

4 | Corrugated hoses

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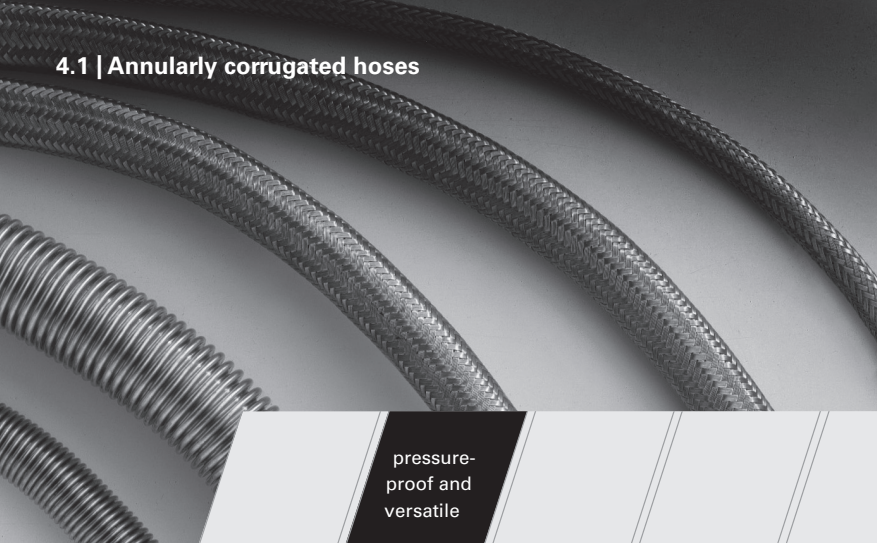
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4.1 | Annularly corrugated hoses



pressure-proof and versatile

The following section contains descriptions of the most common types of hose. The two features that characterise the hoses are the version and the corrugation:

	Geometric dimension	Designation
Version:	Wall thickness	medium / heavy
Corrugation:	Length of corrugation	narrow / medium / wide

Note that pressure resistance increases both with wall thickness and corrugation length. Flexibility, on the other hand, falls with both increasing corrugation length and wall thickness.

The technical detail tables are preceded by a description of the hose type. If you cannot find “your” hose, please contact us. Witzemann produces a multitude of hose types. The hose for your application will certainly be among them.

Operating pressure

The operating pressures in the following tables that are applicable to stainless steel contain two pressure values:

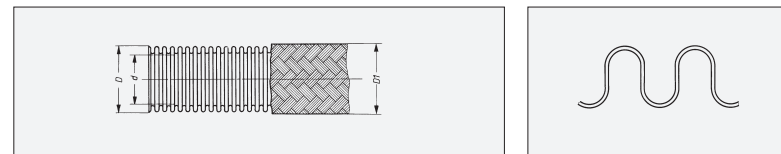
1) Permissible operating pressure P_{zul} at 20 °C for static loading without movement with a bursting safety factor of 3 (**SF 3**).

2) Nominal pressure level as defined in DIN EN ISO 10380: maximum permissible pressure as defined in DIN EN ISO 10380 rounded to the associated pressure level. The maximum permissible pressure includes a bursting safety factor of 4 (**SF 4**) and an average flexibility of 10,000 load cycles in the U-bend (see Section 3).

At higher operating temperatures, the reduction factor given on page 245 applies to the two pressure values.

4.1 | Annularly corrugated hoses, stainless steel Type RS 331 (up to DN 100), Type RS 330 (from DN 125) medium version, normal corrugation

HYDRA



Construction:

Annularly corrugated all-metal hose made of butt-welded tube with or without braiding.

Versions:

- RS ...**S00** without braiding
- RS ...**S12** with single stainless steel wire braiding

Type tests:

The hose type is tested in accordance with DIN EN ISO 10380.

Material of hose:

stainless austenitic steel to DIN EN ISO 10088-2, bright

- standard: material no. 1.4404 comparable with AISI 316 L
- standard: material no. 1.4541 comparable with AISI 321
- other materials: e.g. material no. 1.4571 comparable with AISI 316Ti on request

Material of braiding:

- stainless austenitic steel
- material no. 1.4301 comparable with AISI 304
 - material no. 1.4571 comparable with AISI 316Ti on request

Temperature range:

-270 °C up to max. 600 °C (only for the hose)

Operating pressure:

The following tables with technical data of metal hoses contain two pressure values. Please refer to the general information on page 50.

