COMPACTION

COMPACTION TECHNOLOGY

AMMANN TECHNOLOGY PORTFOLIO

AMMANN

INTELLIGENT COMPACTION GETS EVEN SMARTER

Precise, transparent and verifiable compaction processes increasingly are required on construction sites. Ammann took the first steps toward providing these processes in 1998 with the advent of Ammann Compaction Expert (ACE), an automated compaction measurement and control system. ACE has been continually improved since its introduction and remains the industry leader.

ACE^{pro}

which provides absolute compaction measurement, automatic control and ADS (Ammann Documentation System)

ACE^{pro+}

which provides absolute compaction measurement, automatic control, ADS and can utilise GPS products to provide mapping and operator guidance while measuring compaction

ACE^{force}

which provides absolute compaction measurement and ADS

ACE^{force+}

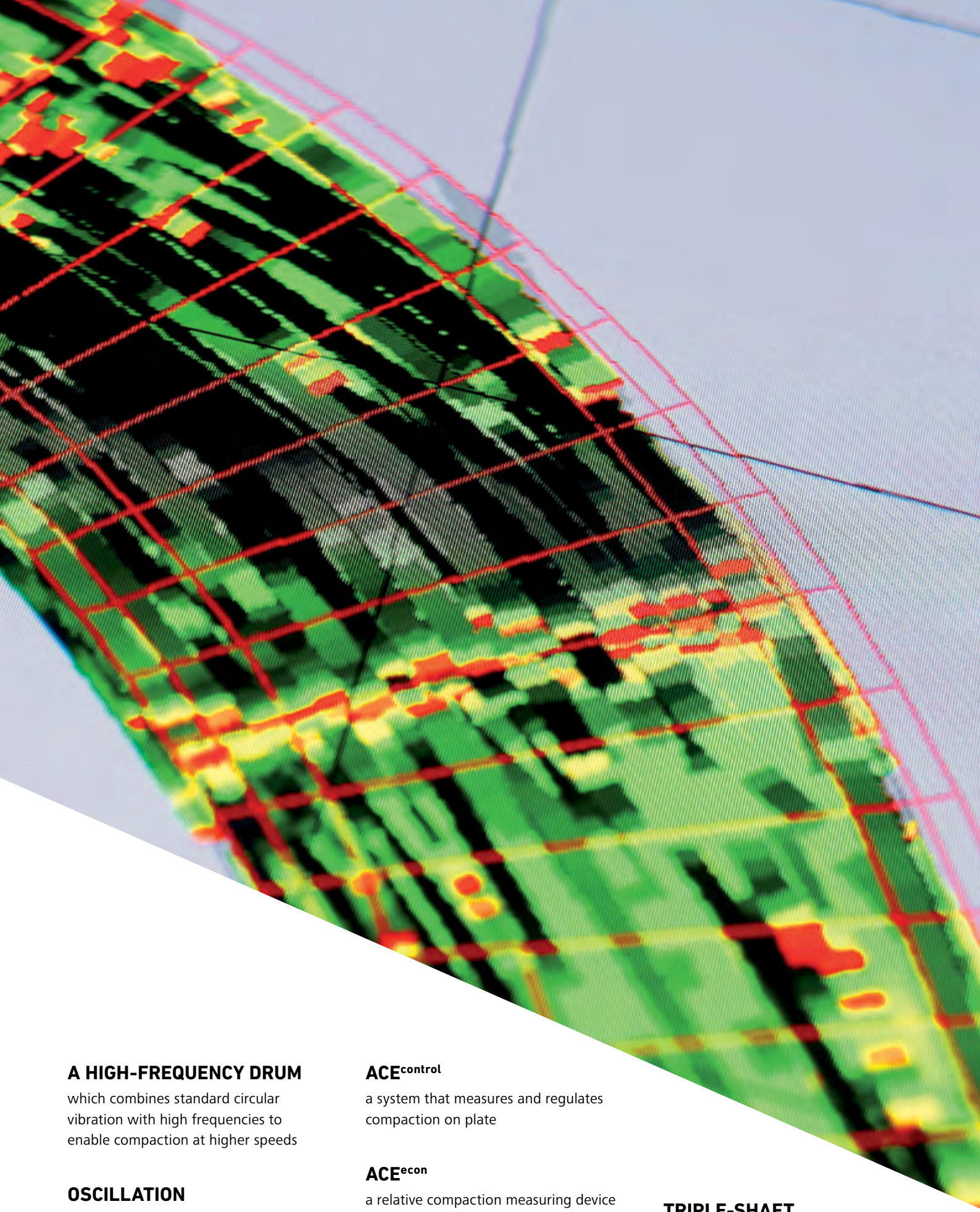
which provides absolute compaction measurement, ADS and can utilise GPS products to provide mapping and operator guidance while measuring compaction

