1350
710 ^	2980	1150	≥ 1580
890 ^	3514	1320	≥ 1920
1175 ^	4409	1605	≥ 2490
1405 ^	5132	1835	≥ 2950
Custom	$\pi R + 4 \text{ links}$	$R + 2Lp + Hm/2$	≥ 2R + Hm



The connecting height should be at least Hm/2 more than Hc. For circular movement, the chain can be equipped with customized reverse-bending radius links (Rbr). f ≅ 9.41 mm/m (maximum pre-set of the chain when empty)

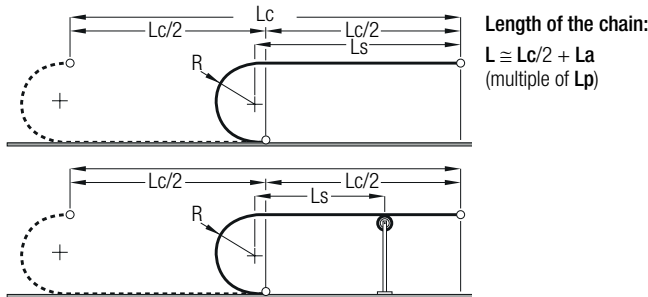
^ = Available on request

Steel Energy Guiding Chains Series LZ96

Sidebands

The self-support diagram refers to a chain self-weight (q_c) of 22.27 kg/m and cavity width of 171 mm.

Diagram base line calculated for the R stay configuration in width $Le = 234$ mm



Frame Stay Types

The LZ96 Series is available in several configurations, depending on the frame stay design:

- **Type R:** Extruded aluminum profile stays, reinforced and with a massive 70 x 9 mm cross section, mounted with two pairs of screws either outside or inside the radius
- **Type S:** Two-parts aluminum stays, with holes according to customers' requirements
- **Type G:** Round profile steel stays
- **Type Gr:** Round profile steel stays with anti-friction rollers to keep vertical separators in place
- **Type C:** Extruded aluminum profile, mould as a tile to completely enclose the chain

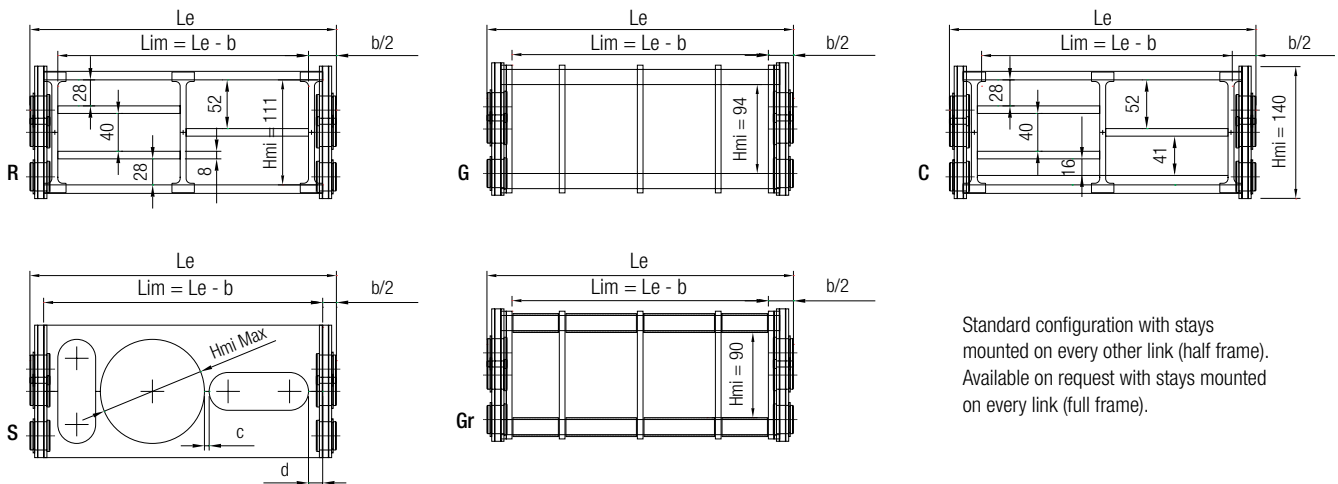
Le (mm)	Type R		Type C		Type S		Type G		Type Gr	
	Li (mm)	Weight (kg/m) ¹⁾	Li (mm)	Weight (kg/m) ¹⁾	Li** (mm)	Weight (kg/m)	Li (mm)	Weight (kg/m) ¹⁾	Li (mm)	Weight (kg/m) ¹⁾
234	173	22.27	173	27.44	204	Custom	173	23.385	173	23.76
284	223	22.42	223	28.73	254	Custom	223	23.7	223	24.18
334	273	22.57	273	30.02	304	Custom	273	24.015	273	24.6
384	323	22.72	323	31.92	354	Custom	323	24.33	323	25.02
434	373	22.87	373	33.21	404	Custom	373	24.64	373	25.44
484	423	23.02	423	34.5	454	Custom	423	24.96	423	25.86
534	473	23.17	473	35.79	504	Custom	473	25.27	473	26.28
584	523	23.32	523	37.08	554	Custom	523	25.59	523	26.7
634	573	23.47	573	38.37	604	Custom	573	25.9	573	27.12
684	623	23.62	623	39.66	654	Custom	623	26.22	623	27.54
734	673	23.77	673	40.95	704	Custom	673	26.53	673	27.96
784	723	23.92	723	42.24	754	Custom	723	26.85	723	28.38
834	773	24.07	773	43.53	804	Custom	773	27.165	773	28.8
884	823	24.22	823	44.82	854	Custom	823	27.48	823	29.22
Custom*	Le - 63		Le - 63		Le - 30 ²⁾		Le - 63		Le - 63	
max Le (mm)	1000		1000		1000		1100		1100	
Hmi (mm)	111		100		max Hmi = \emptyset max. = 118 mm		94		90	

