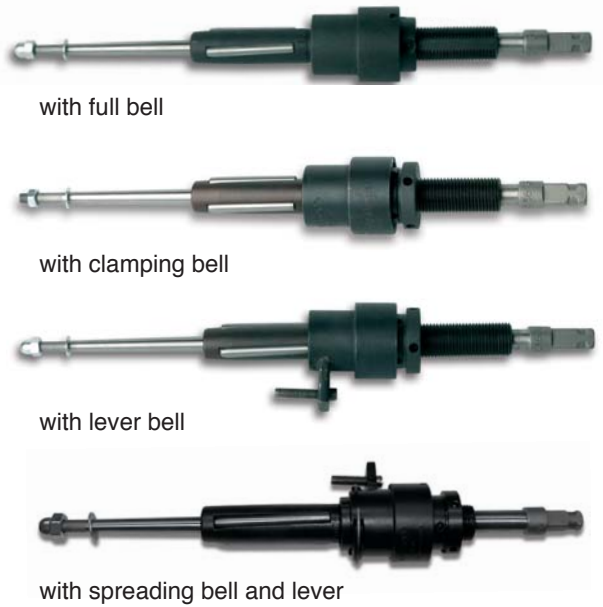




## SELF-FEEDING TUBE EXPANDERS BV



In the **self-feeding tube expanders**, the central axes of the mandrel and the rolls do not lie in one plane, i.e. the rolls are mounted at an angle to the mandrel (twisted). The principle of this tube expander is based on **automatic self-feeding**, caused by the angled position of the rolls.

These tube expanders can be driven both **by hand** and **by machine**. They are partly equipped with **ball bearings** in order to reduce friction heat to a minimum.

## TECHNICAL DATA – TUBE EXPANDER BV

### FOR TUBES WITH METRIC OR IMPERIAL DIMENSIONS

Size body Ø	Tube sheet thickness	Roll length	Roll parabolas	Series	Bell version
inch	inch	inch			
0.283 - 0.335	0.39 - 1.18	1.18	1	BV	) Full bell = 36
0.354 - 0.394	0.59 - 1.97	1.57	1	BV	) Lever bell = 37
0.417 - 3.307	0.59 - 2.76	1.57	1	BV	) Clamping bell = 38
0.283 - 0.335	0.39 - 3.94	1.18	2	BVL	) Full bell = 36
0.354 - 0.394	0.59 - 3.94	1.57	2	BVL	) Lever bell = 37
0.417 - 3.307	0.59 - 3.94	1.57	2	BVL	) Clamping bell = 38
0.283 - 0.335	0.39 - 3.94	1.18	2	BVL	) Full bell = 36
0.354 - 0.394	0.59 - 3.94	1.57	2	BVL	) Lever bell = 37
0.417 - 3.307	0.59 - 3.94	1.57	2	BVL	) Clamping bell = 38
0.417 - 3.307	0.98 - 2.76	1.97	1	BV	) Full bell = 36
0.417 - 3.311	0.98 - 3.94	1.97	2	BVL	) Lever bell = 37
0.417 - 3.315	0.98 - 5.91	1.97	2	BVL	) Clamping bell = 38
0.417 - 3.307	1.38 - 2.76	2.36	1	BV	) Full bell = 36
0.417 - 3.311	1.38 - 3.94	2.36	2	BVL	) Lever bell = 37
0.417 - 3.315	1.38 - 5.91	2.36	2	BVL	) Clamping bell = 38

Tube expanders for tube sheets with thicknesses over 5.906 inch are available in steps of 1.969 inch.