ADS (AMMANN DOCUMENTATION SYSTEM)

which records and evaluates all relevant compaction process data

ACI^{eco} (AMMANN COMPACTION INDICATOR)

which measures relative compaction value and compaction progresses with every pass



A HIGH-FREQUENCY DRUM

which combines standard circular vibration with high frequencies to enable compaction at higher speeds

OSCILLATION

a dynamic compaction method that uses less force but delivers both vertical and horizontal energy, essentially massaging the aggregates into place

ACE^{control}

a system that measures and regulates compaction on plate

ACE^{econ}

a relative compaction measuring device for use with vibratory plates

TRIPLE-SHAFT EXCITER SYSTEM

for Ammann Vibratory plates

HEAVY MACHINES

ELIMINATING PASSES AND THE COSTS THAT GO WITH THEM

Heavy soil and asphalt compactors have become high-technology machines. That technology works quietly behind the scenes. Ammann technology is intuitive and user-friendly, and many operators would be surprised at how often they are utilising it.

	FULL CCC* SYSTEM (MEASUREMENT & DOCUMENTATION)	SEMI CCC (MEASUREMENT)	ABSOLUTE MEASUREMENT	RELATIVE MEASUREMENT
AMMANN	√	√	√	√

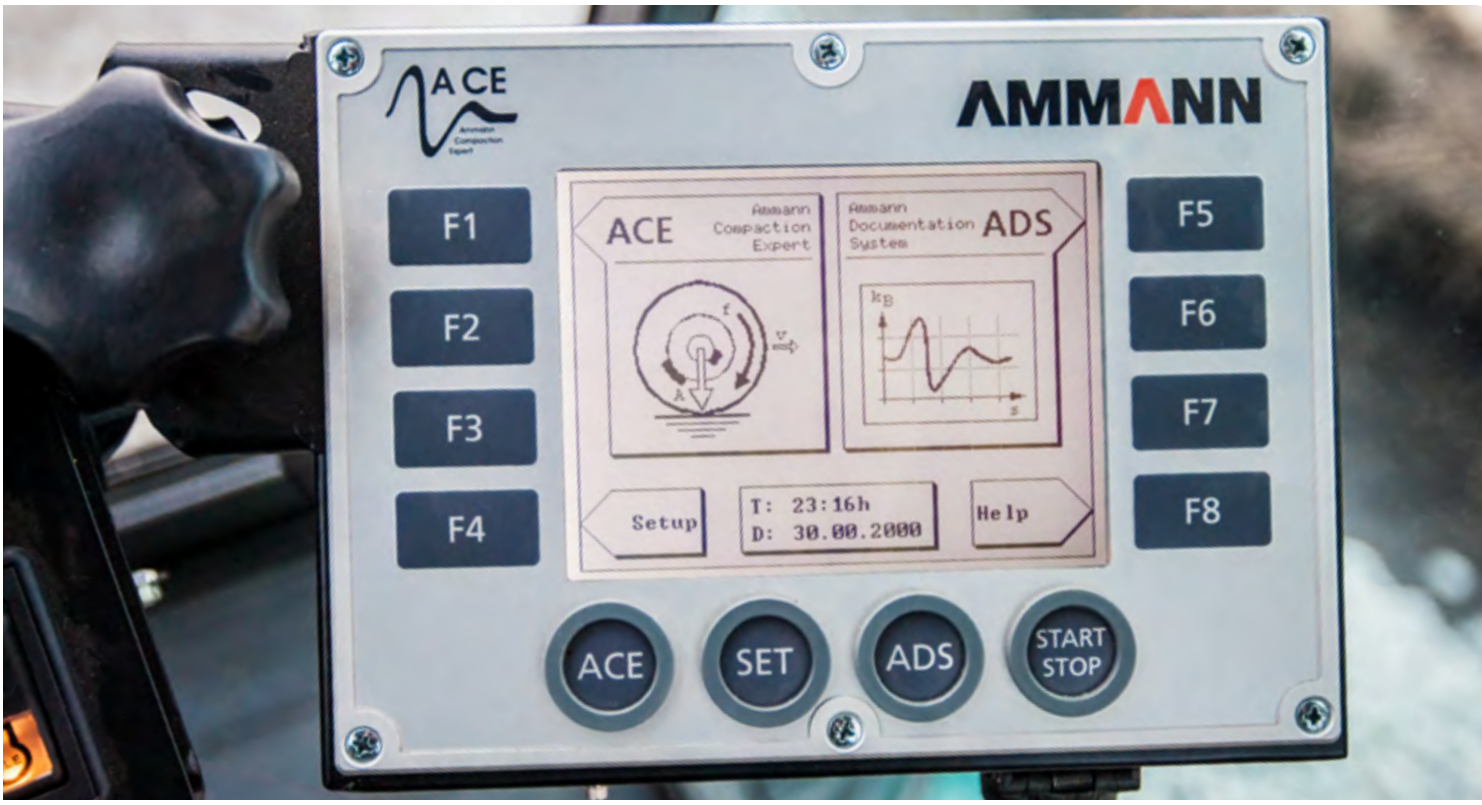
* Continuous Compaction Control

	ACE^{pro}	ACE^{pro+}	ACE^{force}	ACE^{force+}	ADS
SOIL COMPACTORS	√	√	√	√	√
RIGID FRAME TANDEM ROLLERS	√	√	√	√	√
ARTICULATED TANDEM ROLLERS	–	–	√	√	√

	GPS MAPPING	ACI^{eco}	HIGH FREQUENCY DRUM	OSCILLATION
SOIL COMPACTORS	√	√	–	–
RIGID FRAME TANDEM ROLLERS	√	–	–	–
ARTICULATED TANDEM ROLLERS	√	–	√	√

ACE FOR HEAVY MACHINES

FULLY AUTOMATIC CONTINUOUS COMPACTION CONTROL SYSTEM
UNLIMITED SETTING OF AMPLITUDE AND FREQUENCY (ACE^{pro})
SIMPLE SETTING OF REQUESTED COMPACTION TARGETS
HIGHEST PRODUCTIVITY DUE TO HAVING ALWAYS OPTIMAL SETTING
ULTIMATE DOCUMENTATION SYSTEM IN COMBINATION WITH GPS SYSTEMS



THE TIME FOR INTELLIGENT COMPACTION

