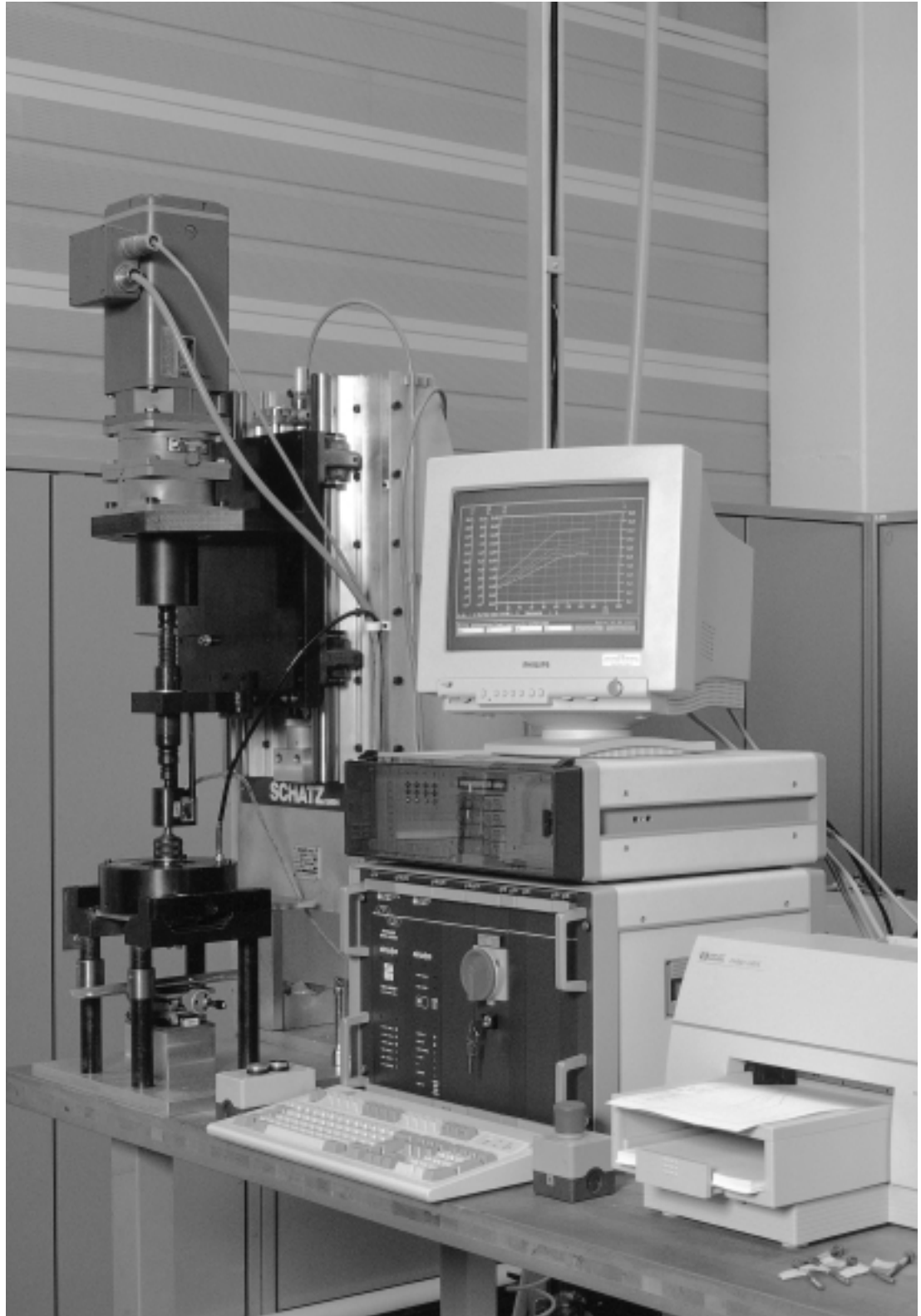
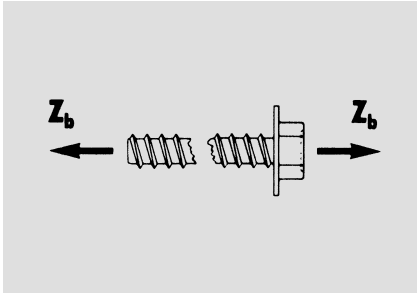
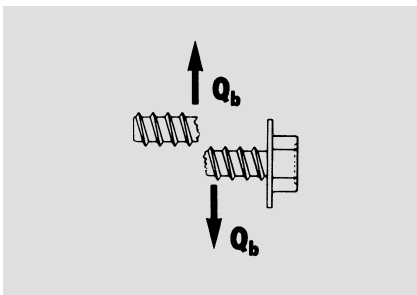


