

Bellows suction pads (round)

Bellows suction pads FSG (2.5 folds)



Bellows suction pads FSG

Our highlights...

- Wide range of diameters and materials
- Optimized shape with 2.5 folds
- Soft, flexible folds
- Soft, tapered sealing lip
- Supports on the bottom

Your advantages...

- >For a wide range of workpiece shapes and sizes
- >High suction force and optimum damping effect during placement on workpieces
- >Very high stroke of suction pad
- >Very good adaptation to curved workpiece surfaces
- >No permanent deformation of thin-walled workpieces



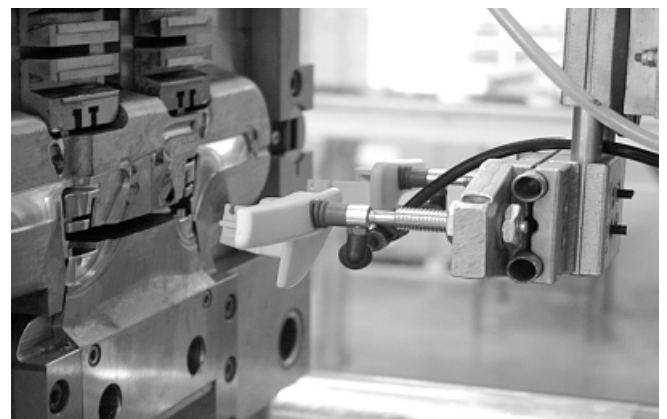
Handling of pipes with adaptable bellows suction pads FSG and FSGB

Applications

- Handling of extremely sensitive workpieces (optimum damping effect due to folds. internal support prevents workpiece from being pulled in)
- Handling of workpieces with extremely uneven surfaces, such as pipes (corrugations permit optimal adaptation to concave and convex surfaces)
- Special design of the folds permits use in systems with very short cycle times
- Available in various materials (see material overview)



Handling of pipes with adaptable bellows suction pads FSG

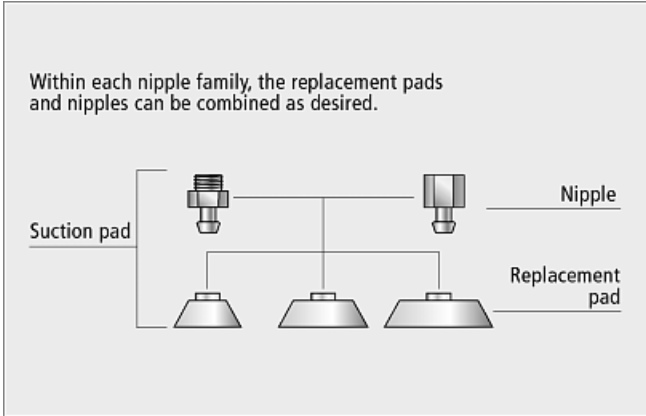


Removal of hot moulded parts from an injection mould with bellows suction pads FSG

Bellows suction pads (round)

Bellows suction pads FSG (2.5 folds)

Vacuum suction pads
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Modular suction-pad system

Construction

- Robust and hard-wearing suction pad FSG with single sealing lip, consisting of suction pad FG with 2.5 folds and connection nipple.
- All nipples plugged in
- Suction pads are delivered unassembled



Suitability for branch-specific applications

Designation code Bellows suction pads FSG (2.5 folds)

Short designation	Diameter in mm	Material and shore hardness	Connection thread
Example: FSG	32	NK-45	G1/4-IG
FSG...with connection nipple FG...without connection nipple	5 to 88	NBR-55 SI-55 HT 1-60 NK-45	M5-IG/AG to G1/4-IG/AG (AG = male; IG = female)

Bellows suction pads (round)

Bellows suction pads FSG (2.5 folds)



Ordering data Bellows suction pads FSG (2.5 folds)