The highly demanding situation in the construction industry has increased the need for precise, transparent and verifiable results of the compaction process. The terms for bidding and tendering in road construction are getting stricter, as are the standards for quality results.

The technologies of intelligent compaction, support the road contractor to achieve the requested efficiency, quality and documented results on their jobs.

Ammann became a trendsetter in the development of intelligent compaction systems since 1998 when it launched the first generation of the Ammann Compaction Expert (ACE), an automatized compaction measurement and control system.

The operation of ACE is managed via one simple structured display which provides a clear and easy to understand dialog to lead the operator through all aspects of achieving the optimum results in the most efficient way.

The operator is guided through the menu as on a simple cash-machine which helps to eliminate mistakes in operation and guarantees satisfying compaction results.

In operation mode the display focuses on the most relevant information and leads the operator by indicating the optimal rolling speed.

All relevant compaction data are displayed and can be printed at any time.

The printer can be operated and adjusted through the menu on the display.

ACE FOR SOIL COMPACTION

The measurement of the bearing capacity and ground stiffness is compareable with the Plate bearing Test and correlates with kB values. For the different material layers that are built in during the road construction process these values can be directly pre-dialed as target values in the ACE system.

ACE FOR ASPHALT COMPACTION

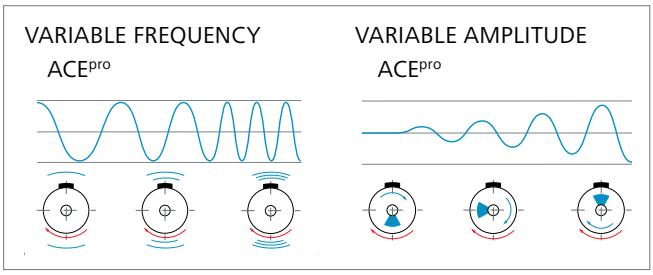
The basic measurement and control structure of the ACE system in asphalt mode is equal to the functionality for soil compaction. For the asphalt application the control of the asphalt temperature is also integrated into the ACE^{pro} and ACE^{force}.

