

Profound – Sonic Integrity Testing



SIT
SIT⁺
SIT^{pro}

Profound SIT-series

(SIT.20100/..200/..300)

With a model of the *SIT*-series you can accurately and efficiently verify the integrity of foundation piles after installation. Using a *SIT*-model enables you to check the pile length and to detect irregularities and/ or cracks in the pile shaft.

The *SIT*-models are robust, fully digital, easily portable and user-friendly. One person can test numerous piles per hour. The built-in Lithium battery allows for up to 8 hours testing (*SIT⁺* and *SIT^{pro}*).

The measurement is performed by hitting the pile head with a hand-held hammer, instrumented or not, and measuring the response on the head with the sensitive and lightweight *SIT*-accelerometer. The *SIT* presents the measurement signal directly on screen, enabling a direct check of the quality of the measurement.

If approved the measurement signals are stored in the memory of the *SIT* system together with relevant information such as, wave velocity, pile number, date, time, amplification factor and filter length.

Due to the enhanced features of the *SIT*-acceleration sensor including very low noise level, you are able to detect even smaller defects in piles. Afterwards you download the measurement results to a Windows computer via USB for further analysis.

Technical specifications *SIT*-series

Housing	Robust hard anodized aluminium case
Protection rating	IP65 according to DIN 40 050/IEC 529 (for housing and connectors)
Temperature range (operating)	- 20 °C to + 60 °C
Display	Type: TFT- LCD Size: 5.7" (diagonal) Resolution: 640 x 480 pixels (RGB colour)
Battery pack	Integrated Lithium ion battery pack
Clock stability	Within 5 minutes/year at 25 °C
Storage capacity	1 GB
Data retention	10 years at 25 °C
AD-converter	48.6 kHz, 24 bits conversion
International standards	ASTM D5882-07, CUR-Aanbeveling 109:2013, EA Pfähle April 2007, AFNOR NF P 94-160-2 1993, NF P 94-160-4 1994*
I/O functionality	Acceleration sensor, mini-USB, battery charger and Instrumented Hammer*
System weight	2.3 kg
System dimensions (L x W x H)	248 mm x 164 mm x 38 mm
Extra	Permanent connection check during operation
PC software program	Download and presentation software package, with basic analysis functionality.
PC operating system	WIN 7.0/Vista/Windows XP
* Instrumented Hammer <i>SIT⁺</i> / <i>SIT^{pro}</i>	



P.O. Box 469
 2740 AL Waddinxveen
 The Netherlands

Tel. +31 (0)182 640 964
 info@profound.nl
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Profound SIT-series (SIT.20100/..200/..300): detailed features overview		SIT	SIT ⁺	SIT ^{pro}
Case	Robust hardened aluminium weatherproof case IP65 rating according DIN 40 050/IEC 529	•	•	•
Battery pack	Lithium ion battery pack (4 hrs of operation)	•		
	Extended battery pack (8 hrs of operation)		•	•
Temperature range	- 20 °C to + 70 °C	•	•	•
Processor	Basic Graphical Processor	•		
	High Quality Graphical Processor		•	•
Display	Type : TFT – LCD			
	Size : 5.7"(diagonal)	•	•	•
	Resolution : 640 x 480 pixels (RGB colour)			
Data management	Storage capacity 1 GB	•	•	•
	Pulse width measurement	•	•	•
	Single pile average	•	•	•
	Group pile average		• ¹⁾	• ¹⁾
	Data validation functionality			•
	Instrumented hammer		○	○
	Mobility analysis**		• ¹⁾	• ¹⁾
Read-out functionality	Profile analysis/Impedance graph**			• ¹⁾
	Single user	•		
I/O functionality	Multiple users/Network license		•	•
	Acceleration sensor	•	•	•
	Instrumented hammer**		•	•
	USB-connection	•	•	•
AD-converter	Charge	•	•	•
International standards	48.6 kHz, 24-bits data conversion	•	•	•
	ASTM D5882-07	•	•	•
	CUR-Aanbeveling 109:2013	•	•	•
	Empfehlungen des Arbeitskreises "Pfähle" EA-Pfähle April 2007	•	•	•
	AFNOR NF P 94-160-2, 1993	•	•	•
PQC (Project Quality Control) Built in GPS	AFNOR NF P 94-160-4, 1994		• ^{**}	• ^{**}
	Date and time stamps per measurement			•
PC read out software	Site location (GPS coordinates)*			•
	Pile location indicator*			•
PC analysis software	Download and presentation pc software package	•	•	•
	Network database server		•	•
	Velocity analysis	•	• ¹⁾	• ¹⁾
PC analysis software	Mobility analysis**		• ¹⁾	• ¹⁾
	Profile analysis - built-in basic version SITWAVE interpretation analysis tool			• ¹⁾

