

**4.1 | Annularly corrugated hoses**

Annularly corrugated hoses, stainless steel, medium version

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Annularly corrugated hoses of bronze

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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.

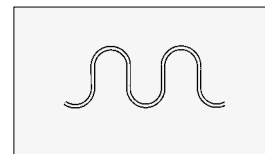
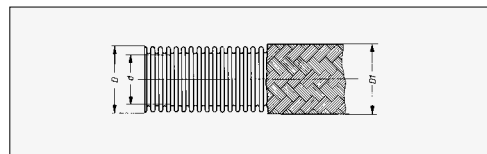
The technical detail tables are preceded by a description of the hose type. If you cannot find “your” hose, please contact us. Witzenmann produces a multitude of hose types. The hose for your application will certainly be among them.

**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 3-to-1 safety factor (**SF 3**) against bursting.
- 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 safety factor of 4 (**SF 4**) against bursting 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.

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



**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.

- 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

# Annularly corrugated hoses, stainless steel

medium version, normal corrugation

# Type RS 331

# Annularly corrugated hoses, stainless steel Type RS 331 (up to DN 100)

medium version, normal corrugation

# Type RS 330 (from DN 125)

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 <sub>min</sub>	r <sub>n</sub>	P <sub>zul</sub>	–	–
–	–	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	±0.3	20	140	12	10	0.12
	RS331S12		18.2		45		85	65	0.25
16	RS331S00	16.2	21.7	±0.3	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	±0.4	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

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 <sub>min</sub>	r <sub>n</sub>	P <sub>zul</sub>	–	–
–	–	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		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

## Annularly corrugated hoses, stainless steel

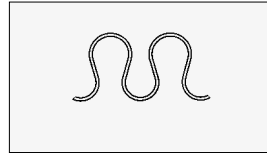
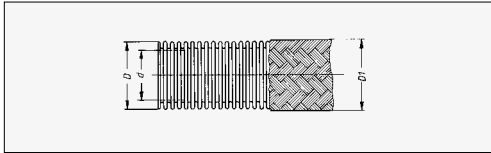
medium version, narrow corrugation / highly flexible

## Type RS 321

## Annularly corrugated hoses, stainless steel

medium version, narrow corrugation / highly flexible

## Type RS 321



### 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.

### 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

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 <sub>min</sub>	r <sub>n</sub>	P <sub>zul</sub>	–	–	
–	–	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	80	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	26.8	±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	2.10	
65	RS321S00	65.0	78.2	±0.5		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

## Annularly corrugated hoses, stainless steel

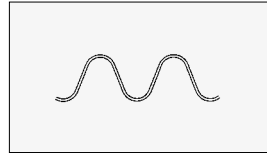
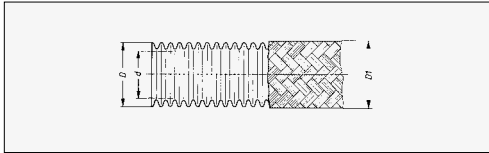
medium version, wide corrugation

## Type RS 341

## Annularly corrugated hoses, stainless steel

medium version, wide corrugation

## Type RS 341



### 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.

### 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

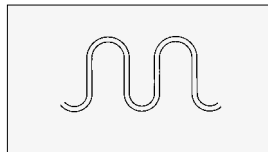
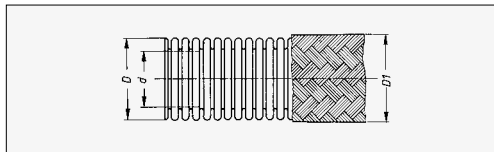
DN	Type	Inside diameter	Outside diameter	Permissible deviation	Minimum bending radius one bending process	Nominal bending radius frequent bending	Perm. static operating pressure at 20° C SF 3	Nominal pressure DIN EN ISO 10380 SF 4	Weight approx.
–	–	d	D, D1	d, D, D1	r <sub>min</sub>	r <sub>n</sub>	P <sub>zul</sub>	–	–
–	–	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

**Annularly corrugated hoses, stainless steel**      **Type RS 531 (DN 5 - 16)**  
 heavy version, normal corrugation      **Type RS 430 (from DN 20 - 300)**

