



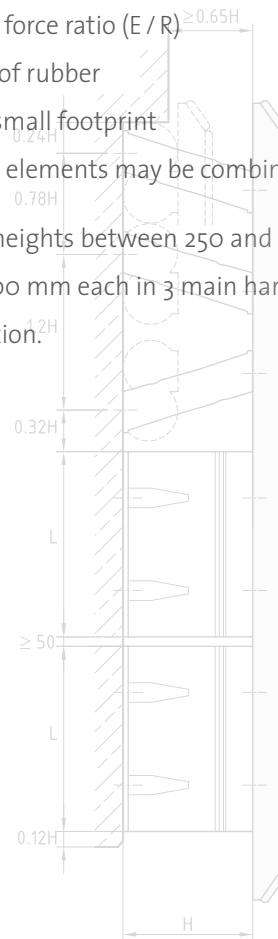
## FE ELEMENT FENDERS

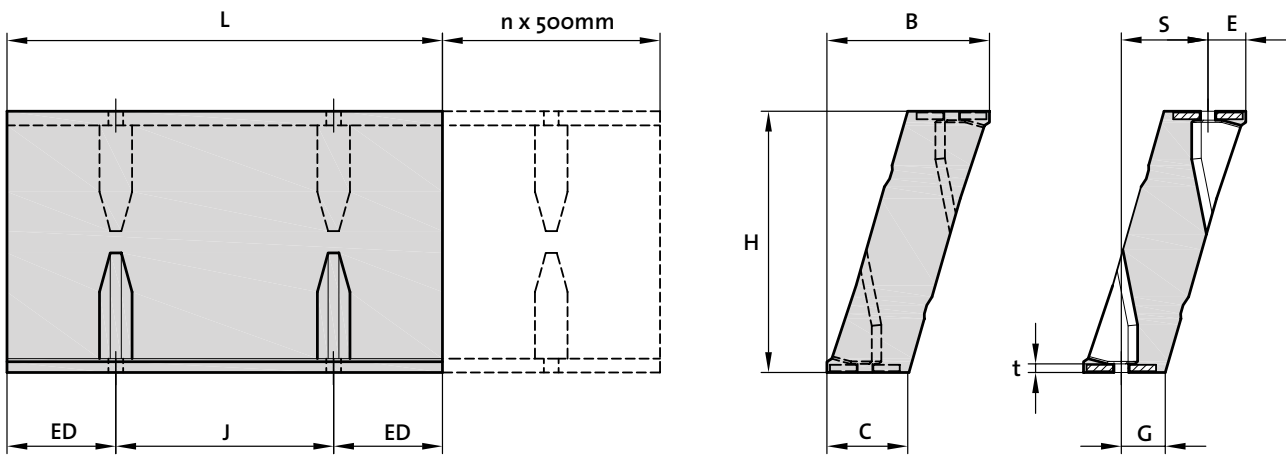
Element Fenders are fully moulded rubber legs with embedded mounting plates. In principle they are based on V Fenders but separated legs increase fender layout flexibility when installed behind steel panels or where mounting space is restricted. The major characteristics include:

- ▶ Good energy absorption to reaction force ratio (E / R)
- ▶ High energy absorption per weight of rubber
- ▶ Modular and compact design with small footprint
- ▶ Vertically and horizontally mounted elements may be combined in one system

The FE Fender element is available in heights between 250 and 1.600 mm, in standard lengths ranging from 500 to 2.000 mm each in 3 main hardness grades\*. This enables the most precise fender selection.