Technical performance values for SFS fasteners

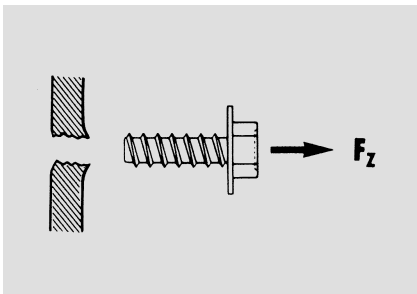




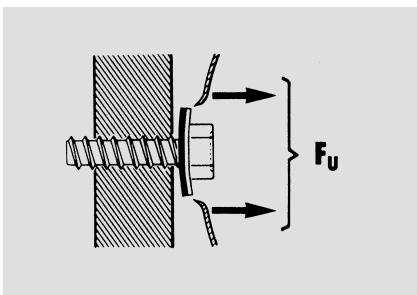
■ Tensile breaking load



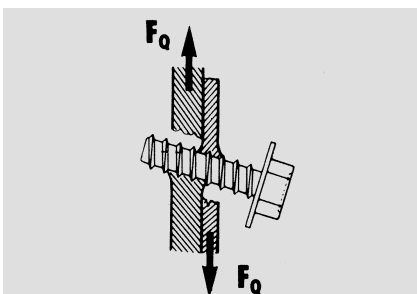
■ Shear breaking load



■ Pull-out load



■ Pull-over load



■ Shear load

Pitched roofing and cladding construction

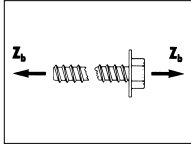
			Page
Self drilling fasteners for single and twin skin construction to steel	Austenitic stainless steel	SX3	2
		SX6	3
		SX12	4
		SX3-L12, SX6-L12	5
	Carbon steel	SD-H15	6
		SD3	7
SD8, SD12		8	
Side lap self drilling fastener	Austenitic stainless steel	SXL, SL2-S	9
	Carbon steel	SL2-T	10
	Aluminium	SL2-A	10
Self drilling fasteners to timber	Austenitic stainless steel	SW-S, SXW	11
	Carbon Steel	SW-T	12
	Aluminium	SW-A	12
Self drilling fasteners for composite panels to steel and timber	Austenitic stainless steel	SXC5, SXC12	13
		SXCW	14
	Carbon steel	SDT5	15
		SDT12	16
Self drilling fasteners for standing seam and secret fix systems	Austenitic stainless steel	SX2	17
		SX3-D12, SX6-D12	18
		SDK2-S	19
	Carbon steel	SD3-D12	20
	Self tapper fasteners for general constructions	Austenitic stainless steel	TDA-S
TDB-S			22
Self tapper fasteners for timber substructures	Austenitic stainless steel	TW-S-D12	23
	Carbon steel	TW-T-D12	23

Austenitic stainless steel is the only material to conform to BS 7543:1992.

Guide to durability of buildings and building elements, products and components with a design of 30 years.

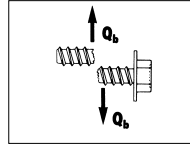
Technical data SX3

Tensile breaking load Z_b in N



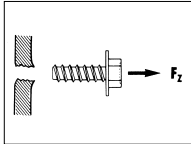
14 000

Shear breaking load Q_b in N



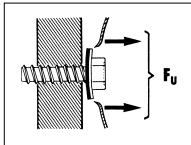
9500

Pull-out load F_z in N



	purlin thickness (mm)					
	1,0	1,5	2,0	2,50	2x0,63	2x1,0
Steel ST37 (375 N/mm ²)	1500	2700	3800	5000	1900	3300
Steel ST52 (530 N/mm ²)	2100	3500	5200	8400	2300	4000
Aluminium AL (230 N/mm ²)	-	2100	2900	3800	1000	2300

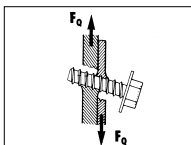
Pull-over load F_u in N



	washer Ø (mm)	sheet thickness (mm)						
		0,4	0,5	0,63	0,7	0,75	0,88	1,0
Steel ST37 (395 N/mm ²)	S16	-	5800	5800	5800	5800	5800	5800
	S19	-	5800	5800	5800	5800	5800	5800
Steel ST52 (530 N/mm ²)	S16	3400	4500	6200	8400	8400	8400	8400
	S19	4300	5000	8400	8400	8400	8400	8400
Aluminium AL (230 N/mm ²)	S16	1800	2100	2400	2650	2950	3200	3500
	S19	2500	2850	3200	3500	3800	4150	4500

Pull-out loads F_z to be considered

Shear load F_Q in N



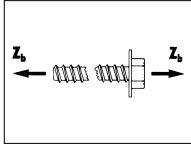
	washer Ø (mm)	sheet thickness (mm)		F_Q in N	
		Sheet 1	Sheet 2		
Steel ST37 (395 N/mm ²)	S16	0,63	2x0,63	2430	
	S19			2360	
	S16	0,75	2x0,75	3580	
	S19			3190	
	S16	1,0	2x1,0	4270	
	S19			4380	
	S16	1,25	1,5	6160	
	S19			3000	
	Aluminium AL (230 N/mm ²)	S16	0,5	0,8	1200
		S19			1200
S16		0,5	2,0	1200	
S19				1800	
S16		0,8	2,0	2500	
S19				3000	
S16		1,0	2,0	3800	
S19				3800	

Figures obtained with displacement of 3 mm between purlin and sheet.

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

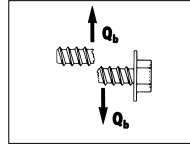
Technical data SX6

Tensile breaking load Z_b in N



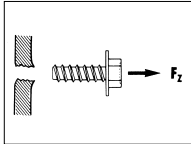
14 000

Shear breaking load Q_b in N



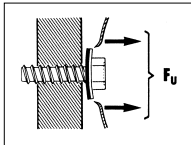
9500

Pull-out load F_z in N



	purlin thickness (mm)					
	2,0	2,5	3,0	4,0	5,0	6,0
Steel ST37 (375 N/mm ²)	2900	4300	5600	8500	11 500	14 000
Steel ST52 (530 N/mm ²)	4200	5500	6800	9200	11 700	14 000
Aluminium AL (230 N/mm ²)	-	-	3600	5300	6 700	8 300

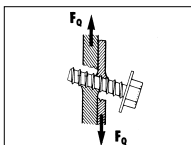
Pull-over load F_u in N



	washer Ø (mm)	sheet thickness (mm)						
		0,4	0,5	0,63	0,7	0,75	0,88	1,0
Steel ST37 (375 N/mm ²)	S16	3000	4000	5300	6000	6200	7500	8 500
	S19	4200	5100	6200	6800	7200	8400	9 500
Steel ST52 (530 N/mm ²)	S16	3200	4300	6200	6900	7300	9000	10 600
	S19	3700	5000	7100	7700	8100	9600	10 900
Aluminium AL (230 N/mm ²)	S16	1200	1500	1900	2300	2700	3100	3 500
	S19	1800	2100	2600	3100	3500	3900	4 300