* Table valid for galvanized and AISI 304 steel. For stainless steel AISI 316 L see page 18

** Maximum usable width for hoses

¹⁾ According to the chosen radius, weights can vary slightly

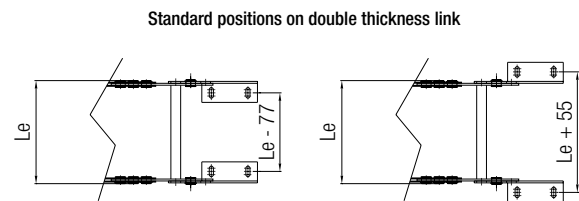
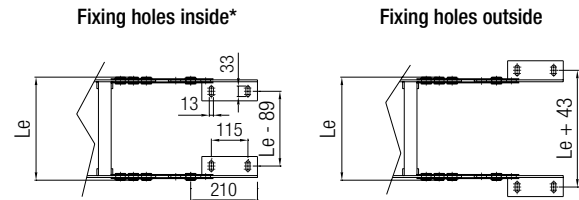
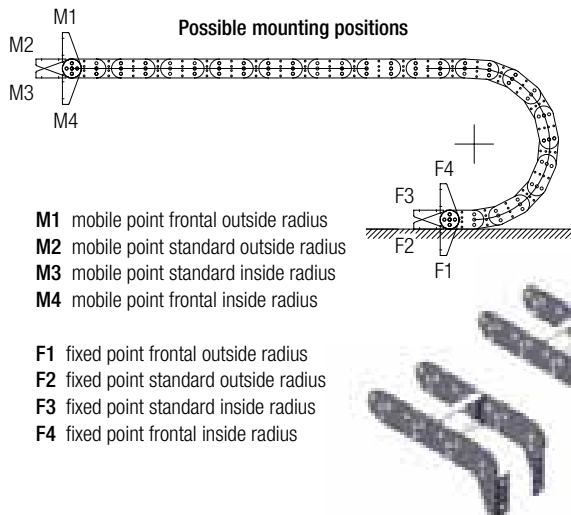
²⁾ For cavity widths of more than 600 mm, depending on the stay design and the utilities carried, use of a vertical screw to hold the two parts together may be necessary



Steel Energy Guiding Chains Series LZ96

End Brackets

The end brackets are permanently mounted on the chain. They can be attached in varying positions on the chain. Unless specified otherwise, the brackets are fitted in M2 / F2 configuration with fixing holes on the inside of the brackets.

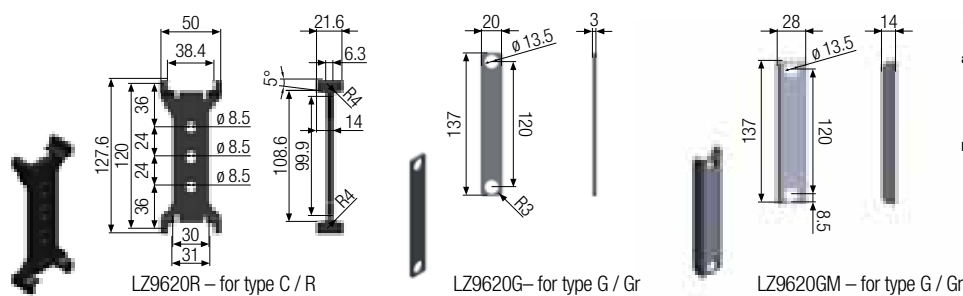


* Configuration possible only for $Le > 149$ mm, to avoid overlapping of the two brackets

Vertical and Horizontal Separators

On request the chain can be supplied with vertical and/or horizontal separators. These components are used to hold cables and hoses in the right position minimizing the stress caused on them by the chain movement and to avoid their twisting.

Frame Stay Config	Vertical separators Material, Items and thickness					Horizontal separators ^{a)} Material and diameters (item LZ9622)		
	Material	Wall	(mm)	Central	(mm)	Material	Full Width	Partial Width
C - R	Nylon	LZ9620R	6.3	LZ9620R	6.3	Aluminum	\varnothing 8 mm ^{b)}	12.15 x 8 mm
S	Aluminum	//	Dmin = 15	//	Cmin = 4	//	//	//
G - Gr		LZ9620GM	12	LZ9620G	3	Aluminum	\varnothing 8 mm ^{b)}	12.15 x 8 mm



^{a)} for the remaining vertical clearance between horizontal separators please refer to the cross section view on page 19
^{b)} maximum distance between vertical separators: 100 mm

Chain Covering Possibilities

By request the chains can be supplied complete with stainless steel covering sheets, sliding on special hooks attached to the sidebands of the chain, in order to protect the cables from hot chips and as a shield from radiation. When steel coverings are requested, the chains can be supplied with stays mounted on every other link (half frame) only.





