



# Falling Weight Deflectometers



**PRIMAX** *innovation through excellence.*

## Bearing capacity of pavements

It is important to check the quality of the pavements bearing capacity either if it is for roads, ports or airports. Does it match the design value and the load it is exposed to. If not the pavement will fail or suffer an accelerated deterioration. The consequences can be severe and costly over time and safety will be reduced. Knowledge of your pavements structural condition is important to observe in order to prevent the pavement of failing.



## What benefits will you receive?

### Low maintenance & service costs by use of

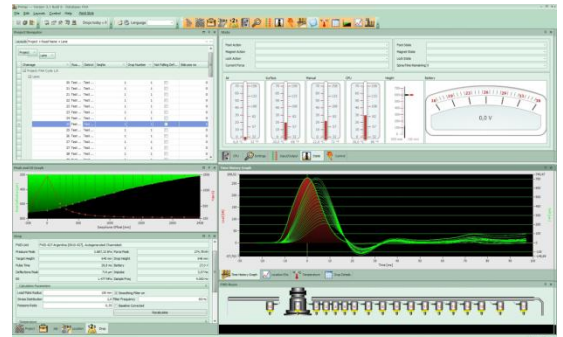
- Innovative technology like magnetic lock system.
- International CE marked standard components.
- Remote control via internet for onsite service support.

### Innovative, advanced and unique in every way with

- Modular based testing equipment system.  
Get upgraded on site from FWD to HWD or SHWD at any time.
- Recalculation of the data when changing parameters.
- All raw data is stored in a 10GB SQL database.
- Real time play back of signals and time history curves.
- On-line support integrated in the data collection software.
- Up to 18 sensors with simultaneous sampling.
- High speed magnetic lock system.

### Quality product and service

- Quality certified company with ISO 9001, 14001 and OHSAS
- 2 years full warranty guaranteed.



**BUREAU  
VERITAS**

**Move Forward with Confidence**



IMPORTADORA  
**SCHILLER**<sup>Cia.  
Ltda.</sup>  
[www.schiller.com.ec](http://www.schiller.com.ec)

#### **SENSORS:**

- ➔ **PRIMAX 1500 (Trailer-mounted FWD)**
- ➔ **PRIMAX 1500 (Van-integrated FWD)**

#### **Contents:**

- Prices**
- Basis of Quotation and Costing**
- List of Accessories**
- General Sales and delivery specifications**
- FWD/HWD/SHWD Specifications**
- ISO 9001-2008 Certificate**
- Warranty Certificate**

We hope the above will be in accordance with your requirements and look forward to hearing from you. If you need further details, please do not hesitate to contact us.

Best regards,

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## **PRIMAX 1500** **(Trailer-mounted)**

- **PRIMAX 1500 FWD**
- Double-axle trailer
- 2.5 m geophone beam
- Automated transport locks
- White colour (RAL9010)
- Hardcover for protection
- Warning lights (flash type)
- Recording equipment (24 volts) with 10 sensors and 1 load cell
- Special load cell and mass system (max load 150 kN)
- 3 automatic temperature sensors integrated in software (air, surface, asphalt)
- DMI integrated in software
- Data collection program (field program in Windows environment)
- Time-history on all 10 geophones and load cell
- PC computer (Windows XP included)
- Manuals in English (2 set)
- 24 months warranty on FWD parts, 6 months warranty on PC



### ***Sensor/geophone options:***

**PRIMAX 1500 with 14 sensors**

**PRIMAX 1500 with 18 sensors**

## **PRIMAX 1500** **(Van-integrated)**

- **PRIMAX 1500 FWD**
- 2.5 m geophone beam
- Automated transport locks
- White colour (RAL9010)
- Hardcover for protection
- Recording equipment (24 volts) with 10 sensors and 1 load
- 3 automatic temperature sensors integrated in software (air, surface, asphalt)
- DMI integrated in software
- Data collection program (field program in Windows environment)
- Time-history on all 10 geophones and load cell
- PC computer (Windows XP included)
- Manuals in English (2 set)
- 24 months warranty on FWD parts, 6 months warranty on PC
- VW Turbo Diesel (TDI) 102 HP, power steering



### ***Sensor/geophone options:***

**PRIMAX 1500 with 14 sensors**

**PRIMAX 1500 with 18 sensors**

### **Types of vans available:**

- Turbo Diesel (TDI) 140 HP and power steering
- #Turbo Diesel (TDI) 102 HP and power steering

### **Accessories for VW Transporters:**

- Air conditioner
  - Automatic gearbox
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## Spare Parts