Pull-out loads F_z to be considered

Shear load F_Q in N



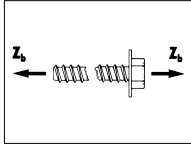
	washer Ø (mm)	thickness (mm)		F_Q in N
		Sheet 1	Purlin 2	
Steel ST37 (370 N/mm ²)	S16	0,63	2,0	2800
	S19			2400
	S16	0,63	5,0	3200
	S19			2800
	S16	0,75	2,0	2900
	S19			3200
	S16	0,75	5,0	3250
	S19			3500
	S16	0,88	2,0	4200
	S19			3700
	S16	1,0	2,0	4600
	S19			4200
	S16	1,0	5,0	5000
	S19			4700
	S16	1,25	3,0	5500
	S19			

Figures obtained with displacement of 3 mm between purlin and sheet.

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

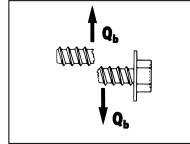
Technical data SX12

Tensile breaking load Z_b in N



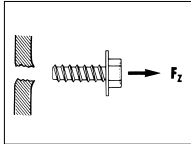
18 000

Shear breaking load Q_b in N



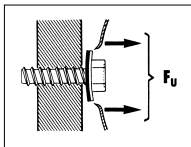
12 000

Pull-out load F_z in N



	purlin thickness (mm)					
	3	4	5	6	8	10
Steel ST37 (375 N/mm ²)	5400	8000	9300	13000	18000	18000

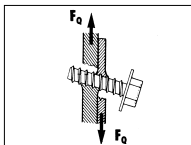
Pull-over load F_u in N



	washer Ø (mm)	sheet thickness (mm)				
		0,5	0,62	0,75	0,88	1,0
Steel ST37 (375 N/mm ²)	S16	3860	5130	6820	7150	9100
	S19	4300	5820	7380	8030	10450
Aluminium AL (230 N/mm ²)	S16	980	1220	–	2600	2970
	S19	1490	1550	–	2845	3400

Pull-out loads F_z to be considered

Shear load F_o in N



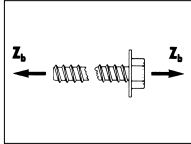
	washer Ø (mm)	thickness (mm)		F_o in N
		Sheet 1	Purlin 2	
Steel ST37 (375 N/mm ²)	S16	0,63	4	2800
	S19			2970
	S16	0,63	6	2800
	S19			3065
	S16	0,63	10	2950
	S19			3060
	S16	1,0	4,0	5000
	S19			5630
	S16	1,0	10	6130
	S19			6220
	S16	1,5	4,0	7020
	S19			7025
	S16	1,5	10	8110
	S19			8115

Figures obtained with displacement of 3 mm between purlin and sheet.

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

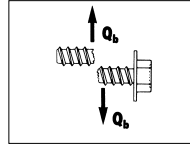
Technical data SX3-L12, SX6-L12

Tensile breaking load Z_b in N



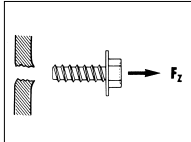
SX3-L12	14000
SX6-L12	14000

Shear breaking load Q_b in N



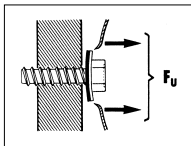
SX3-L12	9500
SX6-L12	9500

Pull-out load F_z in N



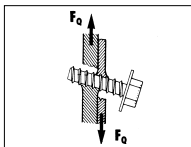
		purlin thickness (mm)						
		1,5	2,0	2,5	3,0	4,0	5,0	6,0
Aluminium AL (230 N/mm ²)	SX3	2100	2900	3800	-	-	-	-
Aluminium AL (230 N/mm ²)	SX6	-	-	-	3600	5300	6700	8300
Steel ST37 (370 N/mm ²)	SX6	-	2900	4300	5600	8500	11500	14000
Steel ST37 (370 N/mm ²)	SX3	2700	3800	5000				

Pull-over load F_u in N



		sheet thickness (mm)			
		0,5	0,7	0,8	1,0
Aluminium AL (180 N/mm ²)	SX3-L12-A10	770	1540	1725	-
	SX6-L12-A10	790	1403	1538	-
Steel ST37 (350 N/mm ²)	SX3-L12-A10	4000	5000	-	7500

Shear load F_Q in N

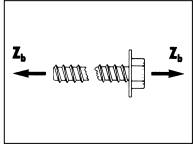


		thickness (mm)		F_Q in N
		Sheet 1 Alu (230 N/mm ²)	Steel 2 Alu (230 N/mm ²)	
SX3-L12		0,5	1,5	599
		0,8	1,5	2056
		0,5	2,0	715
		0,8	2,0	2225
SX6-L12		0,5	3,0	620
		0,8	3,0	2001
		0,5	4,0	643
		0,8	4,0	2111
SX3-L12		Sheet 1 Alu (230 N/mm ²)	Steel 2 Steel ST37 (350 N/mm ²)	F_Q in N
		0,5	1,5	624
SX6-L12		0,8	1,5	2116
		0,5	2,0	748
		0,8	2,0	2089
		0,5	3,0	750
	0,8	3,0	2122	

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

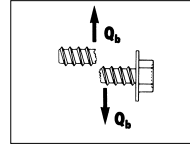
Technical data SD-H15

Tensile breaking load Z_b in N



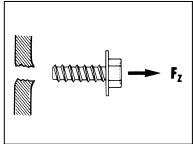
SD5-H15	16 000
SD8-H15	15 800
SD12-H15	15 800