Steel Energy Guiding Chains Series LZ97

General Description



Heavy-duty large-size Energy Guiding Chain with steel sidebands and metal frame stays.
This chain can be specified in the ideal configuration to operate under extreme conditions.

Application parameters:

- Maximum speed: 20 m/min
- Maximum acceleration: 2.5 m/s²
- Working temperature:
 - 50° / +150° Frame Stay Type S *
 - 50° / +200° Frame Stay Type G *

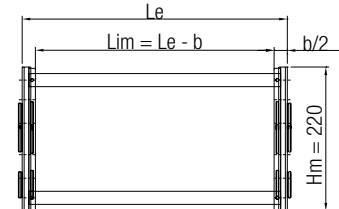
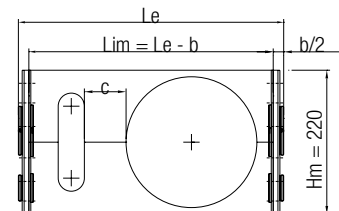
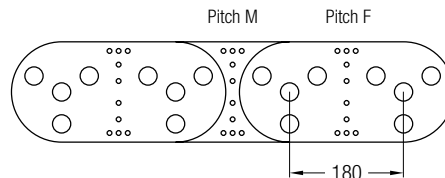
* See page 23 for descriptions of frame stay types

Sidebands

Sidebands are build up of alternating single-thickness and double-thickness links, connected by four pins for heavy-duty applications.

Available in the following materials:

- Galvanized steel
- AISI 304 stainless steel
- AISI 316L stainless steel (ATEX Zone 2 compliant)



Sidebands technical features	Sidebands material	Galvanized steel	Stainless steel AISI 304	Stainless steel AISI 316L
	Chain height Hm (mm):	220		
	Link pitch Lp (mm):	250		
	Li* (mm):	Le - 52		Le - 51

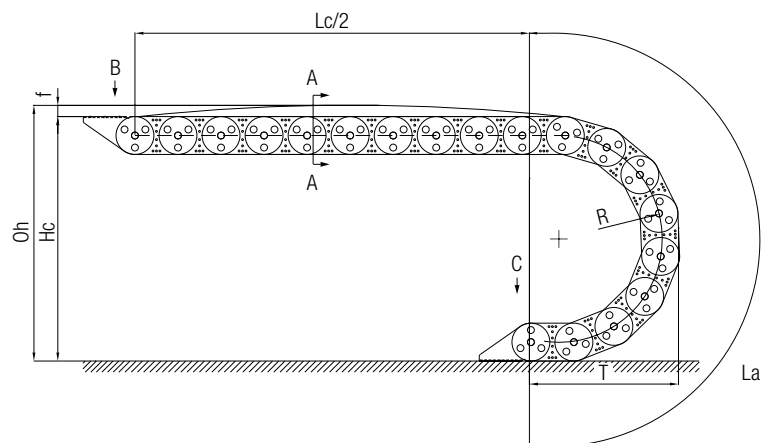
Double Thickness Pitch F needs horizontal steel bars as reinforcement for the chain

* Dimension Li refers to type N configuration of the frame stays. For other configurations see table on page 23.

For standard configurations:

- c = 0, so Le = Lef;
- Li = Lim

R (mm)	La (mm)	T (mm)	Hc (mm)
365	2146	975	950
445	2398	1055	1110
600	2885	1210	1420
760	338	1370	1740
920	3890	1530	2060
1075	4377	1685	2370
Custom	$\pi R + 4$ links	$R + 2Lp + Hm/2$	$2R + Hm$



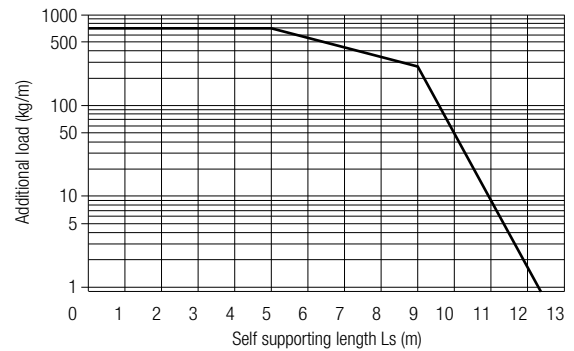
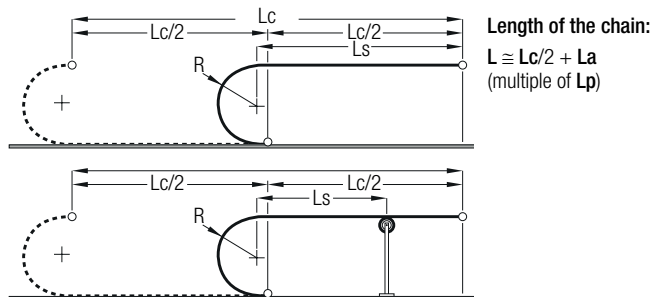
The connecting height should be at least $Hm/2$ more than Hc . For circular movements, the chain can be equipped with customized reverse-bending radius links (Rbr).
 $f \cong 14.7$ mm/m (maximum pre-set of the chain when empty)

Steel Energy Guiding Chains Series LZ97

Sidebands

This "self-supporting" diagram refers to a chain self-weight (q_0) of 46.4 kg/m and cavity width of 350 mm.