- Spare parts for two years consumption

Item no.	Quantity	Description
1	3	Geophone covers (yellow plastic cover only)
2	3	Geophone cable
3	1	Kit of 4 relays
4	4	Control switches (non-contact)
5	1	Kit of various bulbs
6	1	Motor relay
7	1	Power relay
8	1	Adjustable wrench
9	1	Spray can for TriFlow
10	1	Set of rubber for load plate foot
11	1	Set of geophone spikes for geophones 1-8
12	1	Geophone spike for centre geophone
13	1	Ratchet wrench (part of a set)
14	1	Extension (part of a set)
15	1	Temperature probe for manual
16	1	Kit of various fuses
17	1	2 litres of hydraulic oil for FWD
18	1	Geophone beam cable
19	1	Set of Allen keys
20	1	Special Burndy plug tool
21	1	17 mm fork wrench for control switches
22	1	Tool box
23	1	Petrol can
24	2	Burndy geophone plug (male)
25	2	Burndy geophone plug (female)
26	1	3-pin plug for hydraulic valve
27	1	Warning light

## Installation & Basic Training

- Installation, instruction in operation & maintenance of the FWD
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NO.	LIST OF ACCESSORIES FOR FWD/HWD PRIMAX	QTY.	
	DESCRIPTION OF ITEMS		
1	Automatic spray marking equipment (to mark each point measured).	1	
2	450 mm circular load plate.	1	
3	T-beam (rear extension bar) for measurements behind and next to loading points on concrete slabs.	1	
4	Extra geophone	1	
5	Relative calibration verification equipment (stacking tower) for checking of whether the sensors have drifted from initial settings.	1	
6	12/220 Volt Power Inverter (for power supply to the computer and printer in the towing vehicle).	1	
7	Generator unit 24V DC, 35 Amp mounted on trailer for vehicle independent powering.	1	
8	12/24Volt unit powered by the towing vehicle, portable for use with different towing vehicles or permanently installed on the trailer FWD.	1	
9	Beam with flash lights to be mounted on towing vehicle.	1	
10	Video camera and monitor (black/white) to be mounted on trailer for accurate location over concrete slab joints etc.	1	
11	Printer	1	
12	Automated IR pavement surface temperature transmitter	1	
13	RoSy Design Roads <b>or</b> Airport software incl. 3 day training course – 2 licenses incl.	1	
14	RoSy Design Roads <b>and</b> Airport software incl. 3 day training course – 2 licenses incl.	1	
15	Extra extended training courses on site: Operation, maintenance and calibration of the FWD/HWD (3 days). Extended training will take place in continuation of "Installation & Basic Training"	1	
16	On-site service after the first 12 months	1	
17	GPS integrated with the PRIMAX data collection software (Antenna and Software)	1	
18	Computer table installed in VW Transporter	1	
19	Highway safety/signboard package	1	
20	Highway safety/signboard package	1	
21	PRIMAX Pavement/Road Image System (one camera)	1	
22	PRIMAX Pavement/Road Image System (two camera)	1	
23	Track Guide system (stand alone) for Tracks (Overlaps and skips can be avoided) Incl. one EGNOS GPS antennae...	1	
	if DGPS signal is needed a Local subscription and/or DGPS antennae might be needed (extra cost). This varies from country to country and region to region.		

