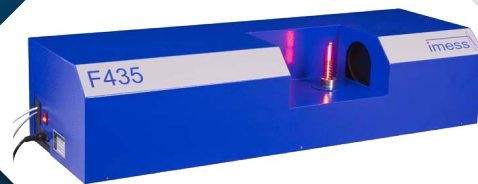


F435

3D Geometry of
Compression Springs



imes F435 offers extensive measurement of compression springs.

The spring is centrally placed and analysed after a 360° turn.

A light bolt within the spring centre and a backlight illuminate the spring.

Prior to the measurement, a master spring is taught in which is used for comparison. The data of all master springs is saved to allow fast switches between the different types.

The proven system is used for

- high precision quality control,
- comfortable coiler setup and
- easy spring construction with 3D data feedback.

Spring Quality Control

| Characteristics | ground Spring | unground Spring |
|-----------------------------------|---------------|-----------------|
| e1 | x | |
| e2 | x | |
| n_T | x | x |
| L_0 | x | x |
| De | x | x |
| Wire End Thickness | x | |
| Grinding Angle | x | |
| further characteristics on demand | | |

Explanation:

Fully automatic check of the most important characteristics over 360°. Regardless of the state of production. Raw, ground, set or blasted. imess F435 is prepared for every testing situation.

Characteristics:

- Flexible, individual test plans
- Storage of measurement values in Excel-readable files
- Calculation of statistical parameters and graphical depiction as histogram

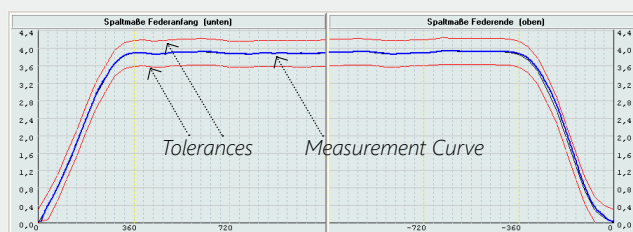
The screenshot shows a table with columns for different measurement parameters and their corresponding values. The parameters include e1, e2, nT, L0, De, and various wire end thickness and grinding angle measurements. The values are presented in a grid format, likely representing data points for a histogram or statistical analysis.

Screenshot of Statistics

| Coiling Graphic of | ground Spring | unground Spring |
|--------------------|---------------|-----------------|
| Clearance | x | x |
| Diameter | x | x |
| Pitch | x | x |
| End coil | x | |

Graphical Depiction:

The coiling is depicted in a graph after the measurement in 3° steps. In addition, the measurement values are usually shown numerically in a table in 18° steps. Thus, the data can be compared to the master.



Coiling Graphic of Pitch Gap

Spring Types:

The system measures all common compression spring types, such as:

- cylindrical
- conical / bi-conical
- bee-hive

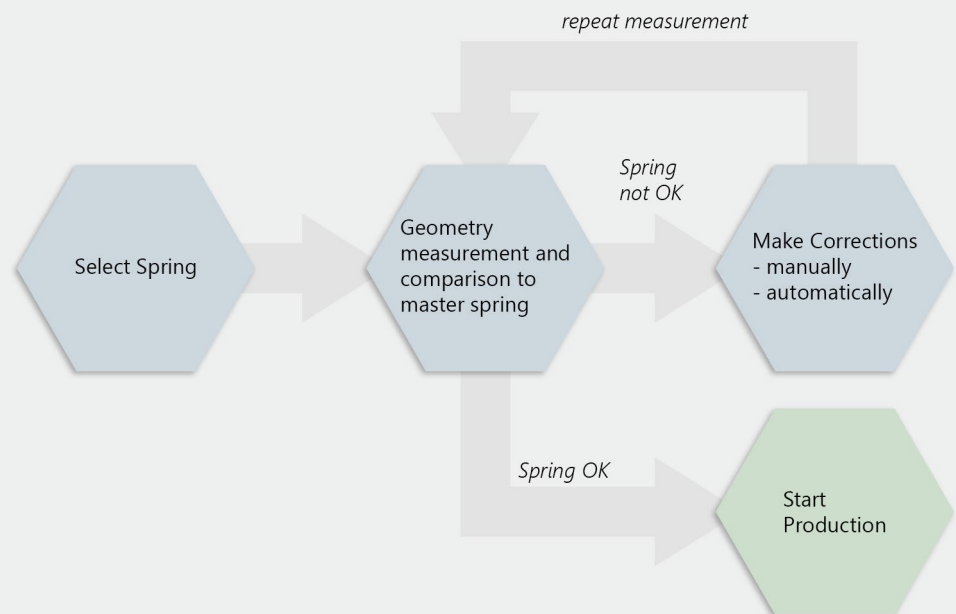
A central sleeve is used to keep unground springs upright.

Coiler Setup

Explanation:

The spring geometry highly influences the spring's reaction under load. Therefore, production aims for constant spring geometry independent from user or production time. Thus, the F435 has an interface to the coiler. The entire coiling data of the spring is provided for the machine.

The correction is done either automatically by the manufacturer of the coiler or manually by the operator.