Diagram base line calculated for stay Type G
in width $Le = 350$ mm



Frame Stay Types

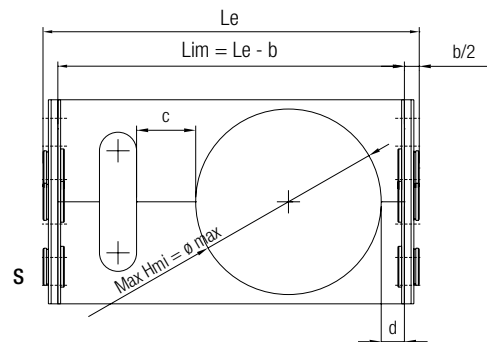
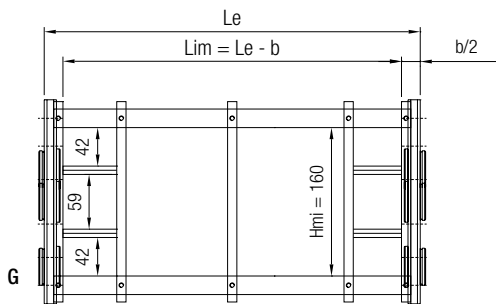
The LZ97 Series is available in several configurations, depending on the frame stay design:

- **Type S:** Two-part aluminum stays, with holes according to customer's requirements
- **Type G:** Round profile steel stays
- **Type Gr:** Round profile steel stays with anti-friction rollers to keep vertical separators in position

Le (mm)	Type S		Type G		Type Gr	
	Li** (mm)	Weight (kg/m)	Li (mm)	Weight (kg/m) ¹⁾	Li (mm)	Weight (kg/m) ¹⁾
Custom*	Le - 32 ²⁾	Custom	Le - 52	Custom	Le - 52	Custom
max Le (mm)	1100		1200		1200	
Hmi (mm)	max Hmi = \varnothing max. = 175 mm		160		156	

* Table applies to galvanized steel and AISI 304 stainless steel. For AISI 316L stainless steel, see page 22 ** Maximum usable width for hoses

¹⁾ Depending on the chosen radius, weights can vary slightly

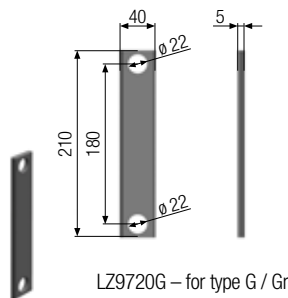


Steel Energy Guiding Chains Series LZ97

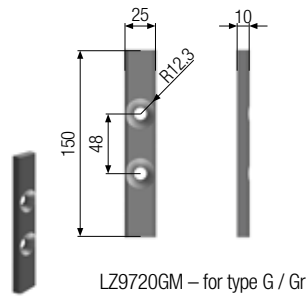
Vertical and Horizontal Separators

On request the chain can be supplied with vertical and/or horizontal separators. These components are used to hold cables and hoses in the right position minimizing the stress caused on them by the chain movement and to avoid their twisting.

Frame Stay Config	Vertical separators Material, Items and thickness					Horizontal separators ^{a)} Material and diameters (item LZ9722)		
	Material	Wall	(mm)	Central	(mm)	Material	Full Width	Partial Width
S	Aluminum	//	Dmin = 15	//	Cmin = 4	//	//	//
G / Gr	Steel	LZ9720GM	10	LZ9720G	8	Aluminum	ø 8	ø 8



LZ9720G – for type G / Gr



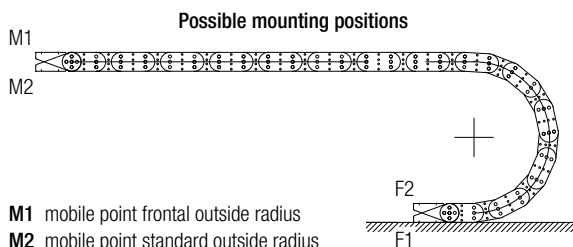
LZ9720GM – for type G / Gr

^{a)} for the remaining vertical clearance between horizontal separators please refer to the cross section view on page 23

Standard configuration with stays mounted on every other link (half frame). Available on request with stays mounted on every link (full frame).

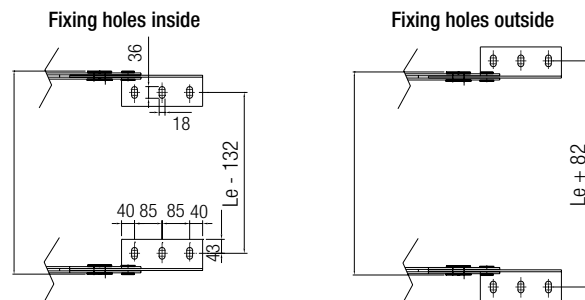
End Brackets

The end brackets are permanently mounted on the chain. They can be attached in varying positions on the chain. Unless specified otherwise, the brackets are fitted in M2 / F2 configuration with fixing holes on the inside of the brackets.