### USABLE DEPTH 1.181 / 3.937 / 5.906 · ROLL LENGTH 1.181 inch (SIZES 0.283 - 0.335)

Size body Ø	Expansion up to	Tube inner Ø min.	Tube outer Ø min.	Tube outer Ø max.	Outer bell Ø	Tube projection / insertion Bell 0437	Tube projection / insertion Bell 0438	adj. from	rolling width*) to	Usable depth	Mandrel square
inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch
0.283	0.323	0.295	0.374	0.433	1.102	0	0.591	0.39-0.98	(0.79)	1.181	Straight shank
0.295	0.335	0.307	0.374	0.472	1.102	0	0.591	0.39-0.98	(0.79)	or	Straight shank
0.303	0.343	0.315	0.374	0.512	1.102	0	0.591	0.39-0.98	(0.79)	3.937	Straight shank
0.315	0.354	0.323	0.394	0.512	1.102	0	0.591	0.39-0.98	(0.79)	or	Straight shank
0.323	0.362	0.335	0.394	0.512	1.102	0	0.591	0.39-0.98	(0.79)	5.906	Straight shank
0.335	0.374	0.346	0.394	0.551	1.102	0	0.591	0.39-0.98	(0.79)	...	Straight shank

\*) value in brackets = max. rolling width for rolls with double-sided parabola

USABLE DEPTH 1.969 / 2.756 / 3.937 / 5.906 inch · ROLL LENGTH 1.575 inch (SIZES 0.346 - 2.756)