SF = Bursting Safety Factor (3 or 4)

Connection fittings:

- flanges
- threaded connections
- welding ends
- customized connections on request

Approvals:

see page 16 – 17

Production lengths:

- DN 4 5 – 30 m
- DN 6-50 10 – 100 m
- DN 65-100 20 m
- DN 125-150 10 m

4.1 | Annularly corrugated hoses, stainless steel

Type RS 331

medium version, normal corrugation



DN	Type	Inside diameter	Outside diameter	Permissible deviation	Minimum bending radius* one bending process	Nominal bending radius** frequent bending	Perm. static operating pressure at 20 °C SF 3	Nominal pressure DIN EN ISO 10380 SF 4	Weight approx.
-	-	d	D, D1	d, D, D1	r _{min}	r _n	P _{zul}	-	-
-	-	mm	mm	mm	mm	mm	bar	PN	kg/m
4	RS331S00	4.2	7.1	±0.1	15	80	40	40	0.06
	RS331S12		8.2		25	135	100	0.11	
6	RS331S00	6.2	9.7	±0.2	15	80	25	25	0.08
	RS331S12		10.8		25	200	150	0.14	
8	RS331S00	8.3	12.3	±0.2	16	120	20	20	0.10
	RS331S12		13.7		32	180	100	0.21	
10	RS331S00	10.2	14.3	±0.2	18	130	16	16	0.11
	RS331S12		15.7		38	140	100	0.23	
12	RS331S00	12.2	16.8	±0.2	20	140	12	10	0.12
	RS331S12		18.2		45	85	65	0.25	
16	RS331S00	16.2	21.7	±0.2	28	160	8	6	0.19
	RS331S12		23.3		58	90	65	0.40	
20	RS331S00	20.2	26.7	±0.3	32	170	5	4	0.27
	RS331S12		28.3		70	55	40	0.49	
25	RS331S00	25.5	32.2	±0.3	40	190	4	4	0.38
	RS331S12		34.2		85	65	50	0.79	
32	RS331S00	34.2	41.0	±0.3	50	260	3	2.5	0.49
	RS331S12		43.0		105	35	25	0.96	
40	RS331S00	40.1	49.7	±0.4	60	300	2.5	2.5	0.77
	RS331S12		52.0		130	60	40	1.46	
50	RS331S00	50.4	60.3	±0.4	70	320	1.5	0.5	0.91
	RS331S12		62.6		160	35	25	1.67	
65	RS331S00	65.3	78.0	±0.4	115	460	1	0.5	1.51
	RS331S12		81.2		200	40	25	2.88	

* Minimum bending radius ≤ DIN EN ISO 10380 Type 1/2

** Nominal bending radius ≤ DIN EN ISO 10380 Type 1

Please quote when ordering:

1. Type of hose, material, nominal diameter (DN), nominal length (NL)
2. Type of connection fitting, material
3. Operating conditions, refer to Inquiry Specification, page 47

4.1 | Annularly corrugated hoses, stainless steel

Type RS 331 (up to DN 100), Type RS 330 (from DN 125)

medium version, normal corrugation



DN	Type	Inside diameter	Outside diameter	Permissible deviation	Minimum bending radius one bending process	Nominal bending radius frequent bending	Perm. static operating pressure at 20 °C SF 3	Nominal pressure DIN EN ISO 10380 SF 4	Weight approx.
-	-	d	D, D1	d, D, D1	r _{min}	r _n	P _{zul}	-	-
-	-	mm	mm	mm	mm	mm	bar	PN	kg/m
80	RS331S00	80.2	94.8	±0.5	130	660	2	0.5	2.28
	RS331S12		98.0		240	25	35	16	4.08
100	RS331S00	100.0	116.2	±0.5	160	750	1.5	0.5	2.53
	RS331S12		119.4		290	25	10	4.54	
125	RS330S00	126.2	145.0	±0.6	350	1000	0.8	0.5	2.68
	RS330S12		148.2		15	6	5.25		
150	RS330S00	151.6	171.0	±1.4	400	1250	0.5	0.5	3.41
	RS330S12		174.2		10	6	6.48		