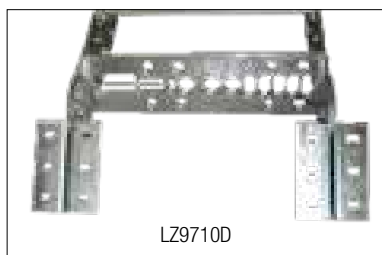
M1 mobile point frontal outside radius
M2 mobile point standard outside radius

F1 fixed point frontal outside radius
F2 fixed point standard outside radius



Standard positions on single thickness link

Double Brackets – Optional



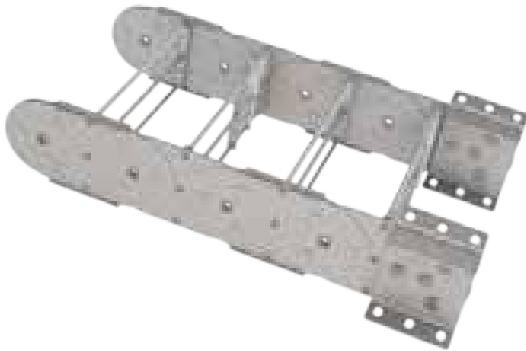
LZ9710D

LZ97 chains are used to handle very high additional loads. For this reason they are available both with single brackets (standard) and double brackets like the one shown in the picture.



Steel Energy Guiding Chains Series LZ98

General Description



Heavy-duty very large-size Energy Guiding Chain with steel sidebands and metal frame stays. This chain can be specified in the ideal configuration to operate under extreme conditions.

Application parameters:

- Maximum speed: 15 m/min
- Maximum acceleration: 2.5 m/s²
- Working temperature: -50° / +200°, Frame Stay Type G *

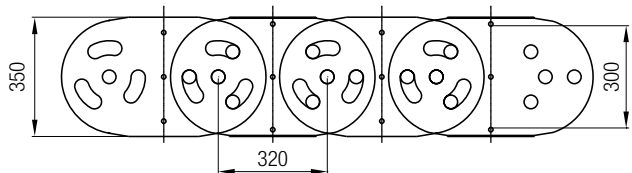
* See page 27 for descriptions of frame stay types

Sidebands

Sidebands are made of alternating single-thickness and double-thickness links, connected by three pins for heavy-duty applications.

Available in the following materials:

- Galvanized steel
- AISI 304 stainless steel
- AISI 316L stainless steel (ATEX Zone 2 compliant)



Sidebands technical features	Sidebands material	Galvanized steel	Stainless steel AISI 304	Stainless steel AISI 316L
	Chain height Hm (mm):	300		
	Link pitch Lp (mm):	320		
	Li (mm):	Le – 102		Le – 102

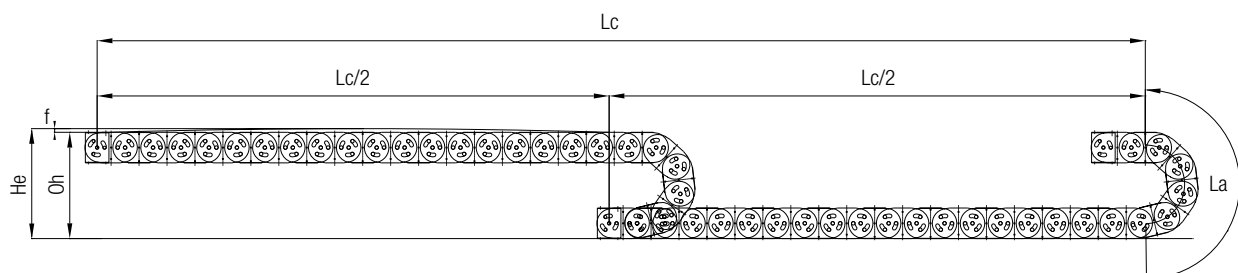
R (mm)	La (mm)	T (mm)	Hc (mm)
500	2850	1290	≥ 1300
670	3384	1460	≥ 1640
870	4013	1660	≥ 2040
1075	4657	1865	≥ 2450
1275	5285	3340	≥ 2850
1480	5951	3750	≥ 3260
1785	6887	4360	≥ 3870
Custom	$\pi R + 4 \text{ links}$	$R + 2Lp + Hm/2$	$\geq 2R + Hm$

The connecting height should be at least **Hm/2** more than **Hc**.

For circular movements, the chain can be equipped with customized reverse-bending radius links (Rbr).

$f = 1,8 \text{ mm/m}$ (maximum preset of the chain when empty).

The first links near the fixed point are without preset, in order to reduce the stress on the brackets.



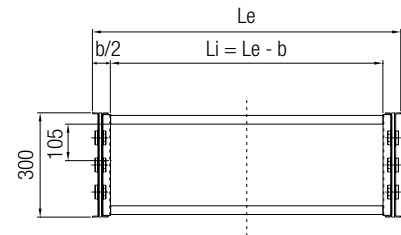
Steel Energy Guiding Chains Series LZ98

Frame Stay Types

The LZ98 Series is available in several configurations, depending on the frame stay design:

- **Type G:** Round profile steel stays
- **Type Gr:** Round profile steel stays with anti-friction rollers to keep vertical separators in place

Le (mm)	Type G		Type Gr	
	Li (mm)	Weight (kg/m) ¹⁾	Li (mm)	Weight (kg/m) ¹⁾
Custom*	Le - 102	Custom	Le - 102	Custom
max Le (mm)	1400		1400	
Hmi (mm)	280		275	



* Table applies to galvanized and AISI 304 stainless steel. For AISI 316 L stainless steel, see page 26

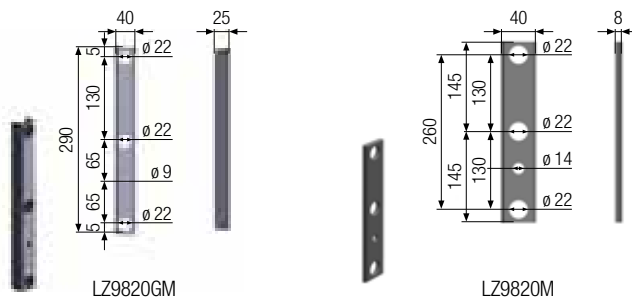
¹⁾ According to the chosen radius, weights can vary slightly

Vertical and Horizontal Separators

By request, the chain can be supplied with vertical and/or horizontal separators. These components are used to hold cables and hoses in the right position which minimizes the stress from chain movement and to avoid twisting the cables and hoses.