Size body Ø	Ex-pansion up to	Tube inner Ø min.	Tube outer Ø min.	Tube outer Ø max.	Outer bell Ø	Tube projection / insertion Bell		adj. rolling width* from	adj. rolling width* to	Usable depth	Mandrel square
inch	inch	inch	inch	inch	inch	Bell 0437	Bell 0438	inch	inch	inch	inch
0.346	0.394	0.354	0.433	0.551	1.102	0.08	0.787	0.59	1.38 (1.18)	1.969	3/8
0.354	0.402	0.366	0.433	0.551	1.102	0.08	0.787	0.59	1.38 (1.18)	or	3/8
0.378	0.425	0.394	0.453	0.551	1.102	0.08	0.787	0.59	1.38 (1.18)	3.937	3/8
0.394	0.445	0.406	0.472	0.551	1.102	0.08	0.787	0.59	1.38 (1.18)	or	3/8
0.417	0.465	0.433	0.492	0.630	1.102	0.08	0.787	0.59	1.38 (1.18)	5.906	3/8
0.449	0.500	0.465	0.531	0.630	1.102	0.08	0.787	0.59	1.38 (1.18)		3/8
0.472	0.543	0.484	0.571	0.748	1.181	0.08	0.787	0.59	1.38 (1.18)	2.756	3/8
0.496	0.575	0.512	0.610	0.748	1.181	0.08	0.787	0.59	1.38 (1.18)	or	3/8
0.512	0.591	0.524	0.618	0.748	1.181	0.08	0.787	0.59	1.38 (1.18)	3.937	3/8
0.543	0.626	0.551	0.650	0.787	1.260	0.08	0.787	0.59	1.38 (1.18)	or	3/8
0.571	0.654	0.583	0.689	0.787	1.260	0.08	0.787	0.59	1.38 (1.18)	5.06	3/8
0.591	0.681	0.602	0.709	0.787	1.260	0.08	0.787	0.59	1.38 (1.18)		3/8
0.610	0.697	0.622	0.728	0.787	1.260	0.08	0.787	0.59	1.38 (1.18)		3/8
0.630	0.724	0.642	0.748	0.906	1.378	0.12	0.787	0.59	1.38 (1.18)		3/8
0.650	0.732	0.661	0.768	0.906	1.378	0.12	0.787	0.59	1.38 (1.18)		3/8
0.669	0.748	0.681	0.787	0.906	1.378	0.12	0.787	0.59	1.38 (1.18)		3/8
0.689	0.776	0.709	0.807	1.000	1.378	0.12	0.787	0.59	1.38 (1.18)		3/8
0.724	0.835	0.748	0.866	1.000	1.575	0.12	0.787	0.59	1.38 (1.18)		3/8
0.748	0.846	0.768	0.886	1.000	1.575	0.12	0.787	0.59	1.38 (1.18)		3/8
0.768	0.858	0.787	0.906	1.000	1.575	0.12	0.787	0.59	1.38 (1.18)		3/8
0.787	0.906	0.807	0.945	1.260	1.654	0.12	0.787	0.59	1.38 (1.18)		3/8
0.807	0.929	0.827	0.965	1.260	1.654	0.12	0.787	0.59	1.38 (1.18)		3/8
0.827	0.945	0.846	0.984	1.260	1.654	0.12	0.787	0.59	1.38 (1.18)		3/8
0.866	0.984	0.886	0.984	1.260	1.654	0.12	0.787	0.59	1.38 (1.18)		3/8
0.906	1.024	0.925	1.063	1.260	1.850	0.12	0.787	0.59	1.26 (1.02)		1/2
0.945	1.063	0.965	1.102	1.260	1.850	0.12	0.787	0.59	1.26 (1.02)		1/2
0.984	1.102	1.004	1.142	1.417	1.850	0.12	0.787	0.59	1.26 (1.02)		1/2
1.024	1.142	1.043	1.181	1.417	1.850	0.12	0.787	0.59	1.26 (1.02)		1/2
1.063	1.181	1.083	1.220	1.417	2.047	0.12	0.787	0.59	1.26 (1.02)		1/2
1.102	1.228	1.122	1.248	1.417	2.047	0.12	0.787	0.59	1.26 (1.02)		1/2
1.142	1.268	1.161	1.299	1.417	2.047	0.12	0.787	0.59	1.26 (1.02)		1/2
1.181	1.307	1.201	1.339	1.772	2.047	0.00	1.024	0.59	1.26 (1.02)		1/2
1.220	1.346	1.240	1.378	1.772	2.047	0.00	1.024	0.59	1.26 (1.02)		1/2
1.260	1.386	1.280	1.417	1.772	2.047	0.00	1.024	0.59	1.26 (1.02)		1/2
1.299	1.425	1.319	1.457	1.772	2.047	0.00	1.024	0.59	1.26 (1.02)		1/2
1.339	1.465	1.358	1.496	1.772	2.047	0.00	1.024	0.59	1.26 (1.02)		1/2
1.358	1.484	1.378	1.496	1.772	2.047	0.00	1.024	0.59	1.26 (1.02)		1/2
1.378	1.504	1.398	1.535	1.772	2.047	0.00	1.024	0.59	1.26 (1.02)		3/4
1.417	1.575	1.437	1.614	1.772	2.047	0.00	1.024	0.59	1.26 (1.02)		3/4
1.496	1.654	1.516	1.693	1.772	2.047	0.00	1.024	0.59	1.26 (1.02)		3/4
1.575	1.732	1.594	1.772	2.205	2.559	0.00	1.024	0.59	1.26 (1.02)		3/4
1.654	1.811	1.673	1.850	2.205	2.559	0.00	1.024	0.59	1.26 (1.02)		3/4
1.732	1.890	1.752	1.929	2.205	2.559	0.00	1.339	0.59	1.26 (1.02)		3/4
1.811	1.969	1.831	2.008	2.205	2.559	0.00	1.339	0.59	1.26 (1.02)		3/4
1.890	2.047	1.909	2.087	2.205	2.559	0.00	1.339	0.59	1.26 (1.02)		3/4
1.969	2.165	1.988	2.165	2.598	2.953	0.00	1.339	0.59	1.26 (1.02)		3/4
2.047	2.244	2.087	2.283	2.598	2.953	0.00	1.339	0.59	1.18 (0.94)		3/4
2.126	2.323	2.165	2.362	2.598	2.953	0.00	1.339	0.59	1.18 (0.94)		3/4
2.205	2.402	2.244	2.441	2.598	2.953	0.00	1.339	0.59	1.18 (0.94)		3/4
2.283	2.480	2.323	2.520	2.598	2.953	0.00	1.339	0.59	1.18 (0.94)		3/4
2.362	2.559	2.402	2.598	3.268	3.740	0.00	1.339	0.59	1.18 (0.94)		3/4
2.441	2.638	2.480	2.677	3.268	3.740	0.00	1.339	0.59	1.18 (0.94)		3/4
2.520	2.717	2.559	2.756	3.268	3.740	0.00	1.339	0.59	1.18 (0.94)		3/4
2.598	2.795	2.638	2.835	3.268	3.740	0.00	1.339	0.59	1.18 (0.94)		3/4
2.677	2.874	2.717	2.913	3.465	3.937	0.00	1.339	0.59	1.18 (0.94)		1
2.756	2.953	2.795	2.992	3.465	3.937	0.00	1.339	0.59	1.18 (0.94)		1