* Depending on the availability and quality of GPS signal

** In combination with optional instrumented hammer

○ Optional accessory for SIT⁺/SIT^{pro}

¹⁾ Fully implemented in SIT software version 8.X



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S/I-accelerometer

Profound S/I-accelerometer (SIT.20800)

The Profound accelerometer for the S/I-series has been custom-designed for high-performance sonic integrity testing of installed foundation piles.

Advanced design

The advanced design of the accelerometer in combination with the carefully selected components resulted in an ergonomic, lightweight and high-end sensitive accelerometer with high linearity and repeatability. The lightweight sensor registers exceptionally well the response to the hammer blow.

Due to this combination users can perform measurements efficiently, as the high-quality sensor can be placed fast and very accurately on the pile head. Thus the system generates high-quality reflectograms, providing users with accurate information about the pile shaft and possible defects.

Digital ID

The S/I-accelerometer has an electronic datasheet, which also includes the serial number. Therefore, the source of measurement data can always be traced.

High-performance

The S/I-accelerometer in combination with the S/I system* provides high signal stability and extremely low noise level. Thus capable to detect even smaller defect in piles.

Technical specifications S/I-accelerometer

Acceleration range, linear**	± 500 m/s ²
Acceleration sensor type	Delta shear with thermal isolation
Nominal sensitivity	10 mV/g
Resonance frequency	32 kHz
Cable	Highly flexible and reinforced spiral cable with length 1 – 2.5m
Dimensions	OD = Ø 25 mm x H = 75 mm
Material	Fibre reinforced synthetics
TEDS	Electronic ID, according to IEEE std. 1451.4
Temperature range (operating)	- 20 °C to + 60 °C
Protection rating	IP65 according to DIN 40 050/IEC 529
Total sensor weight (incl. cable)	60 g (140 g)
Connectors	High quality waterproof IP66 (when connected to the S/I system)
Extra	Permanent connection check during operation

** In compliance with ASTM D5882-07

* More information about the Profound S/I-range can be found in the technical specifications of the S/I-series.



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SIT^{PRO} with instrumented hammer.

SIT-instrumented hammer

Profound SIT-instrumented hammer (SIT.20700)

The Profound SIT-instrumented hammer for the SIT-series has been designed for high-performance force analysis in the frequency domain. The integrated accelerometer measures the force applied to the pile as based on the principle of Newton's 2nd Law.

In addition to the time domain analysis of a pile integrity test, the force measurement allows a more thorough evaluation of the integrity of piles, providing additional information about the hammer blow and investigation of defects near the pile top.

Advanced design

The advanced design of the instrumented hammer in combination with the carefully selected components resulted in an ergonomic hammer equipped with a high-end sensitive accelerometer with high linearity and repeatability. This accelerometer registers exceptionally well the applied force with the hammer.

Digital ID

The SIT-instrumented hammer has an electronic datasheet including the serial number. This is stored with the measurement data, so the sensor can always be traced.

High-performance

The SIT-instrumented hammer in combination with the SIT-series* provides high signal stability and extremely low noise level.

Technical specifications SIT-instrumented hammer

Range	± 32 kN
Acceleration sensor type	LIVM high shock
Acceleration range	5000 g
Nominal sensitivity	1 mV/g
Cable	Highly flexible and reinforced spiral cable with length 1 – 2.5 m
Dimensions hammer head	OD = Ø 48 mm x H = 120 mm
Material	Hard anodized aluminium body, replaceable nylon hammer cap, hickory handle
TEDS	Electronic ID, according to IEEE std. 1451.4
Temperature range (operating)	- 20 °C to + 60 °C
Protection rating	IP65 according to DIN 40 050/IEC 529
Total weight instrumented hammer (excl. cable)	654 g
Total length	325 mm
Connectors	High quality LEMO IP66 (when connected to hammer and system)
International standards	ASTM D5882-07, CUR-Aanbeveling 109:2013, EA Pfähle 2012, AFNOR NF P94-160-2 1993, NF P94-160-4 1994
Extra	Continuous connection check
	SIT system version 7.95 or higher

* More information about the Profound SIT models can be found in the technical specifications of the SIT-series.



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