\* Intermediate rubber grades see page 22–23





FE ELEMENT FENDER DIMENSIONS

Fender Size	L [mm]	H [mm]	B [mm]	C [mm]	S [mm]	E [mm]	t [mm]	G [mm]	ED [mm]	J [mm]	Anchors/ Bolts	Weight [kg]
FE 250	1000	250	158	80	78	40	17	40	50	300	M20	30
FE 300	1000	300	187	94	93	47	17	50	100	400	M20	46
FE 400	1000	400	250	125	124	63	17	62	250	500	M24	66
FE 500	1000	500	316	158	142	87	20	71	250	500	M30	111
FE 550	1000	550	344	172	170	87	20	85	250	500	M30	132
FE 600	1000	600	373	188	199	87	20	101	250	500	M30	153
FE 700	1000	700	443	225	217	113	26	112	250	500	M36	222
FE 750	1000	750	466	235	230	118	26	117	250	500	M36	239
FE 800	1000	800	498	250	240	129	26	121	250	500	M36	268
FE 900	1000	900	569	289	279	145	31	144	250	500	M42	367
FE 1000	1000	1000	634	322	310	162	31	160	250	500	M42	454
FE 1200	1000	1200	762	390	372	195	36	195	250	500	M48	625
FE 1250	1000	1250	792	401	388	202	36	199	250	500	M48	639
FE 1400	1000	1400	870	440	430	220	41	220	250	500	M48	846
FE 1450	1000	1450	901	454	445	228	41	226	250	500	M48	873
FE 1600	1000	1600	1002	507	480	261	50	246	250	500	M56	1114

Also available in different bolt-layouts and with different geometry to replace element fenders of other manufactures.

PERFORMANCE TABLE FE ELEMENT FENDERS (RPD = Rated Performance Data in acc. with PIANC)

Fender Size	E/R	Rubber Grade / Performance Value	G 0.9	G 1.0	G 1.1	G 1.2	G 1.3	G 1.4	G 1.5	G 1.6	G 1.7	G 1.8
FE 250	0.10	Energy Reaction	8.7 79	<b>9.0</b> <b>82</b>	9.3 86	9.6 89	9.9 93	10 96	11 100	11 103	11 107	11 110
FE 300	0.12	Energy Reaction	13 102	<b>13</b> <b>106</b>	13 109	14 112	14 115	15 119	15 122	15 125	16 129	16 132
FE 400	0.18	Energy Reaction	22 122	<b>23</b> <b>126</b>	24 131	25 135	25 140	26 144	27 148	28 153	29 157	29 162
FE 500	0.23	Energy Reaction	32 139	<b>36</b> <b>157</b>	37 162	39 168	40 173	41 179	43 185	44 190	45 196	46 202
FE 550	0.25	Energy Reaction	40 160	<b>44</b> <b>173</b>	46 179	47 185	49 192	50 198	52 204	53 210	55 216	56 222
FE 600	0.28	Energy Reaction	47 168	<b>52</b> <b>188</b>	54 195	56 202	58 209	59 215	61 222	63 229	65 235	67 242
FE 700	0.32	Energy Reaction	63 212	<b>70</b> <b>219</b>	73 227	75 235	78 243	80 251	83 259	85 266	88 274	90 282
FE 750	0.34	Energy Reaction	73 215	<b>81</b> <b>238</b>	84 246	87 254	89 262	92 270	95 279	98 287	101 295	103 303
FE 800	0.37	Energy Reaction	84 227	<b>93</b> <b>251</b>	96 259	99 268	103 278	106 286	109 295	112 303	115 311	119 322
FE 900	0.41	Energy Reaction	106 259	<b>118</b> <b>285</b>	122 295	126 305	130 314	134 324	138 334	142 344	146 354	150 363
FE 1000	0.46	Energy Reaction	131 285	<b>146</b> <b>317</b>	151 328	156 338	161 349	166 360	171 371	176 382	181 393	186 403
FE 1200	0.54	Energy Reaction	186 344	<b>207</b> <b>378</b>	213 389	220 401	226 412	232 424	239 435	245 446	251 458	257 469
FE 1250	0.57	Energy Reaction	194 340	<b>216</b> <b>378</b>	222 389	229 402	235 413	242 426	249 437	255 448	261 460	268 471
FE 1400	0.64	Energy Reaction	257 402	<b>286</b> <b>447</b>	294 455	303 469	311 482	320 495	328 509	336 530	345 539	353 548
FE 1450	0.67	Energy Reaction	336 501	<b>343</b> <b>511</b>	351 523	359 535	367 547	374 558	382 570	390 582	398 594	406 605
FE 1600	0.74	Energy Reaction	363 491	<b>374</b> <b>505</b>	385 520	396 535	408 551	419 566	430 581	441 596	452 611	464 627

Performance values are for single units of 1.000 mm length.  
Standard tolerance of +/- 10 %

Energy absorption in kNm, Reaction force in kN at rated deflection of 57,5 %, max. deflection 62,5 %.