Shear breaking load Q_b in N



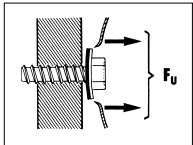
SD5-H15	10 000
SD8-H15	12 000
SD12-H15	12 000

Pull-out load F_z in N



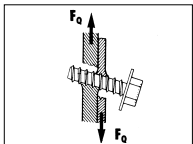
		purlin thickness (mm)						
		2,0	3,0	4,0	5,0	6,0	8,0	10,0
Steel ST37 (350 N/mm ²)	SD5-H15	3400	6300	9300	11 500	–	–	–
	SD8-H15	3200	6200	8800	–	12 500	13 380	–
	SD12-H15	–	–	8400	13 200	13 400	15 800	15 800

Pull-over load F_u in N



		sheet thickness (mm)			
		0,63	0,75	0,88	1,0
Steel ST37 (350 N/mm ²)	SD-H15	3700	6200	8300	9000

Shear load F_o in N



		thickness (mm)		
		Sheet 1	Sheet 2	F_o in N
Steel ST37 (350 N/mm ²)	SD5-H15	0,63	2,0	3500
		0,75	3,0	5400
		1,0	2,0	6800
		1,0	3,0	7300
		1,5	2,0	10 600
	SD8-H15	1,5	3,0	10 800
		0,63	2,0	3300
		0,75	3,0	4200
		1,0	2,0	4400
		1,0	3,0	5800
	SD12-H15	1,5	2,0	6200
		1,5	3,0	7600
		0,63	4,0	3600
		1,0	4,0	5300
		1,5	4,0	8000
		0,63	10	3700
		1,0	10	6600
		1,5	10	8800

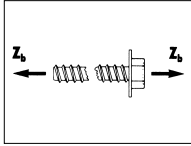
Pull-out loads F_z to be considered.

Figures obtained with displacement of 3 mm between purlin and sheet.

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

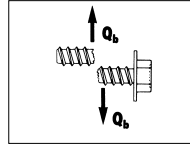
Technical data SD3

Tensile breaking load Z_b in N



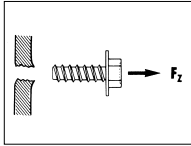
SD3 -6,3x	22 000
SD3 -4,8x	11 000
SD3 -5,5x	16 000

Shear breaking load Q_b in N



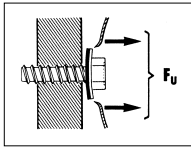
SD3 -6,3x	13 500
SD3 -4,8x	7 000
SD3 -5,5x	10 000

Pull-out load F_z in N



		purlin thickness (mm)				
		0,88	1,0	1,5	2,0	3,0
Steel ST37 (350 N/mm ²)	SD3 -6,3x...	1970	-	3330	5000	-
	SD3 -4,8x...	-	1350	2170	3160	5790
	SD3 -5,5x...			3750	5000	7500

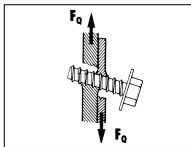
Pull-over load F_u in N



		washer Ø (mm)	sheet thickness (mm)				
			0,5	0,63	0,75	0,88	1,0
Steel ST37 (350 N/mm ²)	T16		4950	5620	7100	7600	8400
	T19		5450	6020	7200	7800	8600

Pull-out loads F_z to be considered.

Shear load F_o in N



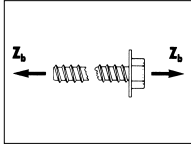
			washer Ø (mm)	thickness (mm)		
				Sheet 1	Purlin 2	F_o in N
Steel ST37 (350 N/mm ²)	SD3 -4,8x...	T15		0,75	2,0	6140
		T19		1,0	2,0	6980
	SD3 -5,5x...	T15		0,63	2,0	3500
		T19		1,0	2,0	6800

Figures obtained with displacement of 3 mm between purlin and sheet.

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

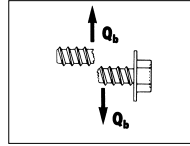
Technical data SD8 / SD12

Tensile breaking load Z_b in N



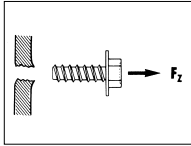
SD8	15 800
SD12	15 800

Shear breaking load Q_b in N



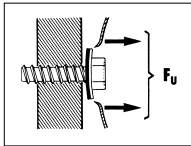
SD8	12 000
SD12	12 000

Pull-out load F_z in N



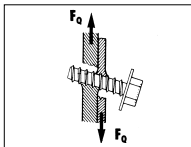
		purlin thickness (mm)					
		2,0	3,0	4,0	6,0	8,0	10,0
Steel ST37 (350 N/mm ²)	SD8	3200	6200	8800	12 500	13 380	-
	SD12	-	5500	8400	13 400	15 800	15 800

Pull-over load F_u in N



		sheet thickness (mm)				
washer Ø (mm)		0,6	0,63	0,75	0,88	1,0
Steel ST37 (350 N/mm ²)	T16	4950	5620	7100	7600	8400
	T19	5450	6020	7200	7800	8600

Shear load F_Q in N



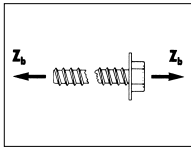
		thickness (mm)			
washer Ø (mm)		Sheet 1	Purlin 2	F_Q in N	
Steel ST37 (350 N/mm ²)	SD8	T15	0,63	2,0	3300
		T19	0,75	3,0	4200
	SD12	T15	1,00	2,0	4400
		T15	1,00	3,0	5800
T16 (T15)		1,50	2,0	6200	
		T19	1,50	3,0	7600

Figures obtained with displacement of 3 mm between purlin and sheet.