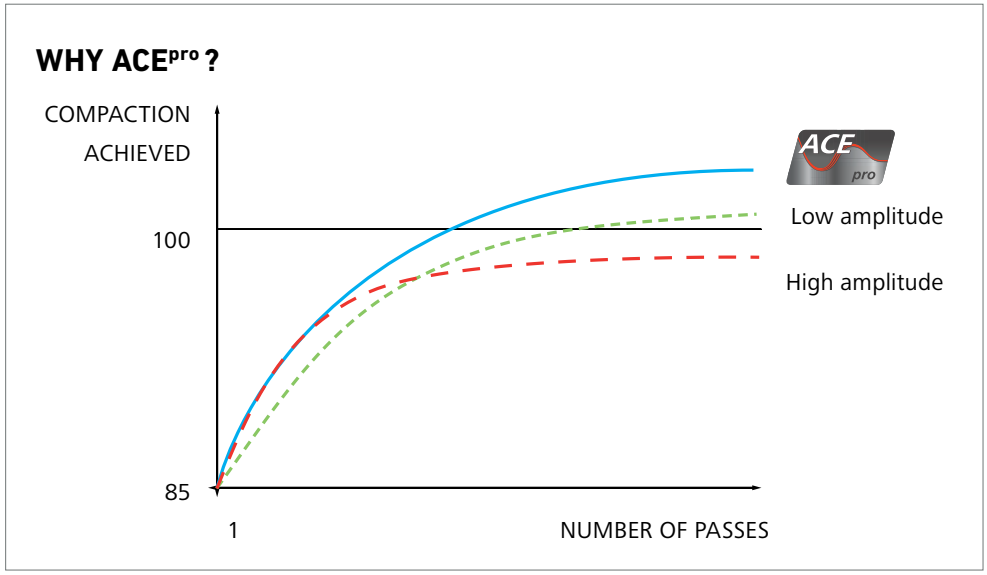
ACE^{pro}

- For use with soil compactors and heavy asphalt rollers
- Provides compaction measurement, automatic control and a documentation system
- Precisely measures and evaluates material stiffness in absolute values
- Continuously adjusts frequency and amplitude depending on compaction measurements
- Delivers the highest compaction efficiency by sending optimal force into the ground
- Eliminates drum jumping and therefore minimises the risk of over-compaction or material destruction
- Includes ADS documentation software with office analysing feature
- Compatible with all major manufacturers' GPS products to provide mapping and operator guidance

ACE^{force}

- For use with soil compactors and heavy asphalt rollers
- Provides measurement and documentation
- Precisely measures and evaluates material stiffness in absolute values
- Shows compaction progress through operator guiding function
- Includes ADS documentation software with office analysing feature
- Compatible with all major manufacturers' GPS products to provide mapping and operator guidance
- Eliminates drum jumping and therefore minimises the risk of over-compaction or material destruction
- Includes ADS documentation software with office analysing feature





ADS (AMMANN DOCUMENTATION SYSTEM)

- Designed for recording and evaluating all relevant compaction process data
- Available for all machines equipped with ACE^{pro} or ACE^{force}
- Recorded data can be printed or exported to evaluation software

The ADS Ammann Documentation System is designed for recording individual roller passes. It meets the international norms for Continuous Compaction Control (CCC).

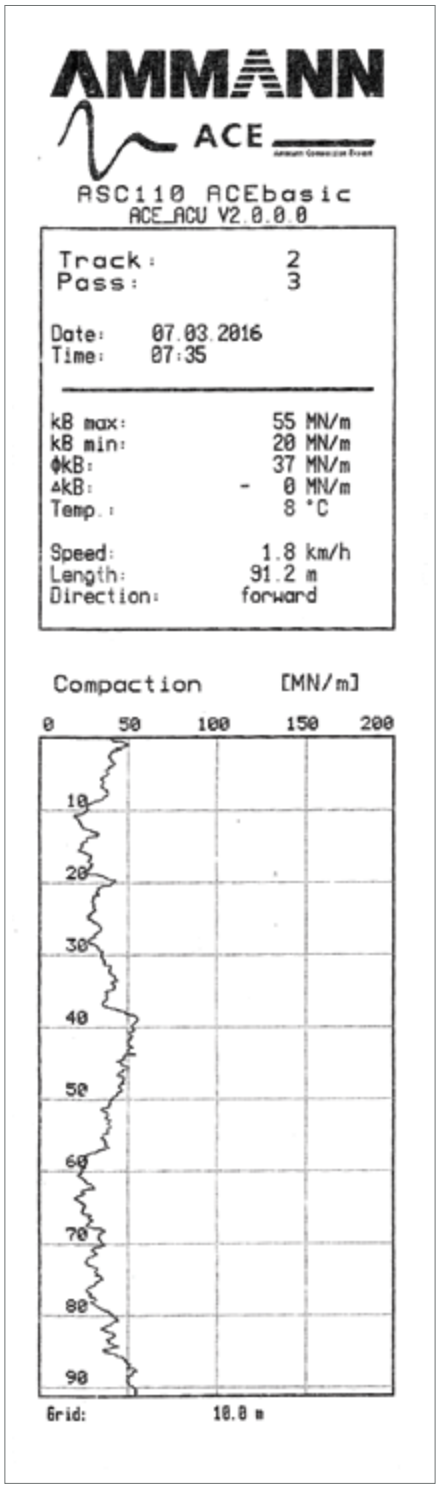
The system is installed on all Ammann tandem and single drum rollers which are already equipped with ACE^{pro} or ACE^{force} systems.