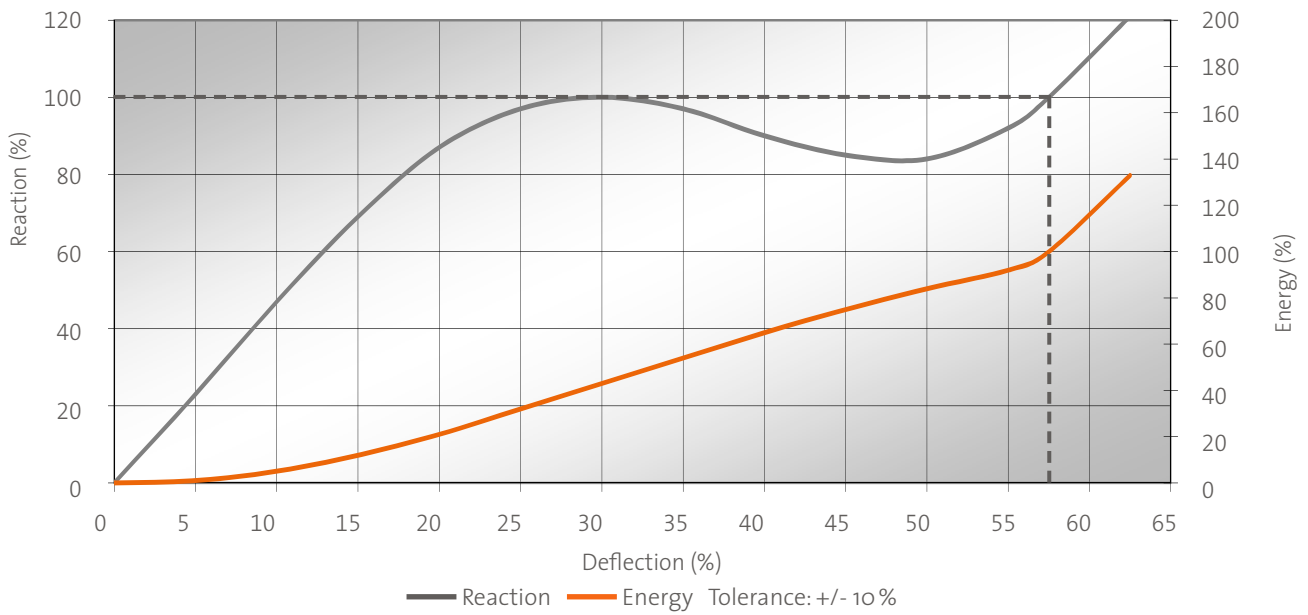
Finger Pier, Klaipeda, Lithuania



G 1.9	G 2.0	G 2.1	G 2.2	G 2.3	G 2.4	G 2.5	G 2.6	G 2.7	G 2.8	G 2.9	G 3.0	G 3.1	Fender Size
12	12	12	13	13	13	14	15	15	15	15	15	17	FE 250
113	117	120	124	127	131	134	138	141	145	148	148	163	
17	17	17	18	18	19	19	19	20	21	22	22	24	FE300
135	138	142	145	148	151	155	158	161	172	176	179	196	
30	31	32	33	33	34	35	36	37	37	38	39	43	FE 400
166	170	175	179	184	188	192	197	201	205	210	214	235	
48	49	50	52	53	54	56	57	58	59	61	62	68	FE 500
207	213	219	224	230	236	241	247	253	258	264	270	294	
58	60	61	63	64	66	67	69	70	72	73	75	83	FE 550
228	234	240	246	253	259	265	271	277	283	289	295	323	
69	71	72	74	76	78	80	82	83	85	87	89	98	FE 600
249	255	262	269	276	282	289	296	302	309	316	322	352	
93	95	98	100	103	105	108	110	113	115	118	120	132	FE 700
290	298	306	313	321	329	337	345	353	361	368	376	413	
106	109	112	115	117	120	123	126	129	131	134	137	151	FE 750
311	320	328	336	344	352	361	369	377	385	394	402	443	
122	125	128	131	135	138	141	144	147	151	154	157	173	FE 800
329	337	345	354	365	372	381	389	397	408	416	424	470	
154	159	163	167	171	175	179	183	187	191	195	199	219	FE 900
373	383	393	402	412	422	432	442	451	461	471	481	529	
191	196	201	206	211	216	221	226	231	236	241	246	271	FE 1000
414	425	436	447	458	469	479	490	501	512	523	534	587	
264	270	278	286	294	302	311	319	327	335	343	351	386	FE 1200
481	492	507	522	537	552	567	582	597	612	627	642	706	
273	281	289	298	306	315	323	331	340	348	356	365	402	FE 1250
473	487	502	517	531	546	560	575	589	604	618	633	710	
362	370	381	392	404	415	426	437	448	460	471	482	530	FE 1400
562	575	592	610	627	644	662	679	696	713	731	748	823	
413	421	429	437	444	452	460	468	475	483	491	499	549	FE 1450
620	631	643	654	666	678	689	701	713	724	736	748	825	
475	486	497	508	520	531	542	553	564	576	587	598	609	FE1600
641	657	671	686	702	718	732	747	762	778	793	808	823	