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

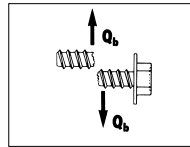
Technical data SXL / SL2-S

Tensile breaking load Z_b in N



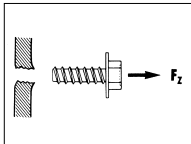
SL2- A14-4,8x	7 300
SXL2- S16-6,3x	16 000

Shear breaking load Q_b in N



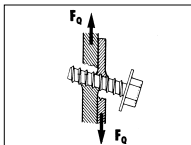
SL2-S-S14-4,8x	6 300
SXL2-S16-6,3x	16 000

Pull-out load F_z in N



		sheet thickness (mm)		
washer Ø in mm		2x0,5	2x0,63	2x0,75
Steel ST37 (450 N/mm ²)	SL2- S-S14-4,8x	890	1180	-
Steel ST37 (450 N/mm ²)	SXL2- S16-6,3x	-	-	1400
Aluminium AL (280 N/mm ²)	SXL2- S16-6,3x	-	450	600

Shear load F_Q in N



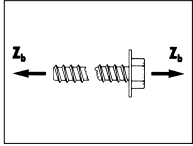
		thickness (mm)		
washer Ø (mm)		Sheet 1	Sheet 2	F_Q in N
Steel ST37 (450 N/mm ²)	SL2- S-S14-4,8x	0,63	0,63	1500
Steel ST37 (450 N/mm ²)	SXL2- S16-6,3x	0,63	0,63	1700
Aluminium AL (280 N/mm ²)	SXL2- S16-6,3x	0,63	0,63	550
Aluminium AL (280 N/mm ²)	SXL2- S16-6,3x	0,77	0,77	1050

Figures obtained with displacement of 3 mm between sheet 1 and sheet 2.

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

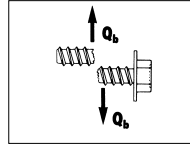
Technical data SL2-T / SL2-A

Tensile breaking load Z_b in N



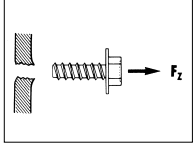
SL2-T-4,8x	10 000
SL2-A-5,5x	5 000

Shear breaking load Q_b in N



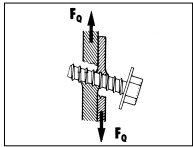
SL2-T-4,8x	6300
SL2-A-5,5x	3500

Pull-out load F_z in N



		sheet thickness (mm)	
		2x0,6	2x0,7
Steel ST37 (450 N/mm ²)	SL2-T-4,8x	1180	-
Aluminium AL (280 N/mm ²)	SL2-A-5,5x	-	550

Shear load F_Q in N



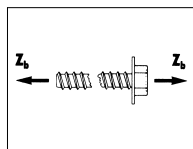
		thickness (mm)		
washer Ø (mm)		Sheet 1	Sheet 2	F_Q in N
Steel ST37 (450 N/mm ²)	SL2-T-A14-4,8x	0,6	0,6	1820
Aluminium AL (280 N/mm ²)	SL2-A-A14-5,5x	0,4	0,4	400
		0,7	0,7	910

Figures obtained with displacement of 3 mm between sheet 1 and sheet 2.

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

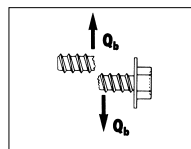
Technical data SW-S / SXW

Tensile breaking load Z_b in N



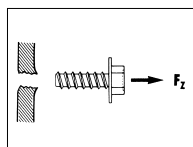
SW-S - 4,8x	8 000
SXW - 5,5x	14 000
SXW - 6,5x	16 000

Shear breaking load Q_b in N



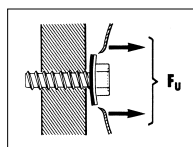
SW-S - 4,8x	6 300
SXW - 5,5x	9 500
SXW - 6,5x	12 000

Pull-out load F_z in N



		embedment in timber (mm)			
		20	25	30	45
Timber	SW-S - 4,8x	1700	2030	2260	-
	SXW - 5,5x	1700	2100	2500	-
	SXW - 6,5x	-	-	-	3600

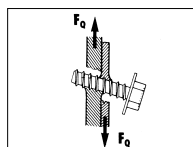
Pull-over load F_u in N



		washer Ø (mm)	sheet thickness (mm) (fastener in timber)		
			0,5	0,75	0,88
Steel ST37 (350 N/mm ²)	SW-S - A14 - 4,8x		2260	2260	-
	SXW - A14 - 5,5x		2260	2260	-
	SXW - S16 - 6,5x		4000	6200	7500
Aluminium AL (250 N/mm ²)	SW-S - A14 - 4,8x		1100	-	2800
	SXW - A14 - 5,5x		1300	-	2600
	SXW - S16 - 6,5x		1500	2700	3100

Figures obtained with fully torqued fasteners, pull-out loads F_z to be considered.

Shear load F_Q in N



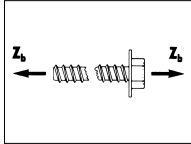
		washer Ø (mm)	sheet thickness (mm) (fastener in timber)		
			0,5	0,77	0,88
Steel ST37 (350 N/mm ²)	SW-S - A14 - 4,8x		1500	2000	2300
	SXW - A14 - 5,5x		1800	2200	2500
	SXW - S16 - 6,5x		2400	3000	4900
Aluminium AL (250 N/mm ²)	SW-S - A14 - 4,8x		880	1300	-
	SXW - A14 - 5,5x		880	1500	-
	SXW - S16 - 6,5x		1200	2000	-

Figures obtained with displacement of 3 mm between sheet and timber purlin.