Please quote when ordering:

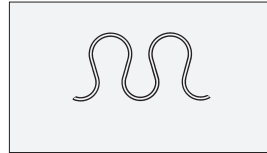
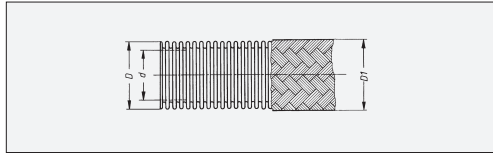
1. Type of hose, material, nominal diameter (DN), nominal length (NL)
2. Type of connection fitting, material
3. Operating conditions, refer to Inquiry Specification, page 47

4.1 | Annularly corrugated hoses, stainless steel

Type RS 321

medium version, narrow corrugation / highly flexible

HYDRA



Construction:

Annularly corrugated all-metal hose made of butt-welded tube with or without braiding.

Versions:

- RS ...S00 without braiding
- RS ...S12 with single stainless steel wire braiding

Type tests:

The hose type is tested in accordance with DIN EN ISO 10380.

Material of hose:

stainless austenitic steel to DIN EN ISO 10088-2, bright

- standard: material no. 1.4404 comparable with AISI 316 L
- standard: material no. 1.4541 comparable with AISI 321
- other materials: e.g. material no. 1.4571 comparable with AISI 316Ti on request

Material of braiding:

- material no. 1.4301 comparable with AISI 304
- material no. 1.4571 comparable with AISI 316Ti on request

Temperature range:

-270 °C up to max. 600 °C (only for the hose)

Operating pressure:

The following tables with technical data of metal hoses contain two pressure values. Please refer to the general information on page 50.
SF = Bursting Safety Factor (3 or 4)

Connection fittings:

- flanges
- threaded connections
- welding ends
- customized connections on request

Production lengths:

- DN 6-32 10 – 70 m
- DN 40-50 20 m
- DN 65-100 7 m

4.1 | Annularly corrugated hoses, stainless steel

Type RS 321

medium version, narrow corrugation / highly flexible

HYDRA

DN	Type	Inside diameter	Outside diameter	Permissible deviation	Minimum bending radius one bending process	Nominal bending radius frequent bending	Perm. static operating pressure at 20 °C SF 3	Nominal pressure DIN EN ISO 10380 SF 4	Weight approx.	
-	-	d	D, D1	d, D, D1	r _{min}	r _n	P _{zul}	-	-	
-	-	mm	mm	mm	mm	mm	bar	PN	kg/m	
6	RS321S00	6.1	9.9	±0.2	20	70	20	20	0.10	
	RS321S12		11.0		25		150	100	0.17	
8	RS321S00	8.2	12.5		25	80	16	16	0.14	
	RS321S12		13.9		30		150	100	0.25	
10	RS321S00	10.1	14.4		30	90	10	10	0.14	
	RS321S12		15.8		35		130	65	0.26	
12	RS321S00	12.4	17.1		35	100	8	6	0.17	
	RS321S12		18.5		40		90	50	0.30	
16	RS321S00	16.2	22.0		40	110	6	6	0.26	
	RS321S12		23.6		50		65	50	0.46	
20	RS321S00	20.2	26.7	±0.3	50	130	4	4	0.31	
	RS321S12		28.4		55		40	40	0.53	
25	RS321S00	25.1	32.2		60	150	5	4	0.49	
	RS321S12		34.2		65		65	40	0.90	
32	RS321S00	34.2	41.0		70	200	2.5	2.5	0.50	
	RS321S12		43.0		75		45	20	0.97	
40	RS321S00	40.0	49.8		±0.4	80	210	2	0.5	1.13
	RS321S12		52.1			90		40	20	1.81
50	RS321S00	50.1	60.5			100	240	1	0.5	1.34
	RS321S12		62.8					110	30	16
65	RS321S00	65.0	78.2	145		280	1.5	0.5	1.96	
	RS321S12		81.4				200	30	16	3.33
80	RS321S00	80.0	95.0	200		400	2.0	0.5	3.12	
	RS321S12		98.2				240	25	10	4.92
100	RS321S00	99.4	116.8	240		500	1.5	0.5	3.70	
	RS321S12		120.0				290	20	6	5.71