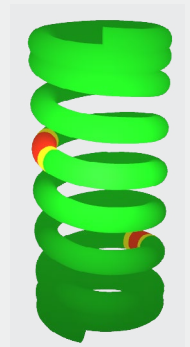


Process of Coiler Setup

Spring Construction

Explanation:

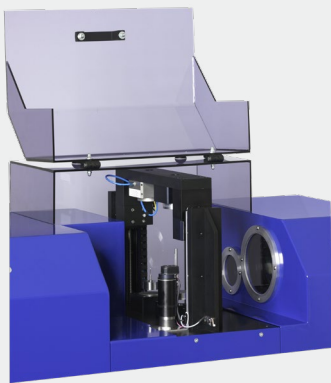
The software develops a 3D model of the spring from the collected data. The 3D file can be saved as .txt to be subsequently used by CAD or other simulation programs. Hence, they may be used as feedback for the R&D department.



F435

System Variations

| System Variations | Max. Length (mm) | Max. Diameter (mm) | Accuracy (mm) |
|-------------------|------------------|--------------------|---------------|
| F435-35 | 35 | 25 | 0,015 |
| F435-70 | 70 | 52 | 0,030 |
| F435-90 | 90 | 70 | 0,040 |
| F435-135 | 135 | 90 | 0,055 |



Option: Load Bridge

imesse offers different systems variants to fulfil the demands regarding accuracy for the various spring sizes. The spring geometry changes drastically once under load. A system variant with load bridge can analyse these changes optionally in addition to standard functions. Only the respective length under load has to be set beforehand.

Take a look:
www.imesse.com/vertrieb/f435.mp4



F435 V

Springs up to 1500 mm



System F435 V

Test Setup:

The construction of the F435 V is optimised for long springs. The camera moves in vertical direction along the spring. In the meantime pictures are taken continuously to be analysed thoroughly.

All previously introduced functions are included in the system as well.

| System Variation | Max. Length (mm) | Max. Diameter (mm) | Accuracy (mm) |
|------------------|------------------|--------------------|---------------|
| F435-220 V | 220 | 60 | from 0,030 |
| F435-400 V | 400 | 60 | from 0,030 |
| F435-1500 V | 1500 | 60 | from 0,030 |

further dimensions on demand

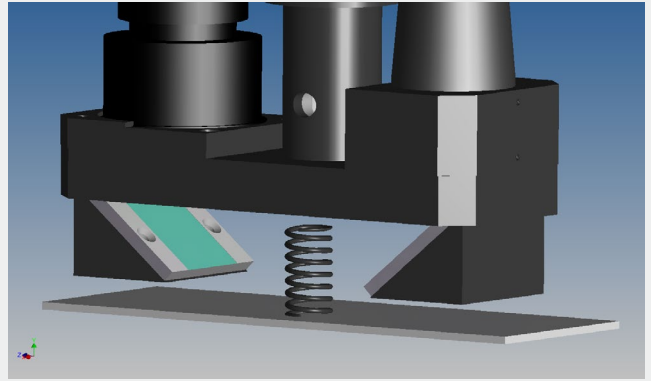
Test Setup:

Spring with fine wire might vibrate on a turning disc which may lead to inaccurate measurement results. The F435 T is fitted with a rotary camera turning around the spring to avoid swinging springs.

All previously introduced functions are included in the system as well.

further applications:

- automatization of spring quality control
- concentricity check for rotation symmetrical parts



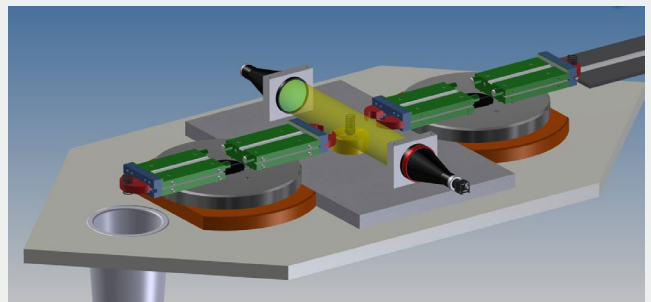
Concept Drawing F435 T

| Variation | Length (mm) | Diameter (mm) | Accuracy (mm) |
|------------------------------|-------------|---------------|---------------|
| F435 T | 3-20 | 3-12 | 0,015 |
| further dimensions on demand | | | |

Test Setup:

F435 I checks automatically the geometry of springs inline. A handling system places the spring onto the test station to then reposition it to the next process step.

All previously introduced functions are included in the system as well.



Concept Drawing F435 I

Take a look:

www.imes.com/vertrieb/f435inline.mp4



| Variation | Max. Length (mm) | Max. Diameter (mm) | Accuracy (mm) |
|------------------------------|------------------|--------------------|---------------|
| F435-70 I | 70 | 48 | 0,030 |
| further dimensions on demand | | | |



imess Optische Mess- und Prüfanlagen GmbH
Stockumer Straße 28
58453 Witten
Germany

Internet:
Phone:
Telefax:
eMail:

www.imess.com
+49 2302/96888-0
+49 2302/96888-16
info@imess.com