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

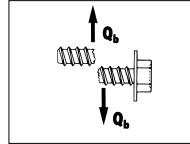
Technical data SW-T / SW-A

Tensile breaking load Z_b in N



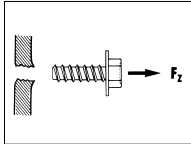
SW- T-4,8x	10 000
SW3-T-6,5x	20 000
SW- A-6,0x	6 500

Shear breaking load Q_b in N



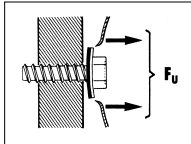
SW- T-4,8x	6 300
SW3-T-6,5x	12 000
SW- A-6,0x	4 200

Pull-out load F_z in N



		embedment in timber (mm)		
		20	25	30
Timber	SW- T-4,8x	1700	2030	2260
	SW3-T-6,5x	1920	2360	3000
	SW- A-6,0x	1790	2190	2840

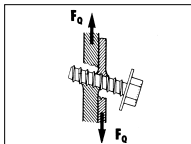
Pull-over load F_u in N



		sheet thickness (mm) (fastener in timber)		
		0,5	0,75	0,8
Steel ST37 (350 N/mm ²)	washer Ø (mm)			
	SW- T-A14-4,8x	2260	2260	-
	SW3-T-T16-6,5x	3000	3000	-
Aluminium AL (250 N/mm ²)	SW3-T-H15-6,5x	-	6200	-
	SW- A-A16-6,0x	2450	-	2840

Figures obtained with fully torqued fasteners, pull-out loads F_z to be considered.

Shear load F_Q in N



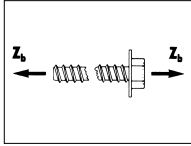
		sheet thickness (mm) (fastener in timber)		
		0,5	0,75	0,8
Steel ST37 (350 N/mm ²)	washer Ø (mm)			
	SW- T-A14-4,8x	1530	1600	-
	SW3-T-T16-6,5x	1700	1800	-
Aluminium AL (250 N/mm ²)	SW3-T-H15-6,5x	1700	1800	-
	SW- A-A16-6,0x	1460	-	1740

Figures obtained with displacement of 3 mm between sheet and timber purlin.

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

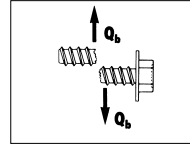
Technical data SXC5 / SXC12

Tensile breaking load Z_b in N



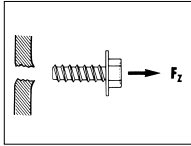
SXC5	17 500
SXC12	14 000

Shear breaking load Q_b in N



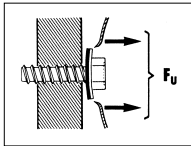
SXC5	10 220
SXC12	12 000

Pull-out load F_z in N



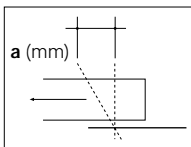
		purlin thickness (mm)							
		1,5	2,0	3,0	4,0	5,0	6,0	8,0	10,0
Steel ST37 (375 N/mm ²)	SXC5	2300	4000	7200	10 280	-	-	-	-
	SXC12	-	-	7060	10 140	12 700	14 000	14 000	14 000

Pull-over load F_u in N



			sheet thickness (mm)			
			0,5	0,63	0,75	0,88
Steel ST37 (375 N/mm ²)	SXC5	S16	4100	4800	6300	6600
		SXC12 S16	3500	4900	-	-
	SXC5	S19	4150	5100	7040	7140
		SXC12 S19	3900	5100	6175	-
Aluminium AL (230 N/mm ²)	SXC5	S16	1400	1900	2400	2400
	SXC5	S19	1370	1990	2150	2700
	SXC12	S19	1410	1960	2290	2850

Max. deflection distance



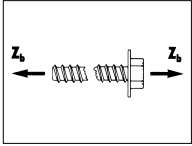
panel thickness (mm)		Steel ST37 (375 N/mm ²)			
		1,5 mm ≤ t ≤ 4 mm		4 mm ≤ t ≤ 12 mm	
		SXC5	a (mm)	SXC12	a (mm)
40		4		3,2	
60		6		4,3	
80		8		5,7	



All stated figures are in newtons and are ± values representing the arithmetical mean value from the test series.

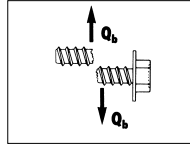
Technical data SXCW

Tensile breaking load Z_b in N



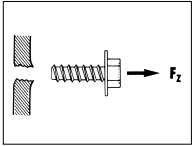
16 600

Shear breaking load Q_b in N



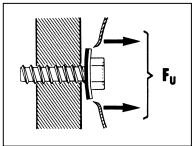
12 700

Pull-out load F_z in N



embedment in timber	F_z in N
Timber	50 mm
	5800

Pull-over load F_u in N

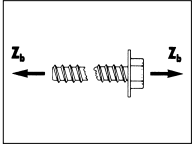


	washer Ø (mm)	sheet thickness (mm)	
		0,5	0,62
Steel ST37 (375 N/mm ²)	S16	4100	5100
	S19	4200	5700
	S22	4100	6400
Aluminium AL (230 N/mm ²)	S16	1300	1600
	S19	1200	1400
	S22	1000	1300

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

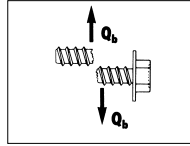
Technical data SDT5

Tensile breaking load Z_b in N



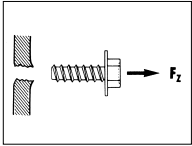
16 000

Shear breaking load Q_b in N



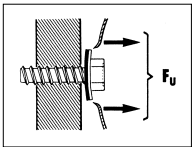
10 000

Pull-out load F_z in N



	purlin thickness (mm)				
	1,5	2,0	3,0	4,0	5,0
Steel ST37 (350 N/mm ²)	2800	3400	6300	9300	11 500