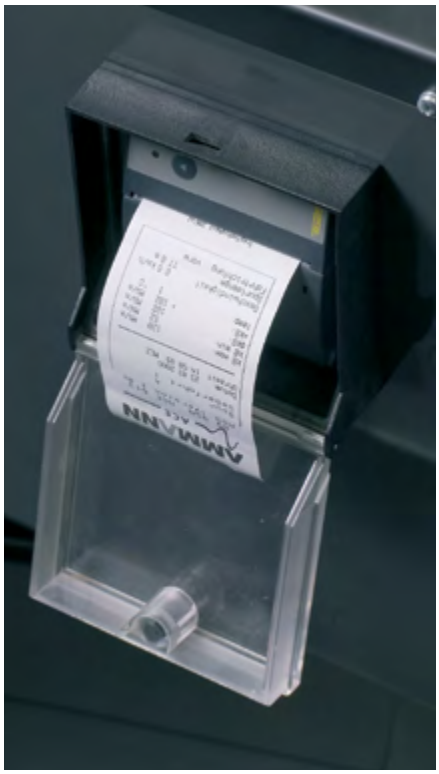
The operation of the optional printer is controlled by the standard ACE display.

The data logger (memory) is integrated in the ACE display. The data are directly print out on the printer which is weatherproof integrated in the operating panel. All data can be exported on any normal USB memory stick and imported on any PC with the ADS software installed.

Each individual roller pass shows the achieved material stiffness (kB value), temperature, roller speed, effective amplitude and frequency and refers to date and time of the compaction.

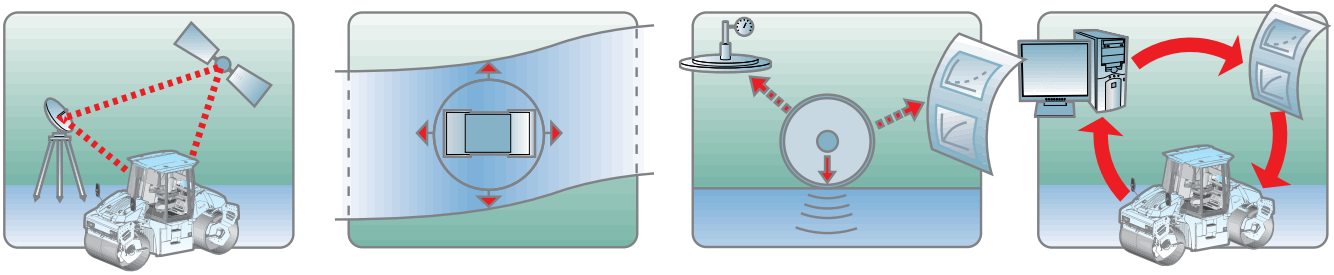
The analyzing software mode that is included in the ADS, supports the evaluation of the compaction results.