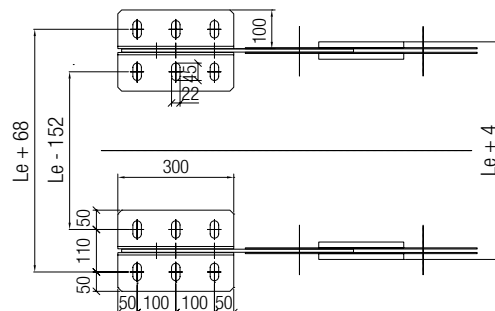
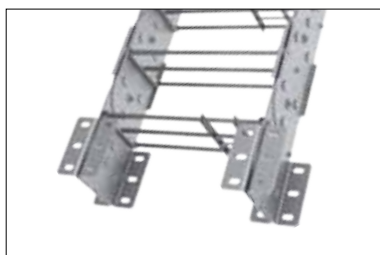
Frame Stay Config	Vertical separators Material, Items and thickness					Horizontal separators ^{a)} Material and diameters (item LZ9822)		
	Material	Wall	(mm)	Central	(mm)	Material	Full Width	Partial Width
G	Steel	LZ9820GM	12	LZ9820G	3	Aluminum	ø 20	ø 16
Gr		LZ9820GrM					ø 25	ø 16

^{a)} For the remaining vertical clearance between horizontal separators, please refer to the cross sectional view on page 26



End Brackets

The end brackets are fixed to the chain in a stationary manner. For the LZ98 series, the weight of the chains, cables, and hoses require double brackets for each part.



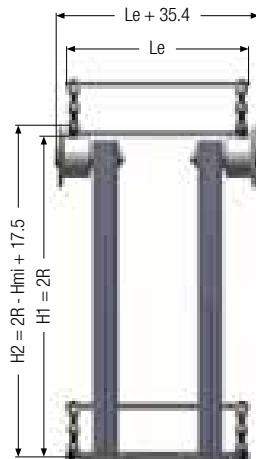
Standard configuration with stays mounted on every other link (half-frame). Stays mounted on every link (full frame) are available on demand.

Steel Energy Guiding Chains Accessories

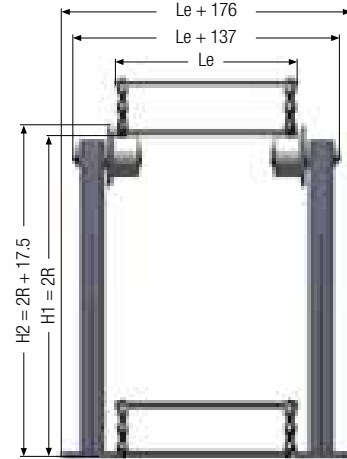
Support Rollers

In applications where the extended side of the travel distance ($Lc/2$) exceeds the self-supporting capacity of the chain (Ls), the chain can be supplied with support rollers. These provide stability and allow the chain to withstand added weight. The support roller's wheels can be mounted inside or outside, depending on chain width (see illustrations below). Rollers are available in galvanized steel, AISI 304 stainless steel, or AISI 316L stainless steel (ATEX zone 2) compliant.

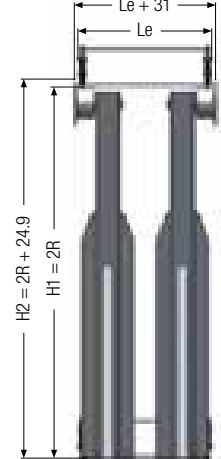
Bending radius	H1	H2	Bending radius	H1	H2
75	150	167.5	265	530	547.5
95	190	207.5	290	580	597.5
115	230	247.5	300	600	617.5
125	250	267.5	320	640	657.5
135	270	287.5	340	680	697.5
140	280	297.5	350	700	717.5
145	290	307.5	375	750	767.5
155	310	327.5	380	760	777.5
170	340	357.5	435	870	887.5
200	400	417.5	490	980	997.5
220	440	457.5	605	1210	1227.5
260	520	537.5	Custom	2R	2R+17.5



LZ92/94/95

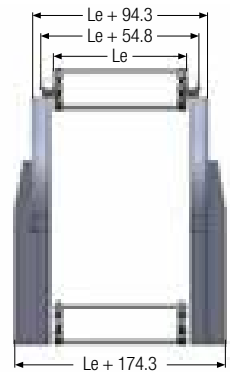
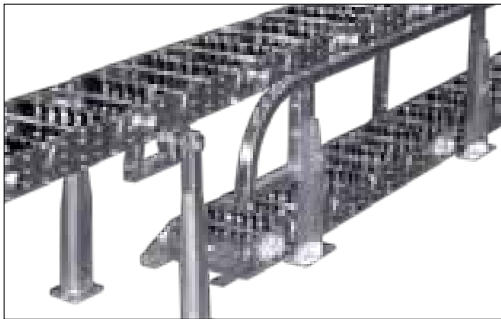


LZ96/97



Sidebands Wheels and Rails

In applications where the retracted side of the travel distance exceeds the self-supporting capacity of the chain, the chain can be supplied with wheels, mounted on the sidebands, and rails. With this configuration, the chain can have a total travel distance of eight times its own maximum self supporting distance with the additional load.