\*) value in brackets = max. rolling width for rolls with double-sided parabola

USABLE DEPTH 1.969 / 2.756 / 3.937 / 5.906 inch · ROLL LENGTH 1.969 inch (SIZES 0.417 - 3.307)

Size body Ø	Ex- pansion up to	Tube inner Ø min.	Tube outer Ø min.	Tube outer Ø max.	Outer bell Ø	Tube projection / insertion Bell 0437		adj. rolling width*) from	adj. rolling width*) to	Usable depth	Mandrel square
inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch
0.417	0.465	0.433	0.492	0.630	1.102	0.08	0.787	0.98	1.77 (1.57)	2.756	3/8
0.449	0.500	0.465	0.531	0.630	1.102	0.08	0.787	0.98	1.77 (1.57)		or
0.472	0.543	0.484	0.571	0.748	1.181	0.08	0.787	0.98	1.77 (1.57)	3.937	3/8
0.496	0.575	0.512	0.610	0.748	1.181	0.08	0.787	0.98	1.77 (1.57)		or
0.512	0.591	0.524	0.618	0.748	1.181	0.08	0.787	0.98	1.77 (1.57)	5.906	3/8
0.543	0.626	0.551	0.650	0.787	1.260	0.08	0.787	0.98	1.77 (1.57)		or
0.571	0.654	0.583	0.689	0.787	1.260	0.08	0.787	0.98	1.77 (1.57)	5.906	3/8
0.591	0.681	0.602	0.709	0.787	1.260	0.08	0.787	0.98	1.77 (1.57)		or
0.610	0.697	0.622	0.728	0.787	1.260	0.08	0.787	0.98	1.77 (1.57)	5.906	3/8
0.630	0.724	0.642	0.748	0.906	1.378	0.12	0.787	0.98	1.77 (1.57)		or
0.650	0.732	0.661	0.768	0.906	1.378	0.12	0.787	0.98	1.77 (1.57)	5.906	3/8
0.669	0.748	0.681	0.787	0.906	1.378	0.12	0.787	0.98	1.77 (1.57)		or
0.689	0.776	0.709	0.807	1.000	1.378	0.12	0.787	0.98	1.77 (1.57)	5.906	3/8
0.724	0.835	0.748	0.866	1.000	1.575	0.12	0.787	0.98	1.77 (1.57)		or
0.748	0.846	0.768	0.886	1.000	1.575	0.12	0.787	0.98	1.77 (1.57)	5.906	3/8
0.768	0.858	0.787	0.906	1.000	1.575	0.12	0.787	0.98	1.77 (1.57)		or
0.787	0.906	0.807	0.945	1.260	1.654	0.12	0.787	0.98	1.77 (1.57)	5.906	3/8
0.807	0.929	0.827	0.965	1.260	1.654	0.12	0.787	0.98	1.77 (1.57)		or
0.827	0.945	0.846	0.984	1.260	1.654	0.12	0.787	0.98	1.77 (1.57)	5.906	3/8
0.866	0.984	0.886	0.984	1.260	1.654	0.12	0.787	0.98	1.77 (1.57)		or
0.906	1.024	0.925	1.063	1.260	1.850	0.12	0.787	0.98	1.65 (1.42)	5.906	1/2
0.945	1.063	0.965	1.102	1.260	1.850	0.12	0.787	0.98	1.65 (1.42)		or
0.984	1.102	1.004	1.142	1.417	1.850	0.12	0.787	0.98	1.65 (1.42)	5.906	1/2
1.024	1.142	1.043	1.181	1.417	1.850	0.12	0.787	0.98	1.65 (1.42)		or
1.063	1.181	1.083	1.220	1.417	2.047	0.12	0.787	0.98	1.65 (1.42)	5.906	1/2
1.102	1.228	1.122	1.248	1.417	2.047	0.12	0.787	0.98	1.65 (1.42)		or
