

# MINIDYN PORTABLE DEFLECTOMETER



Version 4 : 22/12/2023



# 1 General

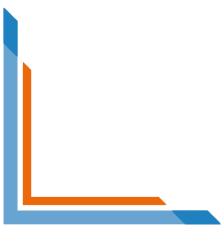
The lightweight dynamic plate (PDL), called LWD (LightWeight Deflectometer) or DP (portable deflectometer) Minidyn, measures lift optimized for PF2 with directly correlated Edyn2 results geolocated on your Android mobile phone.

The lightweight Minidyn dynamic plate is a compact piece of equipment, transportable in a single suitcase offering reliable, reproducible, and immediate measurements of the lift of your road, building or industrial platforms.

- Robust and lightweight anodized aluminum construction
- Reinforced protection IP65
- Single transport case
- Geolocation of your measurements
- Large capacity battery, one week of autonomy in current use
- Integrated force sensor for repeatable and calibrated measurements
- Rapid tests, one measurement point in 10 seconds (3 releases)



**Minidyn**





Specifications	Value
<b>Instrument</b>	Lightweighth deflectometer Minidyn
<b>Weigth without drop mass</b>	15 Kg
<b>Weight of drop mass</b>	10 Kg ou 20 Kg
<b>Plate diameter</b>	300 mm
<b>Plate materials</b>	Stainless steel and anodized aluminum
<b>Drop height</b>	55 cm
<b>Environment</b>	IP65 -20°C à +40°C
<b>Force sensor</b>	Maximum Force strain gauge : 25 KN Error: < 0.3% FS
<b>Displacement sensor</b>	Vertical geophone Frequency range : 4.5Hz...2500Hz Resolution: 1µm
<b>Supply</b>	On battery and charging via USB
<b>Data transfer</b>	Using Bluetooth
<b>Autonomy</b>	One week of current use Automatic shutdown after 15 minutes

#### Minidyn specifications

Minidyn equipment comes with:

- An instrumented loading plate
  - o Plate diameter: 300 mm
  - o Force sensor 25 kN
  - o Displacement sensor  $\pm 2$  mm
  - o Bluetooth and USB acquisition box
- A 10 kg sheep set
  - o Aluminum sheep 10 kg
  - o 55cm guide rod
- Minidyn acquisition software for Android
- User manual

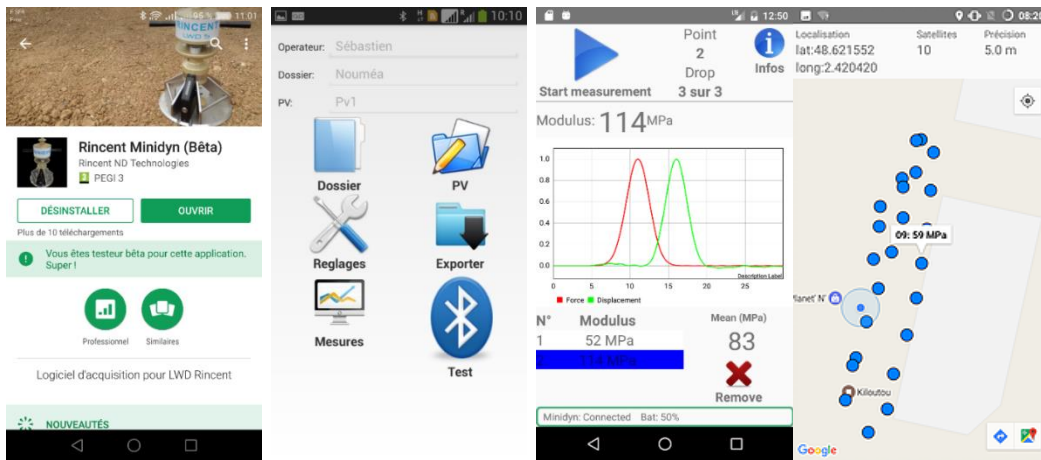




## 2 Android Application

The Minidyn lightweight dynamic plate is controlled by an Android application which can be installed for free. The application is available on Google Play and can be used immediately with your Minidyn without any special configuration steps other than Bluetooth pairing between your phone and the Minidyn.

The user interface is simplified for immediate and intuitive use. It is easy to create a report folder, go to the measurement page and start the acquisition. The application uses the GPS integrated into your phone to precisely geolocate your tests. The resulting mapping is then automatically exported into your report



Android acquisition software

## 3 Transport case

A transport case which can contain the Minidyn equipment and all accessories is available:

- Dimensions: 80cm\*50cm\*30cm
- Weight with 10kg sheep: 34kg





## 4 Transport cart

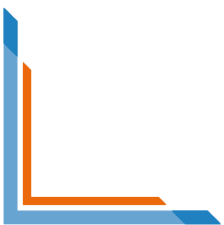
The transport trolley allows easy movement on construction sites.