Please quote when ordering:

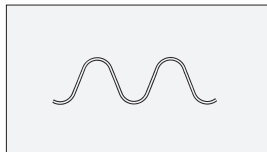
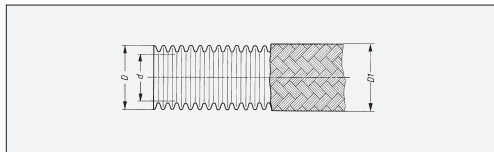
1. Type of hose, material, nominal diameter (DN), nominal length (NL)
2. Type of connection fitting, material
3. Operating conditions, refer to Inquiry Specification, page 47

4.1 | Annularly corrugated hoses, stainless steel

Type RS 341

medium version, wide corrugation

HYDRA



Construction:

Annularly corrugated all-metal hose made of butt-welded tube with or without braiding.

Versions:

- RS 341S00 without braiding
- RS 341S12 with single stainless steel wire braiding

Type tests:

The hose type is tested in accordance with DIN EN ISO 10380.

Material of hose:

stainless austenitic steel to DIN EN ISO 10088-2, bright

- Standard: material no. 1.4404 comparable with AISI 316 L
- Standard: material no. 1.4541 comparable with AISI 321
- Other materials: e.g. material no. 1.4571 comparable with AISI 316Ti on request

Material of braiding:

- material no. 1.4301 comparable with AISI 304

Temperature range:

-270 °C up to max. 600 °C (only for the hose)

Operating temperature:

At higher operating temperatures, different reduction factors apply depending on the material → see page 245.

Operating pressure:

The following tables with technical data of metal hoses contain two pressure values. Please refer to the general information on page 50.

SF = Bursting Safety Factor (3 or 4)

Connection fittings:

In addition to the common types and versions, there are special connections, e.g. for building service equipment.

Production lengths:

- DN 6-8 10 m
- DN 10-50 10 – 100 m
- DN 65-100 6,5 m

4.1 | Annularly corrugated hoses, stainless steel

Type RS 341

medium version, wide corrugation

HYDRA

DN	Type	Inside diameter	Outside diameter	Permissible deviation	Minimum bending radius one bending process	Nominal bending radius frequent bending	Perm. static operating pressure at 20 °C SF 3	Nominal pressure DIN EN ISO 10380 SF 4	Weight approx.
–	–	d	D, D1	d, D, D1	r _{min}	r _n	P _{zul}	–	–
–	–	mm	mm	mm	mm	mm	bar	PN	kg/m
6	RS341S00	6.3	9.5	± 0.3	11	110	65	65	0.05
	RS341S12		10.6		25		175	100	0.12
8	RS341S00	8.5	12.0	± 0.3	15	130	35	25	0.07
	RS341S12		13.4		32		150	100	0.18
10	RS341S00	10.3	14.1	± 0.2	18	150	16	16	0.09
	RS341S12		15.5		38		105	65	0.20
12	RS341S00	12.5	16.5	± 0.2	20	165	18	16	0.10
	RS341S12		18.0		45		80	65	0.23
16	RS341S00	16.3	21.4	± 0.3	25	195	13	10	0.15
	RS341S12		23.0		58		80	65	0.36
20	RS341S00	20.7	26.5	± 0.3	30	225	20	20	0.31
	RS341S12		28.1		70		55	40	0.54
25	RS341S00	25.8	31.7	± 0.4	35	260	16	16	0.39
	RS341S12		33.7		85		60	50	0.80
32	RS341S00	34.6	41.0	± 0.5	40	300	2.5	2.5	0.36
	RS341S12		43.0		105		35	25	0.82
40	RS341S00	40.5	49.5	± 0.5	50	340	3	2.5	0.57
	RS341S12		51.5		130		50	40	1.26
50	RS341S00	50.8	60.2	± 0.4	60	390	2.5	2.5	0.71
	RS341S12		62.5		160		35	25	1.47
65	RS341S00	65.7	77.7	± 0.4	75	460	4	4	1.07
	RS341S12		80.9		200		40	25	2.44
80	RS341S00	80.6	94.2	± 0.5	90	660	4	4	1.72
	RS341S12		97.4		240		40	25	3.52
100	RS341S00	100.4	115.0	± 0.6	110	750	3	2.5	1.95
	RS341S12		118.2		290		20	16	3.94

