Overview

SONOKIT is a transit time based ultrasonic flowmeter for retrofitting on existing pipelines.

The kit includes all necessary parts and special tools to make the installation as one or two track flowmeter.

The set is made for installation on empty pipes or pipes under pressure without process shut-down (hot-tap).

Please contact Siemens for further information of hot-tap tools and instructions.

SONOKIT has transducers in the flow (wetted) which assures superior accuracy and performance compared to doppler and clamp on meters.

Benefits

- Cost-effective solution – contains all the necessary components for retrofitting
- SONOKIT is easy to install in pipeline sizes DN 200 to DN 4000 (8" to 160") 1-track DN 100 to DN 2400 (4" to 96") – without process shut-down or flow interruption
- No bypass installation necessary – withstands pressure up to 40 bar (580 psi) and media temperatures between -20 °C and +200 °C (-4 °F and +392 °F)
- High accuracy – the bigger the pipe, the more accurate the result
- Solid construction and no moving parts for a 100% maintenance and obstruction free flowmeter
- The SONOKIT comes with transducers in IP68 enclosure
- Available in a robust version that can be buried and withstands constant flooding
- Wetted transducers assure superior accuracy and performance compared to doppler and clamp-on flowmeters
- Automatic calculation of the calibration factor when pipe geometry data are entered in the signal transmitter

Application

- Raw water intake for water treatment plants
- Water distribution systems
- Irrigation systems
- Water power stations
- District heating plants
- Cooling water plants within the industry and in power stations
- Systems within the oil and refinery business
- Sewage treatment plants
- Plants transporting non-conductive liquids

Design

The SONOKIT set contains all necessary parts to build up an ultrasonic flowmeter on existing pipes depending on choices at ordering:

- papers to wrap around pipes for alignment of sensors
- transducer alignment tools
- mounting plates and SONO 3000 transmitter type according to ordering
- cables

Technical specifications

Accuracy

Typical, depending on accuracy of measurements of installation	≤ ± (0.5…1.5%)

Note:
Accuracy depends on the accuracy of the measurements taken at location. This means that inaccurate measurements of angles, distance between transducers, wall thickness and pipe diameter have a direct effect on the accuracy. Values measured are entered into the memory of the SONO 3000 transmitter.

Requirements for pipes

Requirements for pipes	
Size	DN 100 … DN 4000 (4" … 160")
Line pressure	max 40 bar (580 psi)
Liquid temperature	Standard version: -20 … +200 °C (-4 … +392 °F)
Enclosure	
• Standard version	IP68
• Ex version	EEx d IIC T3-T6, IP68 [1]
Materials	
• Terminal box	Standard version: PA 6.6, 100 °C (212 °F) AISI 316, 200 °C (392 °F)
• Transducer element	Standard version: AISI 316, 200 °C (392 °F)
Materials of existing pipeline	
• Steel	Transducer holder: EN 10273 or EN 10216 (P235GH)
	Mounting plates: EN 10273 or EN 10216 (P235GH)
• Concrete	Transducer holder: ASTM 316 or similar
	Mounting plates: (not included)
• Stainless steel	Transducer holder: ASTM 316 or similar
	Mounting plates: ASTM 316 or similar
Pipe wall thickness	
• Steel pipe (AISI 316 and St. 37.2 or corresponding material)	Transducer and holder available in length L = 160, allowing a pipe wall thickness up to 20 mm (0.79 inch)
• Concrete pipe	Transducer and holder available in length L = 230, allowing a pipe wall thickness up to 200 mm (7.9 inch)

1) ATEX in progress.