Pull-over load F_u in N



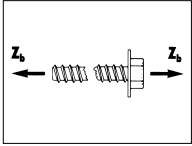
	washer Ø (mm)	sheet thickness (mm)		
		0,5	0,63	0,75
Steel ST37 (375 N/mm ²)	A19	4140	5000	6200
	S19	4150	5100	7040
	T19	4490	6630	7600

Pull-out loads F_z to be considered

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

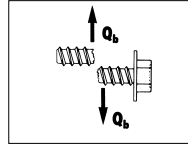
Technical data SDT12

Tensile breaking load Z_b in N



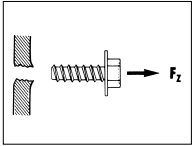
11 000

Shear breaking load Q_b in N



7800

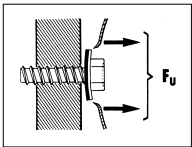
Pull-out load F_z in N



purlin thickness (mm)

	3,0	4,0	5,0	8,0
Steel ST37 (375 N/mm ²)	5290	8900	10 800	11 000

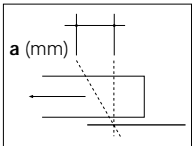
Pull-over load F_u in N



sheet thickness (mm)

	washer Ø (mm)	sheet thickness (mm)		
		0,5	0,63	0,75
Steel ST37 (350 N/mm ²)	T19	4470	6040	7470
	S19	4800	5600	6690
	A19	4140	5008	6270

Max. deflection distance



Steel ST37 (375 N/mm²)
4 mm ≤ t ≤ 12 mm

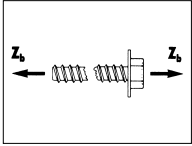
	panel thickness (mm)	
Steel ST37 (375 N/mm ²)	40	2,5
	50	3,1
	60	4,1
	70	5,1
	80	6,8



All stated figures are in newtons and are ± values representing the arithmetical mean value from the test series.

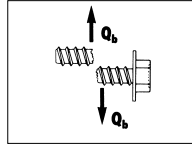
Technical data SX2

Tensile breaking load Z_b in N



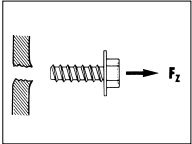
16000

Shear breaking load Q_b in N



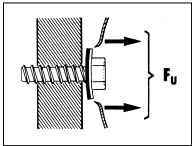
12000

Pull-out load F_z in N



	purlin thickness (mm)			
	1,25	1,5	1,75	2,00
Steel ST37 (375 N/mm ²)	2750	3740	4360	5490

Pull-over load F_U in N

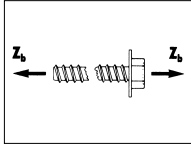


	washer Ø (mm)	sheet thickness (mm)			
		0,5	0,63	0,75	1,00
Steel ST37 (375 N/mm ²)	A16	5490	5900	7720	8480

All stated figures are in newtons and are ± values representing the arithmetical mean value from the test series.

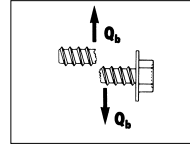
Technical data SX3-D12, SX6-D12

Tensile breaking load Z_b in N



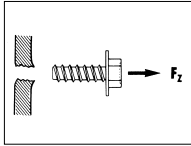
SX3-D12	14000
SX6-D12	14000

Shear breaking load Q_b in N



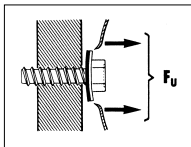
SX3-D12	9500
SX6-D12	9500

Pull-out load F_z in N



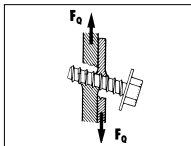
		purlin thickness (mm)						
		1,5	2,0	2,5	3,0	4,0	5,0	6,0
Aluminium AL (230 N/mm ²)	SX3	2100	2900	3800	-	-	-	-
	SX6	-	-	-	3600	5300	6700	8300
Steel ST37 (370 N/mm ²)	SX6	-	2900	4300	5600	8500	11500	14000
	SX3	2700	3800	5000				

Pull-over load F_u in N



		sheet thickness (mm)			
		0,5	0,7	0,8	1,0
Aluminium AL (180 N/mm ²)	SX3-D12-A10	770	1540	1725	-
	SX6-D12-A10	790	1403	1538	-
Steel ST37 (350 N/mm ²)	SX-D12-A10	4000	5000	-	7500

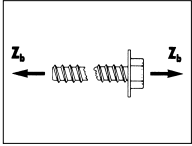
Shear load F_Q in N



		thickness (mm)		F_Q in N
		Sheet 1 Alu (230 N/mm ²)	Sheet 2 Alu (230 N/mm ²)	
SX3-D12		0,5	1,5	599
		0,8	1,5	2056
		0,5	2,0	715
		0,8	2,0	2225
SX6-D12		0,5	3,0	620
		0,8	3,0	2001
		0,5	4,0	643
		0,8	4,0	2111
		Sheet 1 Alu (230 N/mm ²)	Sheet 2 Steel ST37 (350 N/mm ²)	F_Q in N
SX3-D12		0,5	1,5	624
		0,8	1,5	2116
SX6-D12		0,5	2,0	748
		0,8	2,0	2089
		0,5	3,0	750
		0,8	3,0	2122

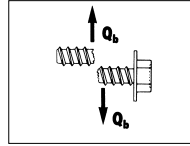
All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

