

Völkel Compaction Sensor

Measuring soil bearing capacity in MN/m²

Based on physical principles the Völkel Compaction Sensor for soil and asphalt compaction calculates an absolute value of the load bearing capacity E_{VT} [MN/m²] during the roller's passes. Compared with other methods it features several advantages:

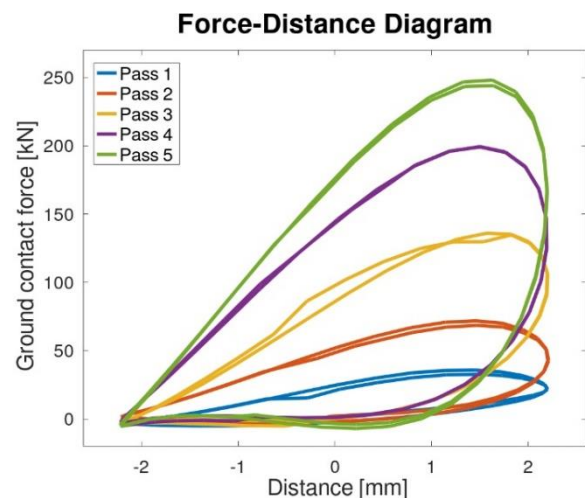


- **Machine-independent:** The E_{VT} -value takes the geometry and forces between drum and soil into account. The result is a measurement which is independent from the roller type and its weight.
- **Driving direction:** The comparable value for moving forward and backward allows to work on site without turning manoeuvres.
- **Amplitude-independent:** The E_{VT} -value is stable even with variable amplitude. Therefore the E_{VT} -value can be used on rollers with an adjustable amplitude.
- **Robust value:** The E_{VT} -value is applicable for weak, cohesive soils (e.g. clay) as well as for hard rock-fills or asphalt. It is stable even during the double-jump operation.
- **Additional values:** Additionally to the soil bearing capacity the sensor permanently supplies the double-jump value, frequency and amplitude.

By calculating the amplitude, vibration path and ground contact force the sensor determines the compaction- and deformation energy and establishes a soil relation. Like the static or dynamic plate bearing test the method utilizes the gain of compression.

The Völkel Compaction Sensor consists of acceleration sensor as well as evaluation unit which enables a precise measurement. The sensor sends 10 measurements per second via CANopen. Operating with 3km/h a measurement grid of 10cm is possible. Decentralized data processing makes it easier to use more than one sensor per machine.

For calculating the load bearing capacity, some parameters of the roller are taken into account. That includes the relationship between the frequency, amplitude and centrifugal force, as well as the load weight (line load), the drum width and its diameter. If these are not parameterized, the sensor supports the calculation of the CMV value as fall-back solution.



Technical data:

Sensor	MEMS 3-axle acceleration sensor
Signaller	RGB diagnostic housing LED
Interface	CANopen (Max Baud rate: 1Mbit/s) Permanent connected cable, 5m, Ø13,4mm, 5 pole M12 connector (Pin-assignment 1: NC, 2: U _B , 3: Ground, 4: CAN High, 5: CAN Low)
Power supply	U _B = 8..32V, polarity protection
Power input	35mA @ 12V
Degree of protection	IP67, IP69K (DIN EN 60529)
Temperature range	-40..85°C (housing temperature)
EMC	Directive 2014/30/EU, UN/ECE-R10 Road vehicles: ISO 10605, ISO 7637-1, ISO 7637-2, ISO 7637-3 Construction machines: DIN EN ISO 13766-1 Agricultural & forestry machines: DIN EN ISO 14982 Industrial use: DIN EN 61000-6-2, DIN EN 61000-6-4
Mechanical strength, climatic resistance	Vibrations: DIN EN 60068-2-6 Shocks: DIN EN 60068-2-27 Bump: DIN EN 60068-2-27 Rough handling shocks: DIN EN 60068-2-31 Cold: DIN EN 60068-2-1 Dry heat: DIN EN 60068-2-2 Change of temperature: DIN EN 60068-2-14 Damp heat: DIN EN 60068-2-30
Weight	approx. 0,75kg
Housing dimensions	