Type	Suction pad material * / hardness in Shore A			
	High temp material HT1 60±5ShA	Natural Rubber NK 45±5ShA	Perbunan NBR 55±5ShA	Silicone SI 55±5ShA
FSG 5 M5-AG	10.01.06.01235	-	10.01.06.00663	10.01.06.00665
FSG 5 M5-IG	10.01.06.01242	-	10.01.06.00662	10.01.06.00664
FSG 7 G1/8-AG	10.01.06.01236	-	10.01.06.00020	10.01.06.00034
FSG 7 G1/8-IG	10.01.06.01243	-	10.01.06.00001	10.01.06.00010
FSG 7 M5-AG	10.01.06.01237	-	10.01.06.00021	10.01.06.00035
FSG 9 G1/8-AG	10.01.06.00962	10.01.06.00432	10.01.06.00022	10.01.06.00036
FSG 9 G1/8-IG	10.01.06.00978	10.01.06.00431	10.01.06.00002	10.01.06.00011
FSG 9 M5-AG	10.01.06.00963	10.01.06.00430	10.01.06.00023	10.01.06.00037
FSG 12 G1/8-AG	10.01.06.01238	10.01.06.00564	10.01.06.00562	10.01.06.00563
FSG 12 G1/8-IG	10.01.06.01244	10.01.06.00561	10.01.06.00559	10.01.06.00560
FSG 12 M5-AG	10.01.06.01255	10.01.06.00567	10.01.06.00565	10.01.06.00566
FSG 14 G1/8-AG	10.01.06.00966	10.01.06.00435	10.01.06.00024	10.01.06.00038
FSG 14 G1/8-IG	10.01.06.00982	10.01.06.00434	10.01.06.00003	10.01.06.00012
FSG 14 M5-AG	10.01.06.00967	10.01.06.00433	10.01.06.00025	10.01.06.00039
FSG 18 G1/8-AG	10.01.06.00968	10.01.06.00438	10.01.06.00026	10.01.06.00040
FSG 18 G1/8-IG	10.01.06.00984	10.01.06.00437	10.01.06.00004	10.01.06.00013
FSG 18 M5-AG	10.01.06.00969	10.01.06.00436	10.01.06.00027	10.01.06.00041
FSG 20 G1/8-AG	10.01.06.01239	10.01.06.00441	10.01.06.00028	10.01.06.00042
FSG 20 G1/8-IG	10.01.06.01245	10.01.06.00440	10.01.06.00005	10.01.06.00014
FSG 20 M5-AG	10.01.06.01240	10.01.06.00439	10.01.06.00029	10.01.06.00043
FSG 25 G1/8-AG	10.01.06.00972	10.01.06.00443	10.01.06.00334	10.01.06.00337
FSG 25 G1/8-IG	10.01.06.00988	10.01.06.00442	10.01.06.00333	10.01.06.00336
FSG 32 G1/4-AG	10.01.06.01241	10.01.06.00445	10.01.06.00030	10.01.06.00044
FSG 32 G1/4-IG	10.01.06.01246	10.01.06.00444	10.01.06.00006	10.01.06.00015
FSG 42 G1/4-AG	10.01.06.00974	10.01.06.00447	10.01.06.00031	10.01.06.00045
FSG 42 G1/4-IG	10.01.06.00990	10.01.06.00446	10.01.06.00007	10.01.06.00016
FSG 52 G1/4-AG	-	-	10.01.06.00582	10.01.06.00586
FSG 52 G1/4-IG	-	-	10.01.06.00584	10.01.06.00587
FSG 62 G1/4-AG	-	10.01.06.00449	10.01.06.00032	10.01.06.00046
FSG 62 G1/4-IG	-	10.01.06.00448	10.01.06.00008	10.01.06.00017
FSG 88 G1/4-AG	-	10.01.06.00451	10.01.06.00033	10.01.06.00047
FSG 88 G1/4-IG	-	10.01.06.00450	10.01.06.00009	10.01.06.00018

*See Section 2, "Basic Principles of Suction-Pad Materials" for further details of materials

Bellows suction pads (round)

Bellows suction pads FSG (2.5 folds)



Vacuum suction pads
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Ordering data spare parts suction pads