Tensile breaking load Z_b in N



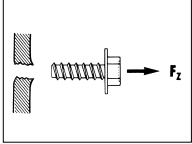
11 000

Shear breaking load Q_b in N



7500

Pull-out load F_z in N



	deck/purlin thickness (mm)	
		clip with 2 fasteners
Steel ST37 (350 N/mm ²)	0,75	3749
	1,00	5295
	1,25	6735
Aluminium AL (225 N/mm ²)	0,90	2213
	1,20	3484
	1,80	5617

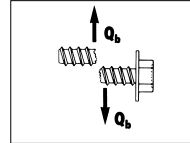
All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

Technical data SD3-D12

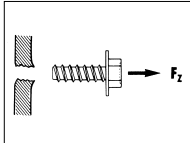
Tensile breaking load Z_b in N

	SD3-D12x	16 000
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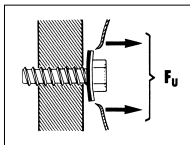
Shear breaking load Q_b in N

	SD3-D12x	10 000
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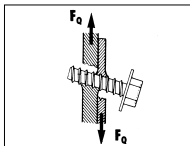
Pull-out load F_z in N

		F_z in N					
		purlin thickness (mm)			embedment in timber (mm)		
		1,5	2,0	3,0	30	35	40
Steel ST37 (350 N/mm ²)	SD3-D12	2650	3400	6300	-	-	-

Pull-over load F_u in N

		sheet thickness (mm)		
		0,5	0,75	1,0
Steel ST37 (350 N/mm ²)	SD3-D12	4000	5000	7500

Shear load F_o in N

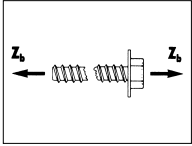
		thickness (mm)		
		Sheet 1	Sheet 2	F_o in N
Steel ST37 (350 N/mm ²)	SD3-D12	0,75	2,0	6140
	SD3-D12	1,0	2,0	6980

Figures obtained with displacement of 3 mm between purlin and sheet.

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

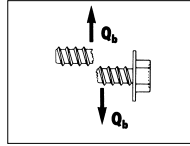
Technical data TDA-S

Tensile breaking load Z_b in N



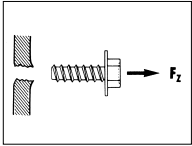
16000

Shear breaking load Q_b in N



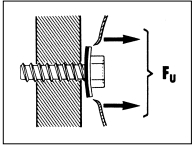
12000

Pull-out load F_z in N



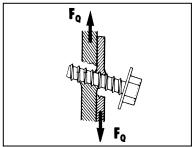
	purlin thickness (mm)	pre-drill hole \varnothing (mm)	F_z in N	
Timber	1,0	4,5		2290
	1,5	5,05		4070
Steel ST37 (370 N/mm ²)	2,0	5,05		5400
	2,5	5,05		7920
	3,0	5,05		9750

Pull-over load F_u in N



	washer \varnothing in mm	sheet thickness (mm)				
		0,50	0,63	0,75	0,88	1,00
Steel ST37 (370 N/mm ²)	S16	4060	5500	5920	7720	8490
	S19	5145	6560	6805	9010	9900

Shear load F_Q in N

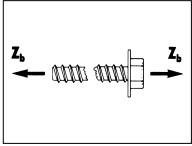


	Sheet 1	thickness (mm)/ F_Q in N		
		Sheet 2		
		1,0	1,5	3,0
Steel ST37 (370 N/mm ²)	0,63	3210	3410	4060
	0,75	4520	4800	5420
	1,00	5040	6410	7090
	1,25	5100	8930	8780
	1,50	5130	11280	-

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

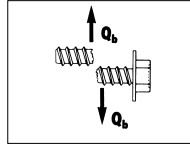
Technical data TDB-S

Tensile breaking load Z_b in N



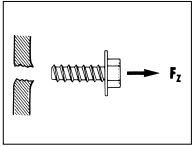
16000

Shear breaking load Q_b in N



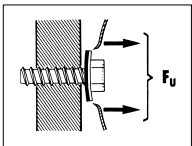
12500

Pull-out load F_z in N



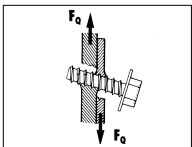
	pre-drill Ø (mm)	purlin thickness (mm)	F_z in N	
			Steel ST52 (420 N/mm ²)	
	5,35	2,0	5200	
	5,35	2,5	7530	
	5,35	4,0	12050	
	5,65	5,0	15642	
	5,65	6,0	17310	
	5,80	8,0	20424	
	5,80	10,0	-	

Pull-over load F_u in N



	washer Ø (mm)	sheet thickness (mm)				
		0,50	0,63	0,75	0,88	1,00
Steel ST37 (370 N/mm ²)	S16	4060	5500	5920	7720	8490
	S19	5145	6560	6805	9010	9900

Shear load F_Q in N

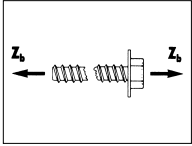


	sheet I (mm)	sheet II thickness (mm)	
		4,0	8,0
Steel ST37 (395 N/mm ²)	0,75	4570	4590
	0,88	6520	6250
	1,00	6740	7280
	1,25	11270	11220

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

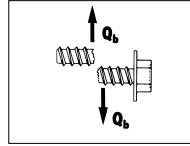
Technical data TW-S-D12, TW-T-D12

Tensile breaking load Z_b in N



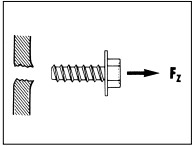
TW-S	7100
TW-T	10000

Shear breaking load Q_b in N



TW-S	5400
TW-T	7000

Pull-out load F_z in N



		penetration in mm/ F_z in N			
		26	30	35	40
Timber	TW-S	2100	-	-	-
	TW-T	-	2700	2900	3500

All stated figures are in newtons and are \pm values representing the arithmetical mean value from the test series.

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