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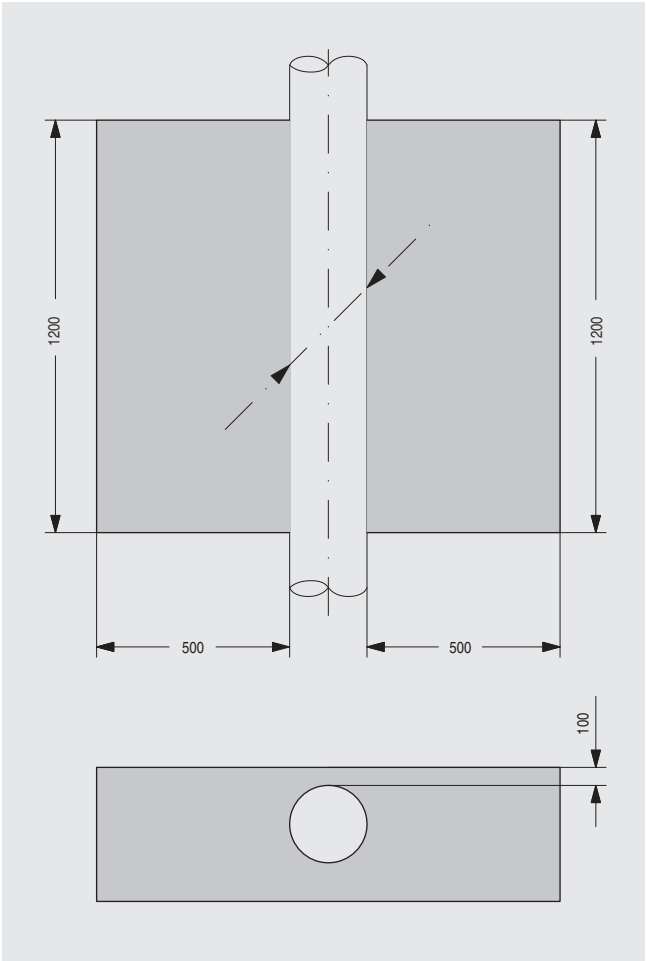
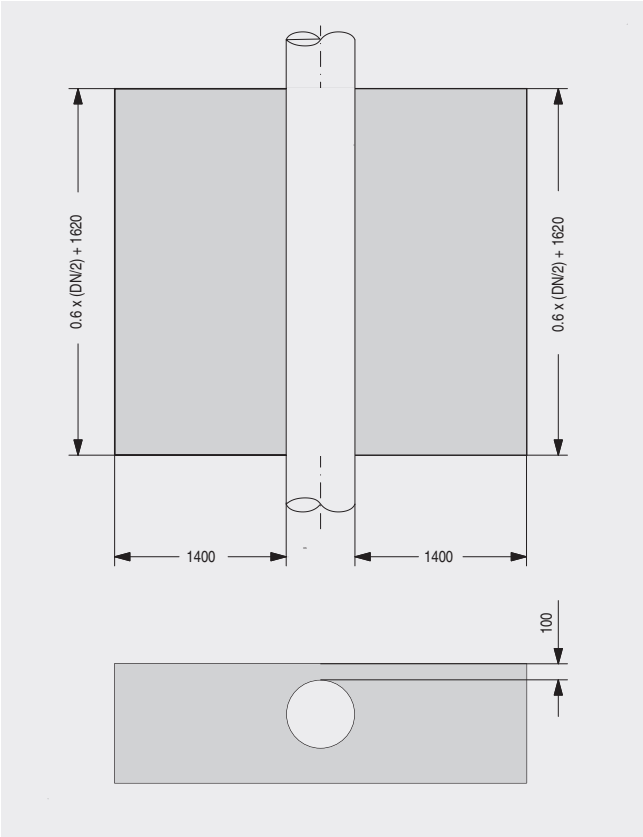
Installation requirements

The space requirements around the pipe for retrofitting a SONOFLO ultrasonic flowmeter type SONOKIT are given below:



Empty pipe installation



Hot-tap installation

Selection and Ordering data		Order-No. 7ME3210-
SITRANS F US Flowsensors SONOKIT 1-track		
Diameter	**Qn [m^3/h]**	
DN 100 / 4 inch	100	1P
DN 125 / 5 inch	150	1T
DN 150 / 6 inch	220	2B
DN 200 / 8 inch	380	2F
DN 250 / 10 inch	600	2K
DN 300 / 12 inch	850	2P
DN 350 / 14 inch	1,000	2T
DN 400 / 16 inch	1,300	3B
DN 450 / 18 inch	1,700	3F
DN 500 / 20 inch	2,200	3K
DN 550 / 22 inch	2,600	3P
DN 600 / 24 inch	3,200	3T
DN 650 / 26 inch	3,600	4B
DN 700 / 28 inch	4,200	4F
DN 750 / 30 inch	4,800	4K
DN 800 / 32 inch	5,500	4P
DN 900 / 36 inch	7,500	5B
DN 1000 / 40 inch	9,000	5K
DN 1100 / 44 inch	10,000	5P
DN 1200 / 48 inch	13,200	5T
DN 1300 / 52 inch	14,000	6A
DN 1400 / 56 inch	16,800	6C
DN 1500 / 60 inch	19,000	6E
DN 1600 / 64 inch	22,800	6G
DN 1700 / 68 inch	25,000	6J
DN 1800 / 72 inch	27,600	6L
DN 1900 / 76 inch	31,000	6N
DN 2000 / 80 inch	36,000	6Q
DN 2100 / 84 inch	37,000	6S
DN 2200 / 88 inch	42,000	6U
DN 2300 / 92 inch	45,000	6W
DN 2400 / 96 inch	51,000	7A
Installation method		
Empty pipe		-A
Hot tap, mounting under pressure		-B
Tapping band (to order separately)		-C
Transducer holder		
None (for tapping band)		-0
Carbon steel, length = 160 mm, mounting plates in carbon steel		-1
Stainless steel, length = 160 mm, mounting plates in stainless steel		-2
Stainless steel, length = 230 mm, for concrete pipe		-3
Transducer type and approval		
IP67 PA housing, PN 40, SS, O-ring, 100 °C, no approval		-1
IP68 SS housing, PN 40, SS, O-ring, 200 °C, EEx d IIC T3 ... T6, ATEX approval in progress		-2
IP68 PA housing, sylgar potting kit, PN 40, SS, O-ring, 100 °C, no approval		-3
IP68 SS housing, sylgar potting kit, PN 40, SS, O-ring, 200 °C, no approval		-4

Selection and Ordering data	Order-No. 7ME3210-
SITRANS F US Flowsensors SONOKIT 1-track	
Transmitter SONO 3000	
None	-A
IP67 PA, 115 ... 230 V AC, 1 current, 1 frequency/pulse, 1 relay, incl. wall mounting kit	-B
IP67 PA, 24 V AC/DC, 1 current, 1 frequency/pulse, 1 relay, incl. wall mounting kit	-C
IP00, 115/230 V AC, 3 current, 2 frequency/pulse, 2 relay	-D
IP00, 115/230 V AC, 1 current, 1 frequency/pulse, 1 relay	-E
IP00, 24 V AC/DC, 3 current, 2 frequency/pulse, 2 relay	-F
IP65 PA, 115/230 V AC, 3 current, 2 frequency/pulse, 2 relay, for wall mounting	-G
IP65 PA, 115/230 V AC, 1 current, 1 frequency/pulse, 1 relay, for wall mounting	-H
IP65 PA, 24 V AC/DC, 3 current, 2 frequency/pulse, 2 relay, for wall mounting	-J
IP65 EEx de (ia/ib) IIC T5...T6, 24 V AC/DC, 1 current, 1 frequency/pulse, 1 relay, no ATEX approval, for wall mounting	-M
Transducer coax cable	
No cable	-0
2x 15 meter, 70 °C	-1
2x 30 meter, 70 °C	-3
2x 60 meter, 70 °C	-4
2x 90 meter, 70 °C	-5
2x 120 meter, 70 °C	-6

Additional information	Order code
Please add „-Z“ to Order No. and specify Order code(s) and plain text.	
Material certificate	
EN 10204-3.1.B, transducer body material	**F30**
EN 10204-3.1.B, transducer holder material	**F31**
EN 10204-3.1.B, mounting plate material	**F32**
Tag name plate	
Stainless steel tag with 12 mm characters (max. 15 characters) (add plain text)	**Y17**
Self-adhesive plastic tag with 8 mm characters (max. 15 characters) (add plain text)	**Y18**