Type	Suction pad material * / hardness in Shore A			
	High temp material HT1 60±5ShA	Natural Rubber NK 45±5ShA	Perbunan NBR 55±5ShA	Silicone SI 55±5ShA
FG 5	10.01.06.01250	-	10.01.06.00640	10.01.06.00642
FG 7	10.01.06.01251	-	10.01.06.00050	10.01.06.00055
FG 9	10.01.06.00878	10.01.06.00452	10.01.06.00051	10.01.06.00056
FG 12	10.01.06.01252	10.01.06.00558	10.01.06.00557	10.01.06.00549
FG 14	10.01.06.00880	10.01.06.00453	10.01.06.00052	10.01.06.00057
FG 18	10.01.06.00881	10.01.06.00454	10.01.06.00053	10.01.06.00058
FG 20	10.01.06.01253	10.01.06.00455	10.01.06.00054	10.01.06.00059
FG 25	10.01.06.00883	10.01.06.00456	10.01.06.00335	10.01.06.00338
FG 32	10.01.06.01254	10.01.06.00457	10.01.06.00140	10.01.06.00144
FG 42	10.01.06.00885	10.01.06.00458	10.01.06.00141	10.01.06.00145
FG 52	-	-	10.01.06.00583	10.01.06.00585
FG 62	-	10.01.06.00459	10.01.06.00142	10.01.06.00146
FG 88	-	10.01.06.00460	10.01.06.00143	10.01.06.00147

*See Section 2, "Basic Principles of Suction-Pad Materials" for further details of materials

Ordering data spare parts suction pad nipples

Type	Suction-pad nipples [AG]		Suction-pad nipples [IG]	
FSG 5 M5	SA-NIP N017 M5-AG	10.01.06.00314	SA-NIP N017 M5-IG	10.01.06.00313
FSG 7 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 7 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 9 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 9 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 12 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 12 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 14 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 14 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 18 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 18 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 20 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 20 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 25 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 32 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSG 42 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSG 52 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSG 62 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSG 88 G1/4	SA-NIP N019 G1/4-AG	10.01.06.01959	SA-NIP N019 G1/4-IG	10.01.06.01960

Bellows suction pads (round)

Bellows suction pads FSG (2.5 folds)



Technical data Bellows suction pads FSG (2.5 folds)

Type	Suction force [N]*	Pull-off force [N]**	Volume [cm ³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]	Nipple family
FSG 5	0,1	0,8	0,033	8	2	N 017
FSG 7	0,1	0,9	0,043	8	4	N 016
FSG 9	0,7	2,3	0,150	10	4	N 016
FSG 12	0,9	3,5	0,600	13	4	N 016
FSG 14	1,2	5,7	0,975	15	4	N 016
FSG 18	2,3	8,5	1,350	20	4	N 016
FSG 20	3,8	12,1	2,000	30	4	N 016
FSG 25	4,5	19,0	5,400	30	4	N 016
FSG 32	12,0	36,9	10,000	35	6	N 018
FSG 42	13,6	44,0	19,500	75	6	N 018
FSG 52	27,0	96,0	62,000	75	6	N 018
FSG 62	39,6	137,0	72,500	75	6	N 018
FSG 88	45,2	286,0	165,000	100	9	N 019

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The pull-off force of the versions made of natural rubber is reduced by about 40%

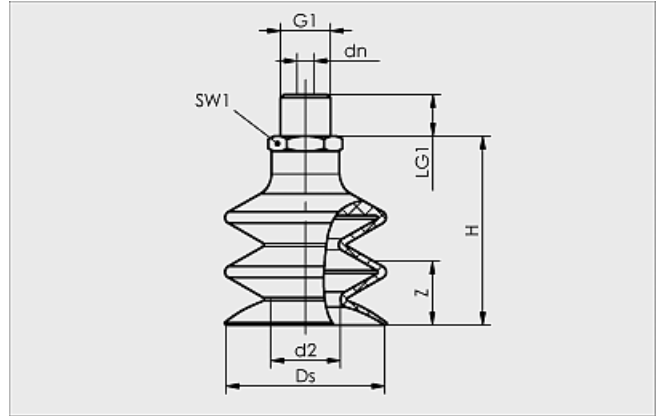
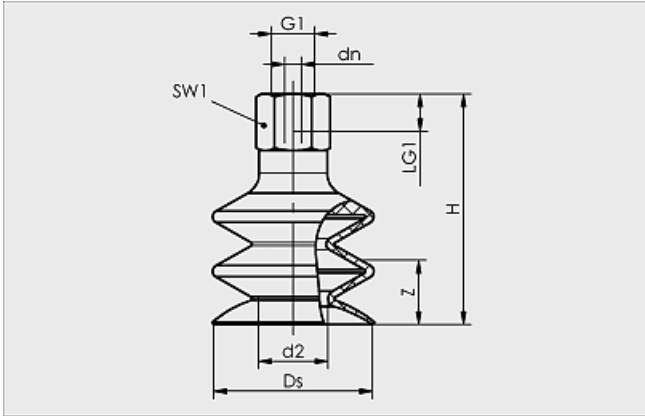
Bellows suction pads (round)