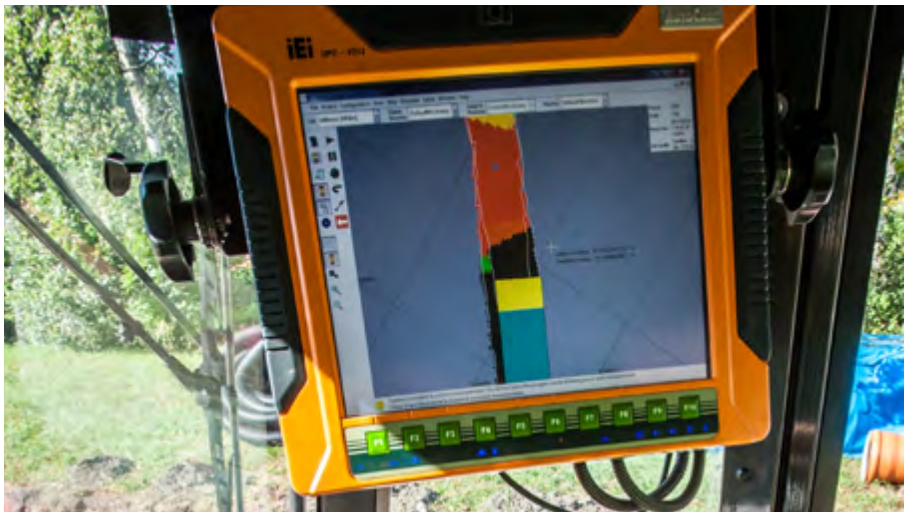




THE FOLLOWING DATA ARE STORED AND PRINTED

- Load bearing capacity (kB value) in MN/m
- Range of kB values (min. and max.)
- Length of roller passes
- Number of roller passes and track
- Roller speed
- Temperature
- Effective amplitude
- Effective frequency
- Date and time





GPS-BASED COMPACTION (ACE^{pro+} AND ACE^{force+})

- Combines ACE measurement and control with a navigation system
- Provides an efficient analysis and documentation system for Continuous Compaction Control (CCC)
- Operated and controlled with touch screen
- Satellite navigation system accurately assigns the measured compaction values to the position coordinates and the time
- Graphic display of measurement data relays the on-site compaction work and enables a fast and reliable performance analysis
- Integrates quality control measures in the work process
- Other compaction parameters can be measured and documented including kB value stiffness (ground bearing capacity), trend of kB values, temperature, vibration status, roller speed, effective amplitude and frequency, pass count, exact geographical position, date and time of passes

2 GPS DISPLAY VARIANTS

ACE +GPS pro

ACE +GPS force

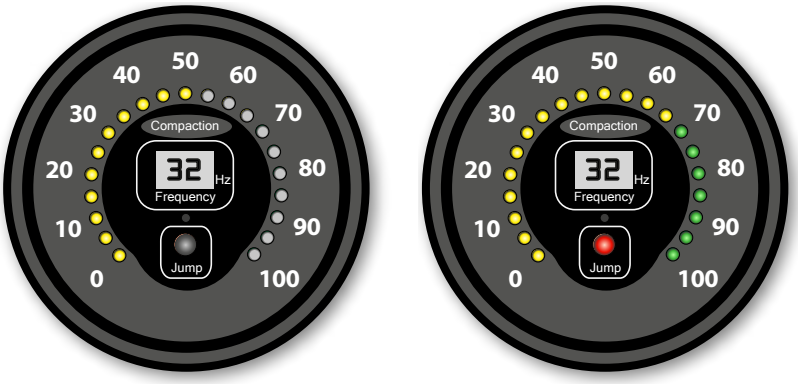
ACI^{eco} (AMMANN COMPACTION INDICATOR) FOR HEAVY MACHINES

MEASURING RELATIVE COMPACTION VALUE
AND COMPACTION PROGRESS WITH EVERY PASS

ACI^{eco}

Measures and identifies compaction increase and provides the information if the maximum compaction is achieved

