DEVICE FOR THE MEASUREMENT OF THE BOND FACTOR ON REBARS

Nr. Datasheet: C1-0-01
Product Description

The adhesion takes an important role in reinforced concrete structures as it allows the transfer of tensile stress from the concrete reinforcing bars to the surrounding area.

In the improved adherence bars (FeB38k and FeB44k of the existing normative) the adhesion is due to the particular geometric shape that allows for seizure of steel ribs and concrete grains.

To characterize the particular geometry of these bars it’s introduced the so called “bond factor” that considers the presence and size of ribs on the surface of the bar and that should quantify the attitude of a certain geometry to improve adhesion.

Lonos Test is able, on request by the customer, to supply both automatic computerized systems and manual systems for the measurement of the bond factor on rebars in according to the International standard ISO 15630-1: 2010 (Steel for the reinforcement and prestressing of concrete – Test methods – Part 1: Reinforcing bars, wire rod, wire).

For the standard ISO 15630-1:2010 bond factor is computed through the following formula called Simpson’s formula:

\[
f_k = (\pi d - \sum e) \cdot \left[ \frac{h_{1/2} + 2 \cdot (h_{1/4} + h_{3/4})}{6\pi dc} \right]
\]

Where

- \( h_{1/2} \) Height of the rib at \( \frac{1}{2} \) of the length
- \( h_{1/4} \) Height of the rib at \( \frac{1}{4} \) of the length
- \( h_{3/4} \) Height of the rib at \( \frac{3}{4} \) of the length
- \( d \) Nominal diameter of the bar
- \( c \) Indentation spacing
- \( \sum e \) Part of the circumference without ribs

Following are the main solutions developed by Lonos Test to facilitate our customers in the calculation of this important parameter characterizing the rebars.
Optical computerized system for the measurement of the bond factor on rebars with improved adherence Mod.MIA 2 ITEM CODE ABIPLT003

System equipped with n°3 cameras for reading the geometry of the rebar to test.

The system can take measurement of the bond factor for bars with diameters from 8 to 25 mm (for bars with double rib rows) and from 8 to 32 mm (for bars with single rib rows)

Using this system, it is possible to measure the bond factors on rebars with improved adherence in a precise and fast way

Operation is completely automatic and managed by a PC

For each sample tested, you can review the various measurement detached out on the screen and the used method of calculation.

Export data with common file format (ASCII and Excel);

Printing of customized test reports

The use of the machine is particularly easy thanks to software MIA-3 and led to a menu created in the main languages (English, Italian).

The machine is sold complete with a comprehensive Operator's Manual, making it unnecessary to install by our technicians, equipped with all the safety systems of security, certificate of compliance and provided with CE certification.
Features of MIA system:

- Sturdy chassis with antivibrating feet
- Driven head controlled by stepper motor directly using specific software with Gripping bar system realized to means of mandrel of high precision with passing hole
- N. 3 high resolution cameras for reliable measures to detect the geometry of the specimen
- Computerized system with specific software in English and Italian language (other to req.) for acquisition, processing, control of information and calculating bond factor
- Equipped with PC and monitor
- Printer for the certification of the results of each test executed
- Size of the machine (without table for PC): 940 X 325 X 840 (h)mm
- Weight: 80 Kg.

Advantages of a computerized system respect to a manual system for the measurement of the bond factor:

The main advantages are the following ones:

- RAPIDITY - a computered test takes a very short time in comparing with other traditional or manual methods
- PRECISION - the uncertainty is lower using automatic methods
- REPEATABILITY - This system permits a great repeatability, apart from different operators take measurement of the same specimen.
- PRINTING OF TEST REPORTS - using a printer device you can have the reports with the results of each test.
### Optical computerized system for the measurement of the bond factor on rebars with improved adherence Mod.MIA 3 ITEM CODE ABIPLT004

It differs from Mod.MIA 2 for the equipment of n°4 high resolution cameras instead of 3 for the detachment of the geometry of the rebar to test.

The system can take measurement of the bond factor for bars with diameters from 8 to 32 mm (for bars with double rib rows) and from 8 to 50 mm (for bars with single rib rows) The system can take measurements with rebars with a maximum number of four rib rows.

### Manual system for the measurement of the bond factor on rebars Mod.MIA DM ITEM CODE ABIPDM001

The system permits to detach all the measurements useful for the computation of the bond factor in according to ISO 15630-1:2010 (Steel for the reinforcement and prestressing of concrete - Test methods - Part 1: Reinforcing bars, wire rod and wire), assuring at the same time repeatability and ease of use.

The system has been studied and tested in collaboration with important Italian material testing laboratoris and the functionality has been widely tested and verified.

The validity of the test executed with the system has been verified through comparison of results with different devices and different computation methods.

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**Test report produced by MIA system**
Components of the system:

Device for the measurement of the bond factor of reinforcing steel bars.

Procedure for the correct use of the device

Software for the computation, equipped with user's manual

Device for the measurement of the bond factor of reinforcing steel bars

Laser indicator and electronic caliper Mitutoyo for the measurement of the Transverse rib or indentation spacing (c) and of the Part of the circumference without ribs or indentations (Σei)

Digital Gauge Mitutoyo, with suitable feeler tips, settable at zero in any position, useful for the measurements of heights of the rib

Support for the position and fixing of long specimens 300 mm and diameter 32 mm.

Dimensions mm 370x200x300, Weight 6 kg
Software system for the computation

It is an Excel file that permits to process all the data detached by the device so that can be possible to compute the bond factor.

Through the software, it is possible:

- Select the type of bar on which execute the measurements
- Insert the measurements, the number of request, date, operator, the manufacturer and any desired annotations.
- Execute detailed print of any single test executed with the possibility to insert in the print the header and company logo

The software includes a short guide explaining the methods for the execution of the measurements
### BILOGGIA DI BORDEA

**TIPOLOGIA T**

- **Fonco**
- **Diametro massimo del massello della base (D)**: [Value]
- **Diametro minimo del provino (d)**: [Value]
- **Lunghezza della nervatura (l)**: [Value]
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Height ribs measurement device for computation of bond factor of rebars Mod.MAH 001 ITEM CODE ABIPLT001

This device permits to take measurement about the height of ribs of concrete reinforced bars, for computation of bond factor.

The extreme ease of use of this tool, together with the capacity to measure according to the requirement by ISO 15630-1:2010 standard, makes MAH-001 an excellent solution for having a high quality/price ratio.

Features of MAH 001 system

Dimensions: 400x250x200 mm

Weight: 15 kg

Reading resolution: 0,01mm

The device is available with a goniometer to measure the rib degree. Mod.MAH 001-GON ITEM CODE ABIPLT005