## General Sales and delivery specifications:

1	<b>Computer And Printer</b>	Computer is supplied with the FWD system. Grontmij reserves the right to any changes in specifications in order to ensure that the computer and/or printer comply with FWD system requirements. Any customer requirements or accessories to computers will be offered separately. Any computers purchased for the FWD system shall be delivered in connection with commissioning and training. On computers and supplied by Grontmij, a warranty of 6 months is granted, which will come into force as of acceptance date after handing over of equipment.
2	<b>Software</b>	Data collection software is always installed on the computer supplied with the FWD equipment. A security backup CD ROM with the data collection software is supplied as well. The RoSy Design software is supplied with a hasp key. This software is an accessory for analysis of collected data. In case of design software supplies the software will be installed on the computer supplied with the FWD if required. The software is under all conditions supplied on a CD ROM.
3	<b>Accessories</b>	Accessories are optional and not part of the standard FWD system. Accessories can be selected and ordered as a part of an order.
4	<b>Manuals</b>	PRIMAX FWD/HWD/SHWD equipment is supplied with one manual in English. The RoSy Design software is delivered with one manual in English. The English version of user manuals is the only authorised version. Any other translations are not valid and Grontmij A/S cannot be held responsible for the contents of such manuals.
5	<b>Installation and training</b>	A basic three-day training course in operation and maintenance of the equipment is offered, which will train the user in how to operate and maintain the equipment. Requirements to persons to operate the FWD, accessories and software programs: Persons appointed to be operators of the FWD equipment and persons to work with RoSy Design and to interpret and analyse data collected, shall be capable of acquiring, receiving and understanding a standard training program so that these persons will be capable of operating the equipment after having received training. It is entirely the responsibility of the client to see to it that employees that he selects for this training are able to acquiring, receiving and understanding a standard training program.
6	<b>Warranty on PRIMAX FWD equipment</b>	On FWD equipment supplied by Grontmij a warranty of 24 months is granted. Grontmij neither warrants any parts, computers or other instruments that are not supplied by Grontmij nor covers any malfunctions of computers not approved by Grontmij on which Grontmij's software has been installed. Grontmij issues a warranty certificate to the customer, which is delivered together with the equipment. A warranty certificate shall only be valid with signature and Grontmij stamp and issuance date.
7	<b>SHRP/ CROW</b>	Grontmij guarantees that PRIMAX FWD/HWD/SHWD versions comply with both SHRP and CROW specifications. Grontmij guarantees that PRIMAX FWD/HWD/SHWD versions comply with the EU Machine and EMC Directives. Equipment is supplied with a certificate issued by Grontmij.
8	<b>Grontmij support</b>	Grontmij recommends that FWD/HWD/SHWD equipment be calibrated minimum every 12 months. A system is always delivered calibrated. During the first 24 months from delivery of the FWD system, the system will be supported according to the warranty conditions.
9	<b>Insurance</b>	The Grontmij product and liability insurance does not cover any damage resulting from misuse or careless handling of the equipment, use of the equipment by unskilled persons or persons, who have not had a basic training course, any manipulation with the system's safety precautions, if a user lets an unauthorised workshop maintain or repair the equipment, freight damage that causes errors on the equipment, except from the transportation from factory to customer in case of a CIF or CIP delivery (Incoterms 2010). If the client discovers any damage on the equipment which has been caused during transport, the client is obliged to report this to the shipping company before receiving the goods and he shall not accept the delivery without having reported this and received a receipt that the shipping company is aware of the damage and he is to report this to Grontmij A/S immediately.
10	<b>Fatal errors on equipment and software</b>	If Grontmij discovers hardware or software parts with fatal errors, Grontmij reserves the right to replace these parts at any time. This is of course done for the cost of Grontmij. If the customer discovers a fatal error he shall be obliged to contact Grontmij at once. If Grontmij considers the reported error fatal, the error will be corrected at Grontmij cost. Otherwise the customer will be contacted by Grontmij.
11	<b>User operation errors</b>	If a user does not use the FWD equipment or any software delivered in accordance with instructions and user manuals, this shall not be considered as the responsibility of Grontmij but shall be solely the responsibility of the customer in case of fatal consequences.
12	<b>Disputes</b>	A dispute arising out of or in connection with a contract shall be finally settled in accordance with the Rules of Conciliation and Arbitration of the International Chamber of Commerce. This quotation and any contracts entered are governed by Danish law.
13	<b>Advance payment guarantee or down payment</b>	A customer can choose between issuance of an advance payment guarantee and a down payment of 20% of the purchase amount. The guarantee must be issued by a first class bank or by a bank approved by NORDEA Bank Danmark A/S.

## APPENDIX 1:

### Technical Specifications - PRIMAX (Falling Weight Deflectometer)

#### Trailer Version

L x W x H (m)	:	4.30 x 1.84 x 1.30 (excl. of warning lights)
Weight	:	1180 kg
No. of axles	:	2

#### Built-in Version

L x W x H (m)	:	4.75 x 1.85 x 1.94 (excl. of warning lights)
Weight	:	2300 kg

#### Load Characteristics

Load range	:	7-300kN, 7-250kN, 7-150kN
Load pulse duration	:	25-30 ms
Load pulse shape	:	Essentially half - sine
Load pulse rise time	:	Approx. 10-15 ms

#### Load Cell

Load cell accuracy	:	1% +/- 0.1 kN
Load resolution	:	0.1 kN (1 KPa)
Load plate	:	4-split 300 mm transverse

#### Deflector Sensor

Sensor type	:	Seismic Velocity Transducer
Number of geophones	:	10-18 (optimum)
Geophone accuracy	:	Better than 0.2% +/- 1 micron
Geophone resolution	:	0.1 micron
Geophone range	:	2200 micron
Geophone beam	:	2500 mm from centre