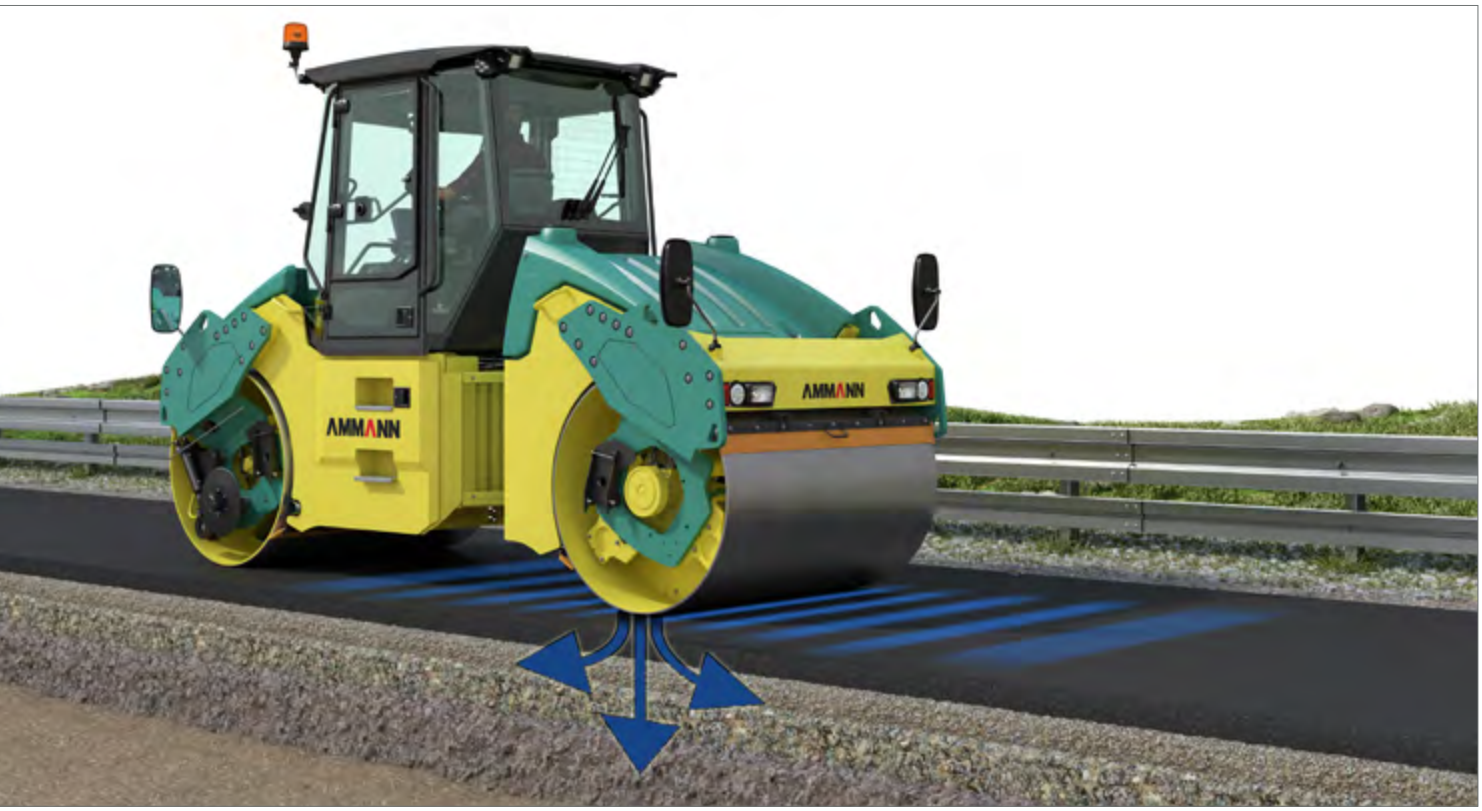
- measures relative compaction value, meaning compaction increase between two passes
- indicates frequency and double-jump mode

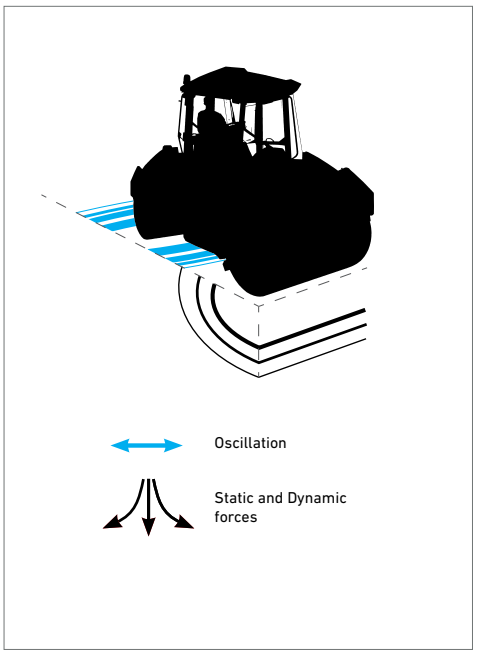


- **COMPACTION DEGREE LED INDICATION**
- **FREQUENCY INDICATION (HZ)**
- **DOUBLE–JUMP WARNING**

OSCILLATION – HEAVY MACHINES

CONSTANT CONTACT THROUGHOUT COMPACTION
VERTICAL AND HORIZONTAL ENERGY
FOR SENSITIVE JOBSITES
FOR MATS THAT ARE TOO HOT OR COLD
SEALS JOINTS





OSCILLATION

- Motion enables the drums to maintain constant contact throughout compaction
- Uses less force but delivers both vertical and horizontal energy, essentially massaging the aggregates into place
- Excels on sensitive jobsites, such as bridges or when working over sewers or utility lines
- Can work on mats that are too hot or cold for traditional compaction methods
- Seals joints without damaging cold mats

OSCILLATION

HOW WOULD YOUR BUSINESS BENEFIT FROM OSCILLATION?