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Selection and Ordering data		Order-No.
SITRANS F US Flowsensors SONOKIT 2-track		**7ME3220-** ■■■■■-0■A■
Diameter	**Qn [m³/h]**	
DN 200 / 8 inch	380	2F
DN 250 / 10 inch	600	2K
DN 300 / 12 inch	850	2P
DN 350 / 14 inch	1,000	2T
DN 400 / 16 inch	1,300	3B
DN 450 / 18 inch	1,700	3F
DN 500 / 20 inch	2,200	3K
DN 550 / 22 inch	2,600	3P
DN 600 / 24 inch	3,200	3T
DN 650 / 26 inch	3,600	4B
DN 700 / 28 inch	4,200	4F
DN 750 / 30 inch	4,800	4K
DN 800 / 32 inch	5,500	4P
DN 900 / 36 inch	7,500	5B
DN 1000 / 40 inch	9,000	5K
DN 1100 / 44 inch	10,000	5P
DN 1200 / 48 inch	13,200	5T
DN 1300 / 52 inch	14,000	6A
DN 1400 / 56 inch	16,800	6C
DN 1500 / 60 inch	19,000	6E
DN 1600 / 64 inch	22,800	6G
DN 1700 / 68 inch	25,000	6J
DN 1800 / 72 inch	27,600	6L
DN 1900 / 76 inch	31,000	6N
DN 2000 / 80 inch	36,000	6Q
DN 2100 / 84 inch	37,000	6S
DN 2200 / 88 inch	42,000	6U
DN 2300 / 92 inch	45,000	6W
DN 2400 / 96 inch	51,000	7A
DN 2500 / 100 inch	53,000	7C
DN 2600 / 104 inch	60,000	7E
DN 2700 / 108 inch	62,000	7G
DN 2800 / 112 inch	72,000	7J
DN 2900 / 116 inch	71,000	7L
DN 3000 / 120 inch	78,000	7N
DN 3100 / 124 inch	82,000	7Q
DN 3200 / 128 inch	85,000	7S
DN 3300 / 132 inch	92,000	7U
DN 3400 / 136 inch	100,000	7W
DN 3500 / 140 inch	100,000	8A
DN 3600 / 144 inch	110,000	8C
DN 3700 / 148 inch	120,000	8E
DN 3800 / 152 inch	130,000	8G
DN 3900 / 156 inch	130,000	8J
DN 4000 / 160 inch	144,000	8L
Installation method		
Empty pipe		A
Hot tap, mounting under pressure		B
Tapping band (to order separately)		C
Transducer holder		
None (for tapping band)		0
Carbon steel, length = 160 mm, mounting plates in carbon steel		1
Stainless steel, length = 160 mm, mounting plates in stainless steel		2
Stainless steel, length = 230 mm, for concrete pipe		3

Selection and Ordering data	Order-No.
SITRANS F US Flowsensors SONOKIT 2-track	**7ME3220-** ■■■■■-0■A■
Transducer type and approval	
IP67 PA housing, PN 40, SS, O-ring, 100 °C, no approval	1
IP68 SS housing, PN 40, SS, O-ring, 200 °C, EEx d IIC T3 ... T6, ATEX approval in progress	2
IP68 PA housing, sylgar potting kit, PN 40, SS, O-ring, 100 °C, no approval	3
IP68 SS housing, sylgar potting kit, PN 40, SS, O-ring, 200 °C, no approval	4
Transmitter SONO 3000	
None	A
IP67 PA, 115/230 V AC, 1 current, 1 frequency/pulse, 1 relay, incl. wall mounting kit	B
IP67 PA, 24 V AC/DC, 1 current, 1 frequency/pulse, 1 relay, incl. wall mounting kit	C
IP00, 115/230 V AC, 3 current, 2 frequency/pulse, 2 relay	D
IP00, 115/230 V AC, 1 current, 1 frequency/pulse, 1 relay	E
IP00, 24 V AC/DC, 3 current, 2 frequency/pulse, 2 relay	F
IP65 PA, 115/230 V AC, 3 current, 2 frequency/pulse, 2 relay, for wall mounting	G
IP65 PA, 115/230 V AC, 1 current, 1 frequency/pulse, 1 relay, for wall mounting	H
IP65 PA, 24 V AC/DC, 3 current, 2 frequency/pulse, 2 relay, for wall mounting	J
IP65 EEx de (ia/ib) IIC T5...T6, 24 V AC/DC, 1 current, 1 frequency/pulse, 1 relay, no ATEX approval, for wall mounting	M
Transducer coax cable	
No cable	0
4x 15 meter, 70 °C	1
4x 30 meter, 70 °C	3
4x 60 meter, 70 °C	4
4x 90 meter, 70 °C	5
4x 120 meter, 70 °C	6

Additional information	Order code
Please add „-Z“ to Order No. and specify Order code(s) and plain text.	
Material certificate	
EN 10204-3.1.B, transducer body material	**F30**
EN 10204-3.1.B, transducer holder material	**F31**
EN 10204-3.1.B, mounting plate material	**F32**
Tag name plate	
Stainless steel tag with 12 mm characters (max. 15 characters) (add plain text)	**Y17**
Self-adhesive plastic tag with 8 mm characters (max. 15 characters) (add plain text)	**Y18**