#### Temperature Sensor

Sensor type	:	PT 100
Number of sensors	:	1 manual – optional 3 (surface, air, manual)
Temperature accuracy	:	Better than 1%
Temperature resolution	:	0.1 °C

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## APPENDIX 1:

### Technical Specifications - PRIMAX (Falling Weight Deflectometer)

#### Distance Meter Counter

Accuracy : Better than 0.1%  
Integrated in data collection software

#### System

Capacity : Up to 65 test points per hour (depending on distance between test points)

#### Operation

Hydraulic system : May be operated by one person  
: - 5°C to +60 °C  
Electronics : - 40 °C to +70 °C, 50 G shock (industrial certification)  
Safety : Complies with EU regulations for mechanical and electronic devices (CE-marking)

#### Power Supply (FWD)

Trailer : 24 VDC generator unit mounted on trailer  
Built-in version : 24 VDC mounted on car engine (car: 12 VDC)

#### Data Acquisition System

Time history (real time) : On all geophones and load  
Simultaneous sampling (real time) : All channels, load cell, temp. and geophones  
Resolution : 16 BIT on all channels (load, geophones, temperature, falling height)  
Sampling : 25 kHz for all channels  
Sampling period : 60-500 ms (chosen by user)  
Data storage (peak value) : SQL database  
Data storage (time history) : SQL database



## APPENDIX 1:

### Technical Specifications - PRIMAX (Falling Weight Deflectometer)

#### Data Collection & Project Management Software

System: MS Windows 7, XP and VISTA

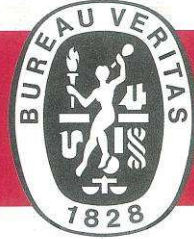
- Easy set-up of data and sequence
- Presentation of time history and peak value displayed simultaneously
- Automatic loading of temperature with alarm for correct measurement
- Full manual mode operation from PC
- Easy set-up of system configuration with saving and load functions
- Full FWD test module with all digital and analog I/O channels
- Easy file handling module with view function
- Integrated distance meter calibration module

#### Optional Hard- and Software

- Paint marker
- Rear deflector extension bar (rear 600 mm & transverse 450 mm)
- Stacking tower (calibration verification)
- 450mm load plate (optional rigid or 4 split)
- Video camera & monitor
- Warning light (trailer and car)
- National language versions (may require national MS Windows version)
- Calibration reference package (geophones) ready for operation:  
Hardware & software
- Upgrading to heavy weight (7-250 kN) or super heavy (7-300kN)
- **New:** PRI tourtrack for security, survey and easy support.
- **New:** PRIMAX Touch screen for easy operation of data collection software.
- **New:** PRIMAX Wireless connection (PC ↔ FWD unit)
- **New:** PRI survey (pavement/road image system)
- **New:** PRIMAX/PRIMA100 sensor (geophone) calibration equipment
- **New:** PRIMAX/PRIMA100 temperature sensor calibration equipment
- **New:** PRIMAX extended warranty
- **New:** 12/24Volt unit powered by the towing vehicle, portable for use with different
- Upgrading from trailer to built-in version (VW transporter van)
- Reflecting safety panel (traffic signs)
- Automated IR pavement surface temperature transmitter
- (D) GPS (antenna and software)

**APPENDIX 2:**

**BUREAU VERITAS**  
Certification



**Certification**

Awarded to

**Grontmij A/S**

Danish CVR No. 48233511

*Sites as to attached appendix*

**Bureau Veritas Certification certify that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below.**

**STANDARD**

**ISO 9001:2008/ ISO 14001:2004  
DS/OHSAS 18001:2008 & Arbejdstilsynets bek. nr. 87:2005**

**SCOPE OF SUPPLY**

**Consultancy in the fields of Civil and Transportation, Building, Environment, Water, Energy, Industry, Marine, IT and Management. IT system Development and Maintenance. Hardware Production and Service. Delivery of Developed IT Products. Business Support.**

*Original approval date:* 21-05-2007

*Subject to the continued satisfactory operation of the organisation's Management System, this certificate is valid until:* 31-03-2013

*To check the validity of this certificate please call: (+45) 77 311 000.*

*Further clarification regarding the scope of this certificate and the applicability of the system requirements may be obtained by consulting the organisation*

*Certificate Number:* DNKFRC10000204A      *Issue Date:* 31-03-2011



*Las Andersen*

SF06 Certification office: Oldenborgside 1B, DK-7000 Fredericia

 **DANAK**  
System Reg. 5005, 6002, 6502

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