SENSITIVE SETTINGS

Because oscillation does more massaging than it does pounding, it is often the method of choice on sensitive jobsites such as bridges, or when working over sewers or utility lines.

HIGH TEMPERATURES

Oscillating rollers can work on hot mats. This widens the compaction window for crews and helps them quickly get to work on thin lifts, such as those placed on bridges.

COOL TEMPERATURES

The "softer" approach of oscillation prevents damage to cooler mats.

JOINT WORK

Rollers with oscillation are great fits for sealing cold joints. The drum simultaneously can work on the hot and cold mats, so it delivers the best of both worlds. The massaging approach prevents damage to the cold mat but applies enough energy to compact the hot materials – and seal the joint, too.

PRODUCTION

Oscillation doesn't pound like a vibratory roller, but it ultimately delivers more force into the mat because it uses both vertical and horizontal energy. That increased force means quicker compaction and fewer passes. The constant contact with the surface helps too.

OPERATOR FRIENDLY

Rollers with oscillation automatically adjust to compaction needs, removing some of the burden from operators. The longer compaction window also gives operators a margin of error as they keep pace with the paver and other rollers.

SMOOTHNESS

Vibrating drums can leave "chatter" behind; oscillating rollers do not.

COST SAVINGS

Reducing the number of passes saves on labor, machine wear and fuel. It also helps keeps jobs on track – and customers happy.

> **"WHAT IS OSCILLATION? Oscillation is a dynamic compaction method that has significant advantages over traditional vibratory compaction."**

LIGHT COMPACTORS

BIG GAINS FOR SMALLER MACHINES

Vibratory plate compactors are often put to work on smaller jobsites. But the efficiencies that can be gained on the smaller sites can have a significant impact on the owner and operator of the plates.

ACE^{econ}

- For use with vibratory plates
- Relative compaction measuring device
- Continuous information about compaction levels
- Evaluates when maximum compaction has been reached

ACE^{force}/ACE^{control}

- For use with light tandem rollers (ACE^{force}) and vibratory plates (ACE^{control})
- Provides measurement
- Precisely measures and evaluates material stiffness

TRIPLE-SHAFT EXCITER SYSTEM

The compaction energy generated by the 3 exciter shafts is detected by sensors on the base plate, which transfer the measuring data and the relative positions of the exciters to the control unit. This control system inclusive display is vibration-isolated mounted and clearly visible to the user on the handle. It controls all operations based on a patented design and ensures that the machine continuously operates at maximum efficiency.

	ACE^control	ACE^eco	TRIPLE-SHAFT EXCITER SYSTEM
VIBRATORY PLATES	√	√	√

ACE – display on operator handle

Hydraulic Stop mode (Emergency Stop)

Manual mode

Automatic mode

Measurement mode

MANUAL MODE

When this option is selected, information relating to the achieved degree of compaction in the soil is continuously shown graphically on the easily readable display, which has an automatic brightness regulating feature during operation. This enables the operator to adapt the mode of operation to the achieved degree of compaction and avoid unnecessary compaction passes and possible over-compaction.

AUTOMATIC MODE

When this option is selected, the machine automatically reduces the compaction performance preventing reliably harmful loosening in the upper soil layers. This option therefore also allows less experienced operators to achieve an optimal compaction result. As in the manual mode, graphic information on the degree of compaction is continuously displayed, enabling the operator to respond accordingly.

MEASUREMENT MODE

Measurement mode allows compaction measurement at any point on site. When the proportional display shows that sufficient compaction is achieved, the actual kB value can be determined by the machine via measurement. For this purpose, selection of the measurement menu is necessary the machine then signals via the display whether measurement can be effected. After a short time, the soil rigidity is displayed as a numerical value in MN/m.

For additional product information
and services please visit:
www.ammann-group.com