Please quote when ordering:

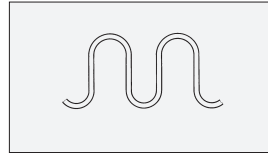
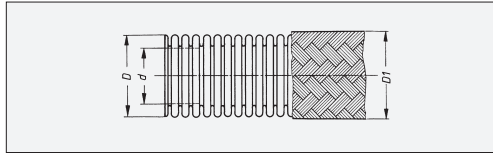
1. Type of hose, material, nominal diameter (DN), nominal length (NL)
2. Type of connection fitting, material
3. Operating conditions, refer to Inquiry Specification, page 47

4.1 | Annularly corrugated hoses, stainless steel

Type RS 531 (DN 5 - 16), Type RS 430 (DN 20 - 300)

heavy version, normal corrugation

HYDRA



Construction:

Annularly corrugated all-metal hose made of butt-welded tube with or without braiding.

Versions:

- RS ...**S00** without braiding
- RS ...**S12** with single stainless steel wire braiding
- RS ...**S22** with double stainless steel braiding
- RS ...**S42** with single stainless steel braided braid
- RS ...**S52** with double stainless steel braided braid
- RS ...**S92** with double stainless steel braiding of special design

Type tests:

The hose type is tested in accordance with DIN EN ISO 10380.

Material of hose:

stainless austenitic steel to DIN EN ISO 10088-2, bright

- Standard: material no. 1.4404 comparable with AISI 316 L (< DN 150)
- Standard: material no. 1.4541 comparable with AISI 321
- Other materials:
e.g. material no. 1.4571 comparable with AISI 316Ti on request

Material of braiding:

- material no. 1.4301 comparable with AISI 304
- material no. 1.4306 comparable with AISI 304 L (knurled braiding DN 150–300)
- material no. 1.4571 comparable with AISI 316Ti on request

Temperature range:

-270 °C up to max. 600 °C (only for the hose)

Operating pressure:

The following tables with technical data of metal hoses contain two pressure values. Please refer to the general information on page 50.

SF = Bursting Safety Factor (3 or 4)

Connection fittings:

- flanges
- threaded connections
- welding ends
- high-pressure type connection fittings
- customized connections on request

Production lengths:

- DN 5-16 10 – 100 m
- DN 20-125 10 m
- DN 150-300 3 m

4.1 | Annularly corrugated hoses, stainless steel

Type RS 531

heavy version, normal corrugation

HYDRA

DN	Type	Inside diameter	Outside diameter	Permissible deviation	Minimum bending radius one bending process	Nominal bending radius frequent bending	Perm. static operating pressure at 20 °C SF 3	Nominal pressure DIN EN ISO 10380 SF 4	Weight approx.
–	–	d	D, D1	d, D, D1	r _{min}	r _n	P _{zul}	–	–
–	–	mm	mm	mm	mm	mm	bar	PN	kg/m
5	RS531S00	5.3	9.1	±0.2	15	100	32	25	0.10
	RS531S12		10.2		25		250	200	0.16
	RS531S22		11.3		35		380	200	0.22
6	RS531S00	6.2	10.2	±0.2	15	110	50	50	0.12
	RS531S12		11.6		25		300	200	0.23
	RS531S22		13.0		40		400	250	0.33
8	RS531S00	8.0	12.9	±0.2	20	130	50	50	0.20
	RS531S12		14.5		32		250	200	0.35
	RS531S22		16.1		50		380	250	0.49
10	RS531S00	10.0	15.9	±0.3	25	150	35	25	0.29
	RS531S12		17.5		38		240	150	0.48
	RS531S22		19.1		60		300	200	0.66
12	RS531S00	12.1	18.7	±0.3	30	165	32	25	0.41
	RS531S12		20.3		45		185	100	0.62
	RS531S22		21.9		70		315	200	0.82
16	RS531S00	16.1	23.8	±0.3	40	195	20	20	0.55
	RS531S12		25.8		58		190	150	0.92
	RS531S22		27.8		90		280	200	1.29