Accessories/Spare parts

Transducers SONO 3200

(Transducer element without terminal housing, including insert)

Transducer type	Material	Gasket	Pressure rating	Temperature range [°C]	Length [mm]	Order No.	Symbol
O-ring	316 SS	O-ring	PN 40	-20 … +200	90	**FDK:085L1101**	
O-ring	316 SS	O-ring	PN 40	-20 … +200	160	**FDK:085B1406**	
O-ring	316 SS	O-ring	PN 40	-20 … +200	230	**FDK:085B1407**	

Transducer insert

Temperature range [°C]	Length [mm]	Order No.	Symbol
-20 … +200	90	**FDK:085B1100**	
-20 … +200	160	**FDK:085B1419**	
-20 … +200	230	**FDK:085B1420**	

Terminal housing

Type	Order No.	Symbol
• Material: PA 6.6, Temperature range: -20…+100 °C	**FDK:085B1403**	
• Material: ASTM 316, Temperature range: -20…+200 °C	**FDK:085B1402**	
Gaskets for O-ring transducer PN 40, Material: 70 FFKM, Temperature range: -20…+200°C	**FDK:085B1089**	

Accessories for SONOFLO ultrasonic flowmeter

Submersible kit

Type/description	Order No.	Symbol
Submersible kit, IP68, 10 m w.g. rating	**FDK:085L2403**	

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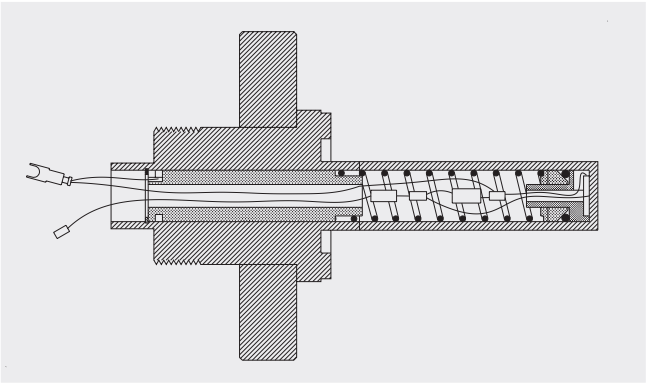
Transducer SONO 3200

Transducers are available in two versions: Flange type or O-ring type.

Transducers are constructed in three parts:

- Terminal housing
- Transducer element
- Tranducer insert

Transducer element flange version



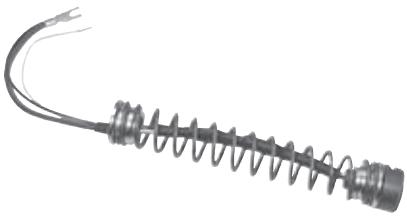
Terminal box, transducer element and insert are identical in both versions.

The ultrasonic pulse is produced by sound energy being transmitted, via the window, to/from the liquid. The sound source is a piezoelelectric crystal in the insert.

The insert, consisting of a spring and piezo crystal, can be removed from the transducer element during operation. No draining is necessary as the transducer element remains in the pipe.

When exchanging the transducer insert, everything must be kept extremely clean to avoid dirt between crystal and window.

Transducer insert



Cables

Type/description	Order No.	Symbol
Standard 75 Ω coax cable, T_{max} = 100 °C		
• 15 m	**FDK:085B1373**	
• 30 m	**FDK:085B1374**	
• 60 m	**FDK:085B1375**	
• 100 m	**FDK:085B1376**	
Teflon 75 Ω coax cable, T_{max} = 200 °C		
• 5 m	**FDK:085B1378**	
• 15 m	**FDK:085B1379**	

Transducer holder

Type/description	Order No.
1-track	
• 230 mm for concrete pipe 60°, DN 600 … DN 4000	**FDK:085L1656**
• 160 mm stainless steel 60°, DN 300 … DN 4000	**FDK:085L1105**
• 160 mm carbon steel 60°, DN 300 … DN 4000	**FDK:085L1104**
2-track	
• 230 mm for concrete pipe 60°, DN 600 … DN 4000	**FDK:085L1111**
• 160 mm stainless steel 60°, DN 300 … DN 4000	**FDK:085L1109**
• 160 mm carbon steel 60°, DN 300 … DN 4000	**FDK:085L1108**

The part which is welded onto the pipe is either stainless steel or carbon steel.