1.142	1.268	1.161	1.299	1.417	2.047	0.12	0.787	0.98	1.65 (1.42)	5.906	1/2
1.181	1.307	1.201	1.339	1.772	2.047	0.00	1.024	0.98	1.65 (1.42)		or
1.220	1.346	1.240	1.378	1.772	2.047	0.00	1.024	0.98	1.65 (1.42)	5.906	1/2
1.260	1.386	1.280	1.417	1.772	2.047	0.00	1.024	0.98	1.65 (1.42)		or
1.299	1.425	1.319	1.457	1.772	2.047	0.00	1.024	0.98	1.65 (1.42)	5.906	1/2
1.339	1.465	1.358	1.496	1.772	2.047	0.00	1.024	0.98	1.65 (1.42)		or
1.358	1.484	1.378	1.496	1.772	2.047	0.00	1.024	0.98	1.65 (1.42)	5.906	1/2
1.378	1.504	1.398	1.535	1.772	2.047	0.00	1.024	0.98	1.65 (1.42)		or
1.417	1.575	1.437	1.614	1.772	2.047	0.00	1.024	0.98	1.65 (1.42)	5.906	3/4
1.496	1.654	1.516	1.693	1.772	2.047	0.00	1.024	0.98	1.65 (1.42)		or
1.575	1.732	1.594	1.772	2.205	2.559	0.00	1.024	0.98	1.65 (1.42)	5.906	3/4
1.654	1.811	1.673	1.850	2.205	2.559	0.00	1.024	0.98	1.65 (1.42)		or
1.732	1.890	1.752	1.929	2.205	2.559	0.00	1.339	0.98	1.65 (1.42)	5.906	3/4
1.811	1.969	1.831	2.008	2.205	2.559	0.00	1.339	0.98	1.65 (1.42)		or
1.890	2.047	1.909	2.087	2.205	2.559	0.00	1.339	0.98	1.65 (1.42)	5.906	3/4
1.969	2.165	1.988	2.165	2.598	2.953	0.00	1.339	0.98	1.65 (1.42)		or
2.047	2.244	2.087	2.283	2.598	2.953	0.00	1.339	0.98	1.57 (1.34)	5.906	3/4
2.126	2.323	2.165	2.362	2.598	2.953	0.00	1.339	0.98	1.57 (1.34)		or
2.205	2.402	2.244	2.441	2.598	2.953	0.00	1.339	0.98	1.57 (1.34)	5.906	3/4
2.283	2.480	2.323	2.520	2.598	2.953	0.00	1.339	0.98	1.57 (1.34)		or
2.362	2.559	2.402	2.598	3.268	3.740	0.00	1.339	0.98	1.57 (1.34)	5.906	3/4
2.441	2.638	2.480	2.677	3.268	3.740	0.00	1.339	0.98	1.57 (1.34)		or
2.520	2.717	2.559	2.756	3.268	3.740	0.00	1.339	0.98	1.57 (1.34)	5.906	3/4
2.598	2.795	2.638	2.835	3.268	3.740	0.00	1.339	0.98	1.57 (1.34)		or
2.677	2.874	2.717	2.913	3.465	3.937	0.00	1.339	0.98	1.57 (1.34)	5.906	1
2.756	2.953	2.795	2.992	3.465	3.937	0.00	1.339	0.98	1.57 (1.34)		or
2.835	3.031	2.874	3.071	3.543	4.134	0.00	1.339	0.98	1.57 (1.34)	5.906	1
2.913	3.110	2.953	3.150	3.622	4.134	0.00	1.339	0.98	1.57 (1.34)		or
2.992	3.189	3.031	3.228	3.701	4.331	0.00	1.339	0.98	1.50 (1.26)	5.906	1
3.071	3.268	3.110	3.307	3.780	4.331	0.00	1.339	0.98	1.50 (1.26)		or
3.150	3.346	3.189	3.386	3.858	4.528	0.00	1.339	0.98	1.50 (1.26)	5.906	1
3.228	3.425	3.268	3.465	3.937	4.724	0.00	1.339	0.98	1.50 (1.26)		or
3.307	3.504	3.346	3.543	4.016	4.724	0.00	1.339	0.98	1.50 (1.26)	5.906	1