Please quote when ordering:

1. Type of hose, material, nominal diameter (DN), nominal length (NL)
2. Type of connection fitting, material
3. Operating conditions, refer to Inquiry Specification, page 47

4.1 | Annularly corrugated hoses, stainless steel

Type RS 430

heavy version, normal corrugation



DN	Type	Inside diameter	Outside diameter	Permissible deviation	Minimum bending radius* one bending process	Nominal bending radius** frequent bending	Perm. static operating pressure at 20 °C SF 3	Nominal pressure DIN EN ISO 10380 SF 4	Weight approx.
-	-	d	D, D1	d, D, D1	r _{min}	r _n	P _{zul}	-	-
-	-	mm	mm	mm	mm	mm	bar	PN	kg/m
20	RS430S00	20.2	29.2	±0.3	45	285	8	6	0.54
	RS430S12		31.2		70		125	65	0.93
	RS430S22		33.2		70		165	100	1.32
25	RS430S00	25.2	34.2	±0.3	50	325	6	6	0.65
	RS430S12		36.2		85		80	50	1.07
	RS430S22		38.2		85		135	100	1.49
32	RS430S00	33.7	42.7	±0.3	60	380	4	4	0.77
	RS430S12		45.0		105		85	65	1.41
	RS430S22		47.2		105		100	65	2.05
40	RS430S00	40.0	55.0	±0.4	75	430	2.5	2.5	1.37
	RS430S12		57.3		130		50	40	2.09
	RS430S22		59.5		130		75	65	2.82
50	RS430S00	50.0	65.0	±0.4	90	490	3	2.5	1.61
	RS430S12		68.2		160		65	50	2.91
	RS430S22		71.3		160		65	65	4.21
65	RS430S00	65.0	81.0	±0.5	110	580	2	0.5	2.06
	RS430S12		84.2		200		40	25	3.46
	RS430S22		87.3		200		60	50	4.86
80	RS430S00	79.8	98.3	±0.5	135	800	1.5	0.5	2.82
	RS430S12		101.5		240		40	16	4.65
	RS430S22		104.6		240		60	25	6.48
100	RS430S00	99.8	117.8	±0.5	160	1000	1.5	0.5	3.59
	RS430S12		121.0		290		35	10	5.97
	RS430S22		124.1		290		60	16	8.35

* Minimum bending radius < DIN EN ISO 10380 Type 1/2

** Nominal bending radius DIN EN ISO 10380 Type 2

Please quote when ordering:

1. Type of hose, material, nominal diameter (DN), nominal length (NL)
2. Type of connection fitting, material
3. Operating conditions, refer to Inquiry Specification, page 47

4.1 | Annularly corrugated hoses, stainless steel

Type RS 430

heavy version, normal corrugation



DN	Type	Inside diameter	Outside diameter	Permissible deviation	Minimum bending radius one bending process	Nominal bending radius frequent bending	Perm. static operating pressure at 20 °C SF 3	Nominal pressure DIN EN ISO 10380 SF 4	Weight approx.
-	-	d	D, D1	d, D, D1	r _{min}	r _n	P _{zul}	-	-
-	-	mm	mm	mm	mm	mm	bar	PN	kg/m
125	RS430S00	125.6	146.0	± 0.6	350	1250	1	0.5	5.23
	RS430S12		149.2				25	10	7.80
	RS430S22		152.4				45	16	10.40
150	RS430S00	151.9	177.4	± 1.4	400	800	0.2	-	4.97
	RS430S12		180.6				10	6	8.10
	RS430S42		181.4				15	10	8.37
150	RS430S22	151.9	183.7	± 1.4	400	800	17	10	11.20
	RS430S92		184.6				25	16	11.90
	RS430S00		231.4				0.2	-	7.92
200	RS430S12	202.2	234.4	±1.6	520	1100	8	6	11.90
	RS430S42		236.9				13	10	12.5
	RS430S22		237.1				15	10	15.90
200	RS430S92	202.2	239.7	±1.6	520	1100	16	16	16.50
	RS430S52		242.4				16	16	17.3
	RS430S00		284.2				0.2	-	13.0
250	RS430S42	248.4	289.7	±1.6	620	1350	8	6	18.10
	RS430S52		295.2				15	10	23.40
	RS430S00		335.8				0.1	-	17.20
300	RS430S42	298.6	341.3	±1.6	1000	1600	5	4	23.10
	RS430S52		346.8				9	6	29.10