Mounting plate

Type/description	Order No.
1-track	
• 160 mm, stainless steel, 60°, DN 300 … DN 4000	**FDK:085L1115**
• 160 mm, carbon steel, 60°, DN 300 … DN 4000	**FDK:085L1114**
2-track	
• 160 mm, stainless steel, 60°, DN 300 … DN 4000	**FDK:085L1119**
• 160 mm, carbon steel, 60°, DN 300 … DN 4000	**FDK:085L1118**

The mounting plates are either completely in stainless steel or carbon steel.

Tools

Type/description	Order No.	Symbol
Extraction tool for replacement of SONO 3200 O-ring transducer under pressure (hot tap)		
Length of transducer		
• 50 mm	**FDK:085B5331**	
• 160 mm	**FDK:085B5333**	
• 230 mm	**FDK:085B5335**	
Angle measurement tool	**FDK:085B5330**	
Hot-tap drilling tool	**FDK:085B5392**	
Alignment tool	**FDK:085B5393**	

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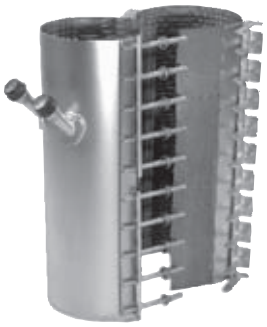
Tapping band

Overview



SONOKIT tapping band is made specially for SONOKIT one or two track in order to be mounted outside on existing pipelines.

SONOKIT tapping bands are particularly designed to be mounted on non-weldable pipes, casted pipes, plastic pipes or concrete.

Retrofitting of tapping band can be done on pressure raised and empty pipes

Design

SONOKIT tapping bands are made of stainless steel AISI 316 .

A complete tapping band for SONOKIT contains, depending on size, 2–8 segments, sealing material, bolts and pre-mounted transducer holders

Ordering

Tapping band for SONOKIT is ordered according to circumference of pipe and wall thickness. SONOKIT tapping band is not available ex stock.

Available standard tapping bands for 1 or 2 tracks

Nominal Diameter	PN	Pipe circumference	Internal Diameter	Wall Thickness	No. of Segments	Min. circumference	Max. circumference
200	16	660	180.0	15	2	659.7	730.4
225	16	730	202.5	15	2	730.4	801.1
250	16	800	225.0	15	2	801.1	871.8
275	16	872	247.5	15	2	871.8	989.6
300	16	990	285.0	15	2	989.6	1064.2
325	16	1065	308.8	15	2	1064.2	1138.8
350	16	1140	332.5	15	2	1138.8	1213.4
375	16	1213	356.3	15	2	1213.4	1319.5
400	16	1320	380.0	20	2	1319.5	1394.1
425	16	1394	403.8	20	2	1394.1	1468.7
450	16	1468	427.5	20	2	1468.7	1543.3
475	16	1543	451.3	20	2	1543.3	1617.9
500	16	1618	475.0	20	4	1617.9	1767.1
550	16	1767	522.5	20	4	1767.1	1947.8
600	16	1948	570.0	25	4	1947.8	2097.0
650	16	2097	617.5	25	4	2097.0	2246.2
700	16	2246	665.0	25	4	2246.2	2395.5
750	16	2395	712.5	25	4	2395.5	2544.7
800	16	2545	760.0	25	4	2544.7	2693.9
850	16	2694	807.5	25	4	2693.9	2945.2
900	16	2945	877.5	30	6	2945.2	3251.5
1000	10	3252	975.0	30	6	3251.5	3557.9
1100	10	3558	1072.5	30	6	3557.9	3864.2
1200	10	3864	1170.0	30	8	3864.2	4170.5
1300	10	4170	1267.5	30	8	4170.5	4476.8
1400	10	4477	1365.0	30	8	4476.8	4861.6
1500	10	4862	1477.5	35	8	4861.6	5171.1
1600	10	5171	1576.0	35	8	5171.1	5480.5
1700	10	5481	1674.5	35	8	5480.5	5790.0
1800	10	5790	1773.0	35	8	5790.0	6099.4
1900	10	6099	1871.5	35	8	6099.4	6408.8
2000	10	6409	1970.0	35	8	6408.8	6718.3

For further information regarding installation methods and special installation without pressure shut-down (Hot-tapping) please see product manuals for SONOKIT or call the Siemens sales office.