## 5 Measurement extension

An extension of the measurement range is available to achieve an impact of approximately 20 kN in order to sufficiently mobilize platforms above 80 MPa.

- Mass of 20 kg
- Two additional buffers
- Increased fall height





## 6 Cell phone

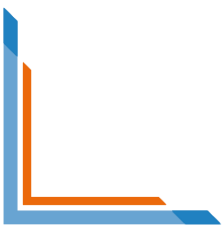
The Minidyn application can run on all Android devices. We can provide you with a suitable field telephone. (Given the rapid evolution of terminals, the exact type of system may change).

Specifications	Value
Type	Android field phone Type cat S41
Resistance	Waterproof IP68 Shock resistant
Screen	4,5 inches
Transfer of measurements	By email via Wifi or 3G (subscription not included) Direct transfer by USB cable
GPS	GLONASS, GPS, aGPS (~3m accuracy)
Storage capacity	> 100 000 measurements
Installed software	Minidyn Android
Function	acquisition and rereading
Hardware connection method	Bluetooth
Stiffness calculation method	Max
Correlation method	Boussinesq, Linéaire or exponentielle

### Android system specifications



Android acquisition software and field phone



## 7 Limitation of use

The lightweight Minidyn dynamic plate is very reliable in a number of situations and it is important to follow a few precautions when using it to get the best out of the instrument.

The depth of auscultation is of the order of 30cm to 50cm depth. Also the control of very thick platforms (backfill, etc.) must be done in layers, typically at each addition and compaction of materials.

Finally, the 300 mm Minidyn loading plate allows use on materials with a Dmax of around 60 mm.



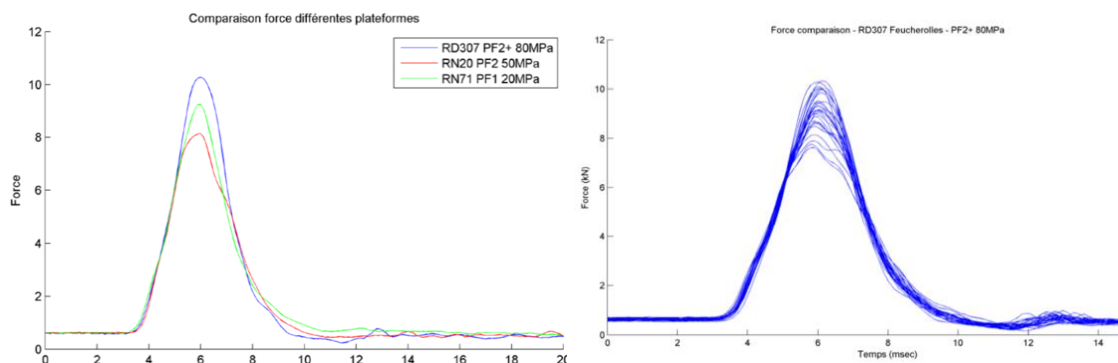
Backfill control by layer

Platform tests > 120 MPa with 20 kg weight

## 8 Metrology

Rincent ND technologies has a calibration bench dedicated to lightweight dynamic plates which is controlled annually to national standards by a COFRAC accredited laboratory.

The force sensor integrated into the Minidyn lightweight dynamic plates makes it possible to measure the variation in the impact force which can go up to 20% of the force applied on the same platform and depending on the target lift of the platform. The absence of a force sensor results in a repeatability error of 20 to 40% in the module calculation.



Variation of impact force depending on the material and the platform

## 9 Correlation and standardizations

When the application is first installed, the measurements obtained with the lightweight Minidyn dynamic plate are directly correlated to EDYN2 thanks to research work carried out jointly between the University of Evry and Rincent Laboratoires.

Five years of work (doctoral and post-doc) resulted in an optimized correlation on different materials common to platforms and over a range of 10 to 80 MPa.

Other correlations are available such as the module under static loading EV2. In particular, it is possible for you to carry out a very precise correlation yourself on your platform with the layers and materials put in place. Our applications engineers are here to guide you through this procedure.

Minidyn equipment fully complies with the requirements of the standards :

- BSI 1924-2 (England),
- ASTM\_E2583-07
- ASTM\_E2835-11 (United States),
- UNI11531-1 (Italy)
- StB 8.4 (Germany)



**Edyn2 correlation assay**




**Ev2 correlation**






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The appearance of the products and/or technical characteristics are subject to change without notice.