\*) value in brackets = max. rolling width for rolls with double-sided parabola

USABLE DEPTH 1.969 / 2.756 / 3.937 / 5.906 inch · ROLL LENGTH 2.362 inch (SIZES 0.346 - 2.756)

Size body Ø	Ex-pansion up to	Tube inner Ø min.	Tube outer Ø min.	Tube outer Ø max.	Outer bell Ø	Tube projection / insertion Bell		adj. rolling width*) from	adj. rolling width*) to	Usable depth	Mandrel square
inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch
0.417	0.465	0.433	0.492	0.630	1.102	0.08	0.787	1.38	2.17 (1.97)	2.756	3/8
0.449	0.500	0.465	0.531	0.630	1.102	0.08	0.787	1.38	2.17 (1.97)	or	3/8
0.472	0.543	0.484	0.571	0.748	1.181	0.08	0.787	1.38	2.17 (1.97)		3/8
0.496	0.575	0.512	0.610	0.748	1.181	0.08	0.787	1.38	2.17 (1.97)	3.937	3/8
0.512	0.591	0.524	0.618	0.748	1.181	0.08	0.787	1.38	2.17 (1.97)	or	3/8
0.543	0.626	0.551	0.650	0.787	1.260	0.08	0.787	1.38	2.17 (1.97)	5.906	3/8
0.571	0.654	0.583	0.689	0.787	1.260	0.08	0.787	1.38	2.17 (1.97)		3/8
0.591	0.681	0.602	0.709	0.787	1.260	0.08	0.787	1.38	2.17 (1.97)		3/8
0.610	0.697	0.622	0.728	0.787	1.260	0.08	0.787	1.38	2.17 (1.97)		3/8
0.630	0.724	0.642	0.748	0.906	1.378	0.12	0.787	1.38	2.17 (1.97)		3/8
0.650	0.732	0.661	0.768	0.906	1.378	0.12	0.787	1.38	2.17 (1.97)		3/8
0.669	0.748	0.681	0.787	0.906	1.378	0.12	0.787	1.38	2.17 (1.97)		3/8
0.689	0.776	0.709	0.807	1.000	1.378	0.12	0.787	1.38	2.17 (1.97)		3/8
0.724	0.835	0.748	0.866	1.000	1.575	0.12	0.787	1.38	2.17 (1.97)		3/8
0.748	0.846	0.768	0.886	1.000	1.575	0.12	0.787	1.38	2.17 (1.97)		3/8
0.768	0.858	0.787	0.906	1.000	1.575	0.12	0.787	1.38	2.17 (1.97)		3/8
0.787	0.906	0.807	0.945	1.260	1.654	0.12	0.787	1.38	2.17 (1.97)		3/8
0.807	0.929	0.827	0.965	1.260	1.654	0.12	0.787	1.38	2.17 (1.97)		3/8
0.827	0.945	0.846	0.984	1.260	1.654	0.12	0.787	1.38	2.17 (1.97)		3/8
0.866	0.984	0.886	0.984	1.260	1.654	0.12	0.787	1.38	2.17 (1.97)		3/8
0.906	1.024	0.925	1.063	1.260	1.850	0.12	0.787	1.38	2.05 (1.81)		1/2
0.945	1.063	0.965	1.102	1.260	1.850	0.12	0.787	1.38	2.05 (1.81)		1/2
0.984	1.102	1.004	1.142	1.417	1.850	0.12	0.787	1.38	2.05 (1.81)		1/2
1.024	1.142	1.043	1.181	1.417	1.850	0.12	0.787	1.38	2.05 (1.81)		1/2
1.063	1.181	1.083	1.220	1.417	2.047	0.12	0.787	1.38	2.05 (1.81)		1/2
1.102	1.228	1.122	1.248	1.417	2.047	0.12	0.787	1.38	2.05 (1.81)		1/2
1.142	1.268	1.161	1.299	1.417	2.047	0.12	0.787	1.38	2.05 (1.81)		1/2