Bellows suction pads FSG (2.5 folds)

Vacuum suction pads
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Design data Bellows suction pads FSG (2.5 folds)



FSG 5 to 88 IG

FSG 5 to 88 AG

Type	Dimensions in mm*							
	d2	dn	Ds	G1	H	LG1	SW1	Z (Stroke)
FSG 5 M5-AG	2,6	2,0	5,0	M5-M	19,0	5,0	8	3
FSG 5 M5-IG	2,6	2,0	5,0	M5-F	24,0	5,5	8	3
FSG 7 G1/8-AG	1,8	3,5	5,9	G1/8"-M	20,0	7,5	14	4
FSG 7 G1/8-IG	1,8	3,5	5,9	G1/8"-F	26,0	8,5	14	4
FSG 7 M5-AG	1,8	2,5	5,9	M5-M	19,0	5,0	7	4
FSG 9 G1/8-AG	4,1	3,5	9,0	G1/8"-M	21,0	7,5	14	3
FSG 9 G1/8-IG	4,1	3,5	9,0	G1/8"-F	27,0	8,5	14	3
FSG 9 M5-AG	4,1	2,5	9,0	M5-M	20,0	5,0	7	3
FSG 12 G1/8-AG	5,0	3,5	12,0	G1/8"-M	27,0	7,5	14	7
FSG 12 G1/8-IG	5,0	3,5	12,0	G1/8"-F	33,0	8,5	14	7
FSG 12 M5-AG	5,0	2,5	12,0	M5-M	26,0	5,0	7	7
FSG 14 G1/8-AG	5,4	3,5	14,5	G1/8"-M	28,0	7,5	14	9
FSG 14 G1/8-IG	5,4	3,5	14,5	G1/8"-F	34,0	8,5	14	9
FSG 14 M5-AG	5,4	2,5	14,5	M5-M	27,0	5,0	7	9
FSG 18 G1/8-AG	8,0	3,5	17,2	G1/8"-M	28,0	7,5	14	9
FSG 18 G1/8-IG	8,0	3,5	17,2	G1/8"-F	34,0	8,5	14	9
FSG 18 M5-AG	8,0	2,5	17,2	M5-M	27,0	5,0	7	9
FSG 20 G1/8-AG	10,5	3,5	20,0	G1/8"-M	28,0	7,5	14	9
FSG 20 G1/8-IG	10,5	3,5	20,0	G1/8"-F	34,0	8,5	14	9
FSG 20 M5-AG	10,5	2,5	20,0	M5-M	27,0	5,0	7	9
FSG 25 G1/8-AG	10,0	3,5	23,0	G1/8"-M	40,0	7,5	14	18
FSG 25 G1/8-IG	10,0	3,5	23,0	G1/8"-F	46,0	8,5	14	18
FSG 32 G1/4-AG	16,0	4,4	32,0	G1/4"-M	41,5	11,0	17	15
FSG 32 G1/4-IG	16,0	4,4	32,0	G1/4"-F	52,5	12,0	17	15
FSG 42 G1/4-AG	17,8	4,4	42,6	G1/4"-M	50,0	11,0	17	20
FSG 42 G1/4-IG	17,8	4,4	42,6	G1/4"-F	61,0	12,0	17	20
FSG 52 G1/4-AG	24,6	4,4	52,5	G1/4"-M	53,0	11,0	17	25
FSG 52 G1/4-IG	24,6	4,4	52,5	G1/4"-F	64,0	12,0	17	25
FSG 62 G1/4-AG	29,5	4,4	62,2	G1/4"-M	59,0	11,0	17	29
FSG 62 G1/4-IG	29,5	4,4	62,2	G1/4"-F	70,0	12,0	17	29
FSG 88 G1/4-AG	33,0	8,0	89,0	G1/4"-M	92,0	11,0	21	34
FSG 88 G1/4-IG	33,0	8,0	89,0	G1/4"-F	103,0	12,0	21	34