Ground Channels

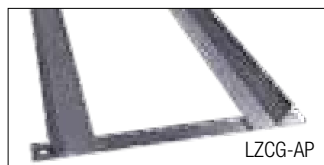
In some situations, the retracted side of the travel distance needs to be supported or driven without it touching the ground. When required, the steel chains can be supplied with a ground channel. Standard ground channel segment length is 2,000 mm. Other custom lengths on demand. Lec is available in multiples of 10 mm, and every channel dimension Lec can be used for chain's Le from $Lc = Lec - 19$ and $Lc = Lec - 10$ mm.

Lec	Le	Lec	Le	Lec	Le	Lec	Le	Lec	Le	Lec	Le	Lec	Le	Lec	Le
80	61-70	140	121-130	200	181-190	260	241-250	320	301-310	380	361-370	440	421-430	500	481-490
90	71-80	150	131-140	210	191-200	270	251-260	330	311-320	390	371-380	450	431-440	510	491-500
100	81-90	160	141-150	220	201-210	280	261-270	340	321-330	400	381-390	460	441-450		
110	91-100	170	151-160	230	211-220	290	271-280	350	331-340	410	391-400	470	451-460		
120	101-110	180	161-170	240	221-230	300	281-290	360	341-350	420	401-410	480	461-470		
130	111-120	190	171-180	250	231-240	310	291-300	370	351-360	430	411-420	490	471-480		

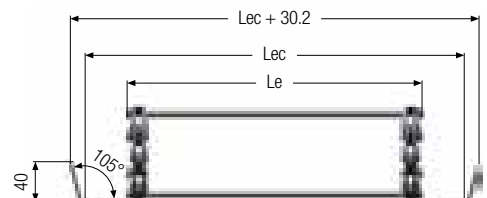
Standard ground channels are made of a single steel layer, bent on the sides (see picture below left). By request, we can supply the ground channels with traverses, to avoid dust or liquid deposits inside the channels (see picture below middle).



LZCG



LZCG-AP



Steel Energy Guiding Chains Accessories / How to Order

Guiding Channels and Sliding Shoes



Steel chains can be equipped with guiding channels and sliding shoes. This configuration can be used when the maximum self-support length of the chain (with the additional load of the application) is less than 1/8 of the travel distance.

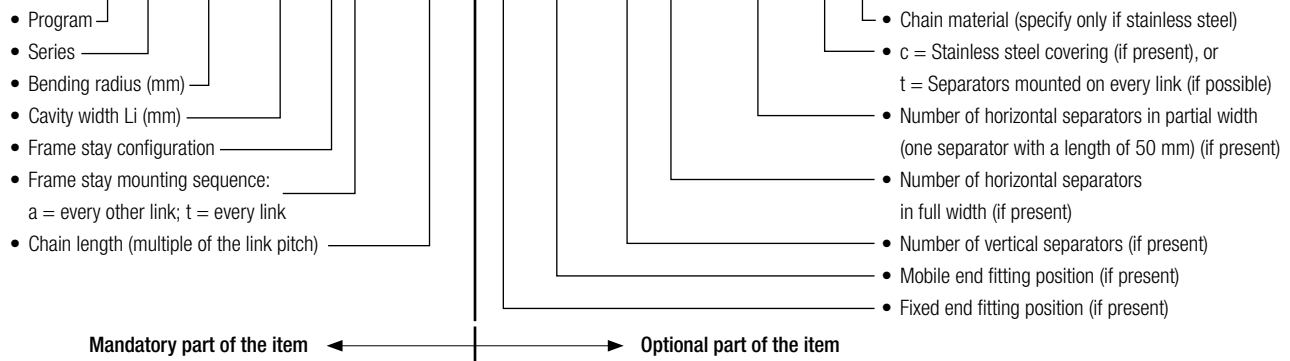
Guiding channels are available in the same material as the chain. Sliding shoes are made of Polyzene® - polyethylene with heavy molecular weight.



How to order

Here is an example of how to order the chain, using our standard part number scheme:

LZ92.095.191.Na-1495-F2/M2-V5/S1/01.50 c-I4

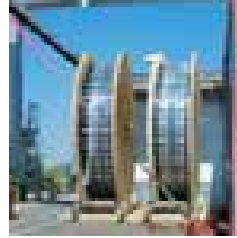


The part numbering scheme can be used for standard configurations only. For special solutions or complete applications, please contact our technical office. An offer drawing will be prepared and its number will be used as reference code for the order