1.181	1.307	1.201	1.339	1.772	2.047	0.00	1.024	1.38	2.05 (1.81)		1/2
1.220	1.346	1.240	1.378	1.772	2.047	0.00	1.024	1.38	2.05 (1.81)		1/2
1.260	1.386	1.280	1.417	1.772	2.047	0.00	1.024	1.38	2.05 (1.81)		1/2
1.299	1.425	1.319	1.457	1.772	2.047	0.00	1.024	1.38	2.05 (1.81)		1/2
1.339	1.465	1.358	1.496	1.772	2.047	0.00	1.024	1.38	2.05 (1.81)		1/2
1.358	1.484	1.378	1.496	1.772	2.047	0.00	1.024	1.38	2.05 (1.81)		1/2
1.378	1.504	1.398	1.535	1.772	2.047	0.00	1.024	1.38	2.05 (1.81)		3/4
1.417	1.575	1.437	1.614	1.772	2.047	0.00	1.024	1.38	2.05 (1.81)		3/4
1.496	1.654	1.516	1.693	1.772	2.047	0.00	1.024	1.38	2.05 (1.81)		3/4
1.575	1.732	1.594	1.772	2.205	2.559	0.00	1.024	1.38	2.05 (1.81)		3/4
1.654	1.811	1.673	1.850	2.205	2.559	0.00	1.024	1.38	2.05 (1.81)		3/4
1.732	1.890	1.752	1.929	2.205	2.559	0.00	1.339	1.38	2.05 (1.81)		3/4
1.811	1.969	1.831	2.008	2.205	2.559	0.00	1.339	1.38	2.05 (1.81)		3/4
1.890	2.047	1.909	2.087	2.205	2.559	0.00	1.339	1.38	2.05 (1.81)		3/4
1.969	2.165	1.988	2.165	2.598	2.953	0.00	1.339	1.38	2.05 (1.81)		3/4
2.047	2.244	2.087	2.283	2.598	2.953	0.00	1.339	1.38	1.97 (1.73)		3/4
2.126	2.323	2.165	2.362	2.598	2.953	0.00	1.339	1.38	1.97 (1.73)		3/4
2.205	2.402	2.244	2.441	2.598	2.953	0.00	1.339	1.38	1.97 (1.73)		3/4
2.283	2.480	2.323	2.520	2.598	2.953	0.00	1.339	1.38	1.97 (1.73)		3/4
2.362	2.559	2.402	2.598	3.268	3.740	0.00	1.339	1.38	1.97 (1.73)		3/4
2.441	2.638	2.480	2.677	3.268	3.740	0.00	1.339	1.38	1.97 (1.73)		3/4
2.520	2.717	2.559	2.756	3.268	3.740	0.00	1.339	1.38	1.97 (1.73)		3/4
2.598	2.795	2.638	2.835	3.268	3.740	0.00	1.339	1.38	1.97 (1.73)		3/4
2.677	2.874	2.717	2.913	3.465	3.937	0.00	1.339	1.38	1.97 (1.73)		1
2.756	2.953	2.795	2.992	3.465	3.937	0.00	1.339	1.38	1.97 (1.73)		1
2.835	3.031	2.874	3.071	3.543	4.134	0.00	1.339	1.38	1.97 (1.73)		1
2.913	3.110	2.953	3.150	3.622	4.134	0.00	1.339	1.38	1.97 (1.73)		1
2.992	3.189	3.031	3.228	3.701	4.331	0.00	1.339	1.38	1.89 (1.65)		1
3.071	3.268	3.110	3.307	3.780	4.331	0.00	1.339	1.38	1.89 (1.65)		1
3.150	3.346	3.189	3.386	3.858	4.528	0.00	1.339	1.38	1.89 (1.65)		1
3.228	3.425	3.268	3.465	3.937	4.724	0.00	1.339	1.38	1.89 (1.65)		1
3.307	3.504	3.346	3.543	4.016	4.724	0.00	1.339	1.38	1.89 (1.65)		1

\*) value in brackets = max. rolling width for rolls with double-sided parabola