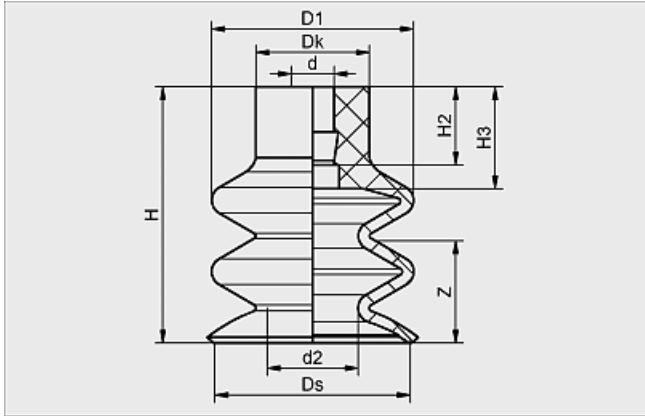
*Acceptable dimensional tolerances for rubber parts concerning to M3 - DIN 7715

Bellows suction pads (round)

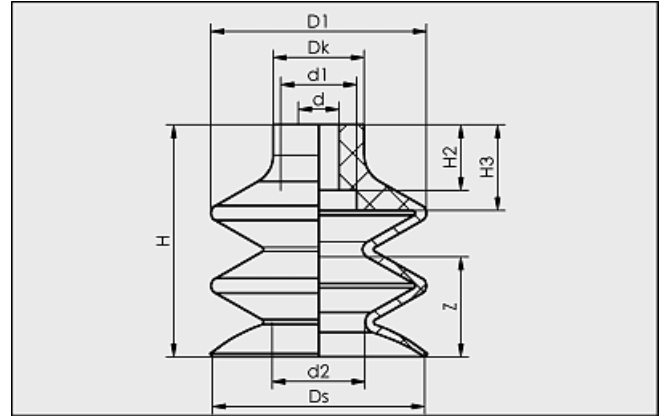
Bellows suction pads FSG (2.5 folds)



Design data Bellows suction pads FG (2.5 folds)



FG 5 to 25



FG 32 to 88

Type	Dimensions in mm*									
	d	d1	d2	D1	Dk	Ds	H	H2	H3	Z (Stroke)
FG 5	3,5	-	2,6	6,0	7	5,0	14,0	8,0	-	2
FG 7	4,5	-	1,8	6,5	9	5,9	14,0	6,5	-	4
FG 9	4,5	-	4,1	8,9	9	9,0	15,0	8,2	-	3
FG 12	4,5	-	5,0	12,0	10	12,0	21,0	6,9	9,0	6
FG 14	4,5	-	5,4	13,9	10	14,5	22,8	6,9	9,0	9
FG 18	4,5	-	8,0	17,8	10	17,2	22,6	6,9	9,0	9
FG 20	4,5	-	10,5	20,0	10	20,0	22,1	6,9	9,0	9
FG 25	4,5	-	10,0	25,0	10	23,0	34,0	6,9	9,0	18
FG 32	8,0	15	16,0	32,6	18	32,0	37,5	13,0	17,0	15
FG 42	8,0	15	17,8	43,5	18	42,6	46,0	13,0	17,0	20
FG 52	8,0	-	24,6	52,0	18	52,5	48,7	13,0	-	25
FG 62	8,0	-	29,5	62,0	18	62,2	54,0	13,0	-	29
FG 88	11,7	25	33,0	88,2	25	89,0	86,5	19,7	26,0	34

*Acceptable dimensional tolerances for rubber parts concerning to M3 - DIN 7715