## GENERIC PERFORMANCE CURVE FE ELEMENT FENDERS



## FENDER PERFORMANCE AT INTERMEDIATE DEFLECTION

Deflection in % of original fender height	0	5	10	15	20	25	30	35	40	45	50	55	57.5	62.5
Energy absorption in % of original value	0	2	7	14	24	32	41	56	66	76	85	95	100	113
Reaction Force in % of original value	0	31	58	78	92	97	100	96	90	85	84	92	100	130

## TEMPERATURE FACTOR

Temperature in °C	-30	-20	-10	0	10	23	30	40	50	60
Correction Factor	1.559	1.375	1.182	1.083	1.034	1	0.976	0.945	0.918	0.917

## VELOCITY FACTORS

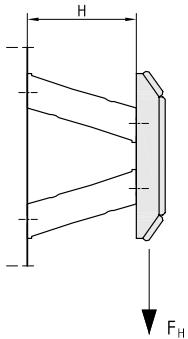
Compression Time in sec.	1	2	3	4	5	6	7	8	≥10
Correction Factor	1.02	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00

## ANGLE FACTORS

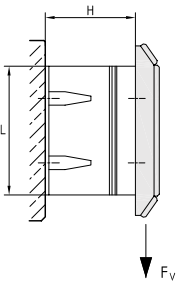
Compression Angle in °	0	2	4	6	8	10	12	14	16	18	20
Energy Correction Factor	100	96	94	92	90	88	86	84	82	80	78
Reaction Force Correction Factor	100	96	94	92	90	88	86	84	82	80	78

**WEIGHT SUPPORT CAPACITY**

The weight support capacity of the FE Fender is depending on the orientation of the elements versus the static weight.



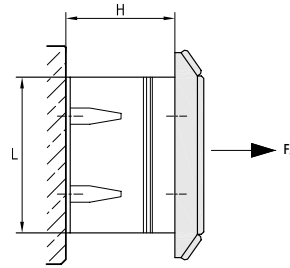
When the fenders are horizontally mounted, they can only support a very limited amount of weight, i.e. we typically allow maximum of 50% of the weight of the rubber units.



When the fenders are mounted vertically, the weight support capacity is far higher, i.e. at least double the weight of the rubber units. Please contact us for details.

**TENSION**

Tension chains are recommended when tensile loads might exceed the rated reaction force of the rubber fender. Please contact us for detailed advice.



**CLEARANCES**

The fender design should allow for:

- ▶ increased dimension of FE Fender during compression
- ▶ sufficient clearance of front panel
- ▶ minimum edge distance for anchoring

Fender Size	L [mm]	H [mm]	m [mm]	n [mm]	o [mm]	p [mm]	q [mm]	r [mm]
FE 250	1000	250	60	195	300	80	30	163
FE 300	1000	300	72	234	360	96	36	195
FE 400	1000	400	96	312	480	128	48	260
FE 500	1000	500	120	390	600	160	60	325
FE 550	1000	550	132	429	660	176	66	358
FE 600	1000	600	144	468	720	192	72	390
FE 700	1000	700	168	546	840	224	84	455
FE 750	1000	750	180	585	900	240	90	488
FE 800	1000	800	192	624	960	256	96	520
FE 900	1000	900	216	702	1080	288	108	585
FE 1000	1000	1000	240	780	1200	320	120	650
FE 1200	1000	1200	288	936	1440	384	144	780
FE 1250	1000	1250	300	975	1500	400	150	813
FE 1400	1000	1400	336	1092	1680	448	168	910
FE 1450	1000	1450	348	1131	1740	464	174	943
FE 1600	1000	1600	384	1248	1920	512	192	1040

