







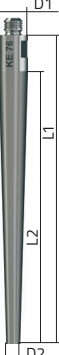

**Titanium probes**

The titanium probes transfer the ultrasonic oscillations from the ultrasonic converter/horn into the medium to be sonicated. Depending on the shape of the probe and the amplitude setting of the generator, different amplitudes are produced at the probe tip. The power density is determined by the probe radiation surface and can reach very high values with small tip diameters.

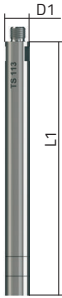
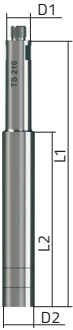
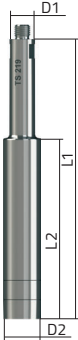
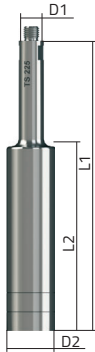
The probes are tuned to the corresponding operating frequency. The lengths given may deviate slightly due to material tolerances in the titanium alloy.

Description	TS 102	MS 72	TS 103	MS 73
Code No.	3740	492	3741	529
Figure				
Length L1 [mm]	157	195	147	179
Length L2 [mm]	81	100	80	87
Diameter D1 [mm]	13	13	13	13
Diameter D2 [mm]	2	2	3	3
Torque [Nm]	25	25	25	25
Volumes [ml]	HD 4050 / 5050 UW 50 / UW 5050: 0,5-20  HD 4100 / 5100 SH 100 G: 2-25	HD 2070.2 / 3100 SH 70 G: 1-25  HD 2200.2 / 3200 SH 213 G: 2-30	HD 4050 / 5050 / 4200 UW 50 / UW 5050: 1-25  HD 4100 / 5100 SH 100 G: 3-50  HD 4200 / 5200 SH 200 G: 5-90	HD 2070.2 / 3100 SH 70 G: 2-50  HD 2200.2 / 3200 SH 213 G: 5-90
Immersion mark	no	no	no	no
Spanner width	SW 10			
Material	TiAl6V4 (3.7165)			

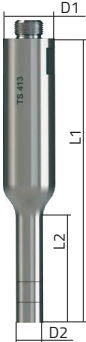
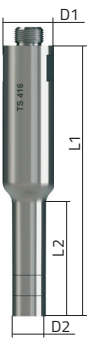
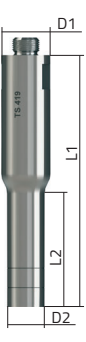
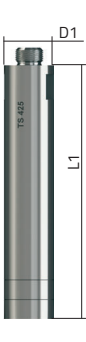
Titanium probes

Description	TS 104	TS 106	KE 76	TS 109
Code No.	3742	3743	530	3744
Figure				
Length L1 [mm]	133	128	137	118
Length L2 [mm]	73	76	121	73
Diameter D1 [mm]	13	13	13	13
Diameter D2 [mm]	4.5	6	6	9
Torque [Nm]	25	25	25	25
Volumes [ml]	HD 4050 / 4100 UW 50 / UW 5050: 3-50  HD 4100 / 5100 SH 100 G: 5-75  HD 4200 / 5200 SH 200 G: 5-100	HD 4050 / 5050 UW 50 / UW 5050: 5-75  HD 4100 / 5100 SH 100 G: 10-100  HD 4200 / 5200 SH 200 G: 10-350	HD 2070.2 / 3100 SH 70 G: 5-100  HD 2200.2 / 3200 SH 213 G: 10-350	HD 4050 / 5050 UW 50 / UW 5050: 10-100  HD 4100 / 5100 SH 100 G: 15-150  HD 4200 / 5200 SH 200 G: 10-500
Immersion mark	no	no	no	yes
Spanner width	SW 10			
Material	TiAl6V4 (3.7165)			

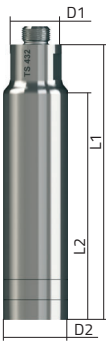
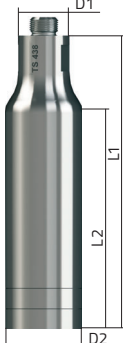
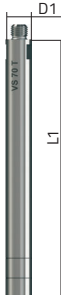
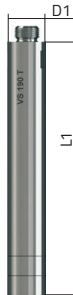
**Titanium probes**