**Annularly corrugated hoses, stainless steel**      **Typ RS 531**  
 heavy version, normal corrugation



**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.

**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

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 <sub>min</sub>	r <sub>n</sub>	P <sub>zul</sub>	–	–
–	–	mm	mm	mm	mm	mm	bar	PN	kg/m
5	RS531S00	5.3	10.2	±0.2	15	100	32	25	0.10
	RS531S12				25		250	200	0.16
	RS531S22				35		380	200	0.22
6	RS531S00	6.2	13.0	±0.2	15	110	50	50	0.12
	RS531S12				25		300	200	0.23
	RS531S22				40		400	250	0.33
8	RS531S00	8.0	16.1	±0.2	20	130	50	50	0.20
	RS531S12				32		250	200	0.35
	RS531S22				50		380	250	0.49
10	RS531S00	10.0	19.1	±0.3	25	150	35	25	0.29
	RS531S12				38		240	150	0.48
	RS531S22				60		300	200	0.66
12	RS531S00	12.1	21.9	±0.3	30	165	32	25	0.41
	RS531S12				45		185	100	0.62
	RS531S22				70		315	200	0.82
16	RS531S00	16.1	27.8	±0.3	40	195	20	20	0.55
	RS531S12				58		190	150	0.92
	RS531S22				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

# 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 <sub>min</sub>	r <sub>n</sub>	P <sub>zul</sub>	–	–
–	–	mm	mm	mm	mm	mm	bar	PN	kg/m
20	RS430S00	20.2	31.2	±0.3	45	285	8	6	0.54
	RS430S12				70		125	65	0.93
	RS430S22				70		165	100	1.32
25	RS430S00	25.2	36.2		50	325	6	6	0.65
	RS430S12				85		80	50	1.07
	RS430S22				85		135	100	1.49
32	RS430S00	33.7	45.0		60	380	4	4	0.77
	RS430S12				105		85	65	1.41
	RS430S22				105		100	65	2.05
40	RS430S00	40.0	55.0		±0.4	75	430	2.5	2.5
	RS430S12			130		50		40	2.09
	RS430S22			130		75		65	2.82
50	RS430S00	50.0	65.0	90		490	3	2.5	1.61
	RS430S12			160			65	50	2.91
	RS430S22			160			65	65	4.21
65	RS430S00	65.0	81.0	110		580	2	0.5	2.06
	RS430S12			200			40	25	3.46
	RS430S22			200			60	50	4.86
80	RS430S00	79.8	98.3	±0.5		135	800	1.5	0.5
	RS430S12				240	40		16	4.65
	RS430S22				240	60		25	6.48
100	RS430S00	99.8	117.8		160	1000	1.5	0.5	3.59
	RS430S12				290		35	10	5.97
	RS430S22				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

# 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 <sub>min</sub>	r <sub>n</sub>	P <sub>zul</sub>	–	–		
–	–	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						25	10	7.80		
	RS430S22						45	16	10.40		
150	RS430S00	151.9	177.4		± 1.4	400	800	0.2	-	4.97	
	RS430S12							10	6	8.10	
	RS430S42							15	10	8.37	
RS430S22	17	10	11.20								
	RS430S92	25	16			11.90					
	200	RS430S00	202.2			231.4	±1.6	520	1100	0.2	-
RS430S12		8								6	11.90
RS430S42		13		10						12.5	
RS430S22	15	10	15.90								
	RS430S92	16	16	16.50							
	RS430S52	16	16	17.3							
250	RS430S00	248.4	284.2	±1.6	620	1350		0.2	-	13.0	
	RS430S42							8	6	18.10	
	RS430S52							15	10	23.40	
300	RS430S00	298.6	335.8		±1.6	1000		1600	0.1	-	17.20
	RS430S42						5		4	23.10	
	RS430S52						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

## Annularly corrugated hoses of bronze

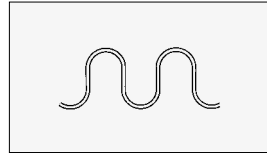
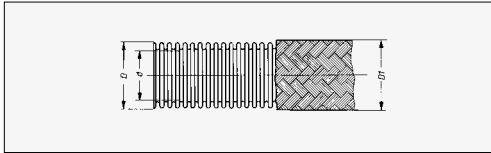
medium version, normal corrugation

## Type RZ 331

## Annularly corrugated hoses of bronze

medium version, normal corrugation

## Type RZ 331



### 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

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 <sub>min</sub>	r <sub>n</sub>	P <sub>zul</sub>	–
–	–	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	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	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