Please quote when ordering:

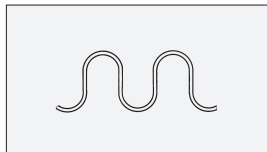
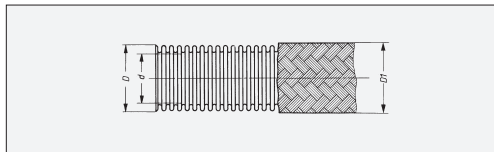
1. Type of hose, material, nominal diameter (DN), nominal length (NL)
2. Type of connection fitting, material
3. Operating conditions, refer to Inquiry Specification, page 47

4.1 | Annularly corrugated hoses of bronze

Type RZ 331

medium version, normal corrugation

HYDRA



Construction:

Annularly corrugated all-metal hose made of butt-welded tube with or without braiding.

Versions:

- RZ 331S00 without braiding
- RZ 331S13 with single bronze wire braiding

Material of hose:

- bronze to DIN 1791
- material no. 2.1010 (CuSn 2)

Material of braiding:

- bronze wire, bright, material no. 2.1016 (CuSn 4) or CW450K, DIN EN 1652

Temperature range:

-196 °C up to max. 250 °C
(only for the hose)

Operating pressure:

The permissible operating pressure stated in the table applies to static pressure and movement loading at +20 °C. For reduction factors for higher operating temperature → see page 251.

Exposure to dynamic stresses caused by movement or pressure necessitates a special design. Please contact us if this applies to you.

Connection fittings:

to customer specification

Production lengths:

- DN 8-25 10 – 50 m
- DN 32 10 – 30 m
- DN 40-50 8 m

4.1 | Annularly corrugated hoses of bronze

Type RZ 331

medium version, normal corrugation

HYDRA

DN	Type	Inside diameter	Outside diameter	Maximum deviation	Minimum bending radius one bending process	Nominal bending radius frequent bending	Permissible operating pressure at 20 °C SF 3	Weight approx.	
–	–	d	D, D1	d, D, D1	r _{min}	r _n	P _{zul}	–	
–	–	mm	mm	mm	mm	mm	bar	kg/m	
8	RZ331S00	8.6	12.6	±0.2	16	90	6	0.11	
	RZ331S13				32		75	0.23	
10	RZ331S00	10.7	15.1		18	130	6	0.13	
	RZ331S13				38		50	0.27	
12	RZ331S00	12.7	17.7		20	150	4	0.14	
	RZ331S13				45		40	0.31	
16	RZ331S00	16.7	22.2		28	170	4	0.24	
	RZ331S13				58		40	0.47	
20	RZ331S00	20.6	27.1		32	200	4	0.44	
	RZ331S13				70		35	0.71	
25	RZ331S00	25.6	33.2	±0.3	40	230	2.5	0.46	
	RZ331S13				85		35	0.97	
32	RZ331S00	32.6	42.0		50	260	2.5	0.72	
	RZ331S13				105		35	1.43	
40	RZ331S00	40.5	51.5		60	310	1.6	0.95	
	RZ331S13				130		28	1.83	
50	RZ331S00	50.5	63.0		±0.4	70	360	1.6	1.35
	RZ331S13					160		30	2.77

Please quote when ordering:

1. Type of hose, material, nominal diameter (DN), nominal length (NL)
2. Type of connection fitting, material
3. Operating conditions, refer to Inquiry Specification, page 47