Description	TS 113	TS 216	TS 219	TS 225
Code No.	3745	3746	3747	3748
Figure				
Length L1 [mm]	130	137	145	153
Length L2 [mm]	–	90	93	100
Diameter D1 [mm]	13	13	13	13
Diameter D2 [mm]	–	16	19	25
Torque [Nm]	25	25	25	25
Volumes [ml]	HD 4100 / 5100 SH 100 G: 20-200  HD 4200 / 5200 SH 200 G: 20-900	HD 4200 / 5200 SH 200 G: 25-900	HD 4200 / 5200 SH 200 G: 25-900	HD 4200 / 5200 SH 200 G: 30-1000
Immersion mark	yes	yes	yes	yes
Spanner width	SW 10			
Material	TiAl6V4 (3.7165)			


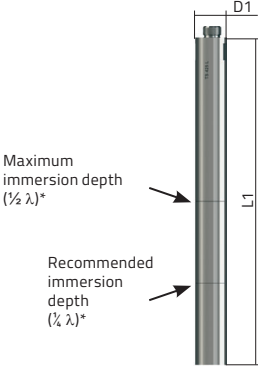
**Titanium probes**

Description	TS 413	TS 416	TS 419	TS 425
Code No.	3752	3753	3754	3755
Figure				
Length L1 [mm]	138	132	129	130
Length L2 [mm]	52	55	58	–
Diameter D1 [mm]	25	25	25	25
Diameter D2 [mm]	13	16	19	–
Torque [Nm]	50	50	50	50
Volumes [ml]	HD 4400 SH 400 G: 100-750	HD 4400 SH 400 G: 250-1000	HD 4400 SH 400 G: 250-1500	HD 4400 SH 400 G: 500-2000
Immersion mark	yes	yes	yes	yes
Spanner width	SW 22			
Material	TiAl6V4 (3.7165)			

**Titanium probes**

Description	TS 432	TS 438	VS 70 T	VS 190 T
Code No.	3756	3757	494	3638
Figure				
Length L1 [mm]	136	144	130	129
Length L2 [mm]	112	106	–	–
Diameter D1 [mm]	25	25	13	19
Diameter D2 [mm]	32	38	–	–
Torque [Nm]	50	50	25	50
Volumes [ml]	HD 4400 SH 400 G: 500-2500	HD 4400 SH 400 G: 500-3000	HD 2070.2 / 3100 SH 70 G: 10-200  HD 2200.2 / 3200 SH 213 G: 20-900	HD 2200.2 HD 3200 / 3400 SH 219 G / SH 3419: 25-900
Immersion mark	yes	yes	yes	yes
Spanner width	SW 22		SW 10	SW 17
Material	TiAl6V4 (3.7165)			

**Titanium probes**

Description	VS 200 T	TS 425 L
Code No.	478	3759
Figure		
Length L1 [mm]	130	254
Length L2 [mm]	–	–
Diameter D1 [mm]	25	25
Diameter D2 [mm]	–	–
Torque [Nm]	50	50
Volumes [ml]	HD 2200.2 HD 3200 / 3400 SH 225 G / SH 3425: 30-1000	HD 4400 SH 400 G: 500-3000
Immersion mark	yes	yes
Spanner width	SW 22	
Material	TiAl6V4 (3.7165)	

\* The length of the probe conforms to a wavelength  $\lambda$ , adapted to material TiAl6V4 at 20 kHz.  
For proper operation, immersion depths of 15 mm down to the bottom marking ( $\frac{1}{4} \lambda$ ) are recommended.  
The immersion depth should not exceed the maximum marking of  $\frac{1}{2} \lambda$ , as the power consumption increases together with the immersion depth. If the ultrasound generator's output limit is exceeded, this can result in a reduced amplitude.

## Titanium probes

### Mounting

In order to mount the probe to the respective standard / booster horn, the appropriate spanner and the prescribed torque (when using a torque wrench) are to be used. Detailed instructions on correct mounting can be found in the accompanying SONOPULS instructions for use.

### Notes

- In order to attain optimal operation and a long life span, the mating surfaces of the standard / booster horn, the probe extension and the probe or titanium flat tip must be clean and free of damage.
- A separate standard horn may not be mounted onto ultrasonic converter UW 50. The probes are fastened directly onto the UW 50.