Cable selection

Application	Basic Chain	Heavy Duty Chain	
Power / Control	CV	CXG	CXP
Composite Power + Control + Data	CV-D	CXG-D	CXP-D
Design	YRDMY + YRDMCY Y Insulation material PVC RD Round M Cable C Shield of braided copper wires Y Sheathing material PVC J With green/yellow earth conductor	11YMSL11Y + 11YMSLC11Y 11Y Insulation material thermoplastic polymer (halogen free) MSL Sheath round cable C Shield of braided copper wires 11Y Outer sheathing material polyurethane, (halogen free)	(N)GRDGOEU-J/O + (N)GRDGCGOEU-J/O (N) Adapted to a VDE standard G Core insulation constructed of a rubber compound (EPR) RD Round cable C Shield of braided copper G Outer sheathing material rubber compound Ö Oil-resistant outer sheath U Outer sheath of low flammability ("fire-proof") -O Without a green/yellow identification of the earth/ground conductor -J With a green/yellow identification of the earth/ground conductor
Suitable for use outdoors?	● limited	● ideal	● ideal
Voltage range	Up to 0.6/1 kV	Up to 0.6/1 kV	Up to 0.6/1 kV
Tensile load capacity max [N/mm ²]	15	15	15
Travel speed max [m/min]	140	300	250
Flexing temperature range [°C]	-5 up to 80	-35 up to 80	-30 up to 80

Custom services!



Conductix-Wampfler is a customer-focused, market-driven company. Our customers can rely on us to provide service for their specific needs and requirements.

With Conductix-Wampfler anything is possible, from the initial design and development to long-term service contracts. Whatever your needs are, we can deliver!

For complicated systems, high expectations for extended service life, and absolute need for operational reliability, it makes sense to take advantage of our after-sales service. When it comes to service, you can count on Conductix-Wampfler to perform.

During the design and development phase we:

- Determine initial requirements
- Define the correct energy guiding chain solution
- Select the optimum energy guiding system, considering the cost, service life, operating parameters, installation, and site conditions.

At preliminary assembly we:

- Prepare the cables
- Assign cables to chains as a function of design drawings and EMC requirements
- Install separators and frame stays
- Secure cable ends
- Prepare the energy guiding chain system for transport by suitable means

During final assembly we:

- Supervise the assembly on site or
- Complete the assembly using our trained specialists.

If your energy guiding chain system is installed by Conductix-Wampfler specialists and you contract for our service package, we give you an additional six-month warranty, and we:

- Inspect your systems at regular intervals
- Take appropriate measures to ensure long-term reliability
- Provide services required on site in the event of an incident, including materials

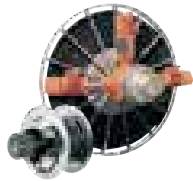


Conductix-Wampfler's specialists provide complete support from initial programming and design to final assembly on site – worldwide!



Your Applications – our Solutions

Steel Energy Guiding Chains from Conductix-Wampfler represent only one of the many solutions made possible by the broad spectrum of Conductix-Wampfler components for the transport of energy, data, and fluid media. The solutions we deliver for your applications are based on your specific requirements. In many cases, a combination of several different Conductix-Wampfler systems can prove advantageous. You can count on all of Conductix-Wampfler's Business Units for hands-on engineering support, coupled with the perfect solution to meet your energy management and control needs.



Cable reels

Motorized reels and spring reels by Conductix-Wampfler hold their own wherever energy, data and media have to cover the most diverse distances within a short amount of time – in all directions, fast and safe.



Festoon systems

It's hard to imagine Conductix-Wampfler cable trolleys not being used in virtually every industrial application. They're reliable and robust and available in an enormous variety of dimensions and designs.



Conductor rails

Whether they're enclosed conductor rails or expandable single-pole systems, the proven conductor rails by Conductix-Wampfler reliably move people and material.



Non-insulated conductor rails

Extremely robust, non-insulated conductor rails with copper heads or stainless steel surfaces provide the ideal basis for rough applications, for example in steel mills or shipyards.



Energy guiding chains

The "Jack of all trades" when it comes to transferring energy, data, air, and fluid hoses. With their wide range, these energy guiding chains are the ideal solution for many industrial applications.



Slip ring assemblies

Whenever things are really "moving in circles", the proven slip ring assemblies by Conductix-Wampfler ensure the flawless transfer of energy and data. Here, everything revolves around flexibility and reliability!



Inductive Power Transfer IPT®

The no-contact system for transferring energy and data. For all tasks that depend on high speeds and absolute resistance to wear.



Reels, retractors and balancers

Whether for hoses or cables, as classical reels or high-precision positioning aids for tools, our range of reels and spring balancers take the load off your shoulders.



Jib boom

Complete with tool transporters, reels, or an entire media supply system – here, safety and flexibility are key to the completion of difficult tasks.



Conveyor systems

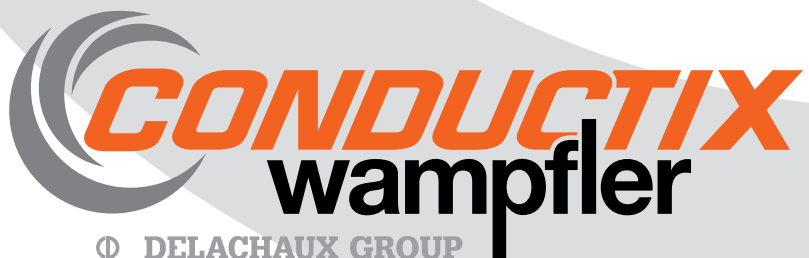
Whether manual, semiautomatic or with Power & Free – flexibility is achieved with fully customized layouts and locations.

www.conductix.com

Conductix-Wampfler has just one critical mission:
To provide you with energy and data transmission systems
that will keep your operations up and running 24/7/365.

chains@conductix.com

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