

# Spot Measuring of Frogs' Cross Sections

## MECHANICAL FROG PROFILE METER



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**MECHANICAL FROG PROFILOMETER** is a measuring equipment designed to make spot measurements of frogs' transversal sections.

**In practice** the MECHANICAL FROG PROFILOMETER is used for :

- Inspection of the state of operational wear of wing rails and of the frog points
- Inspection of the state of the frogs following their welding
- Spot measuring of the standard rolled profile's surface shape.

### Description of the instrument

The instrument consists of a beam (steel rule with millimetre scale of 0 mm to +500 mm range) that forms X axis. There is a slider (rider) moving on this beam complete with a stylus that forms Y axis of +5 mm to -25 mm range. On the rule's left side there is a tightly fitted immovable bracket to attach the profilometer to the frog's measured part. The spring tip over here serves only to delineate a precise mounting of the frog profilometer into a centre mark made beforehand on the outside of a rail end. A rotary beam along with rubber stops provides for fitting the profilometer and to carry out force distribution. The right side of frog profilometer fitting mechanism comprises a sliding bracket complete with a dual lever mechanism. The upper lever of this mechanism serves to brake movement of the sliding bracket anywhere within the steel rule (X-axis]. Also the lower lever gets loose simultaneously with the upper one, and it serves at any X-axis position to provide for a necessary constant pressing down the other opposite tip into its corresponding centre mark on the outside surface of the rail end. Transversal profiles are measured here in relation to the so called reference line. This reference line is made in such a way that you dot the centre marks into the rail ends' outer surfaces and you fit the lever mechanism's spring tips into these centre marks to hold the instrument. The wear of the frog can be evaluated against this reference line. The rule plus the centre punch for making the reference line are auxiliaries of this instrument. With this centre punch you make centre marks at the height of 25 mm to attach the mechanical frog profilometer to the measured part of the frog.

### Application of the MECHANICAL FROG PROFILOMETER :

Proceed as follows when fitting the profilometer. Take the profilometer with your left hand at the point where the rotary arms (on the fixed bracket) are and install the left spring tip into the centre mark. Press

down with your right hand both of the levers and slide the movable bracket with its spring tip to the right centre mark on the rail end's outer surface. Set the water level in its medium position and then relieve both of the levers instantly at the same time from your right hand. The profilometer is now tightly fixed to the frog's measured part. **Always press first both of the levers of the lever mechanism before you make any adjustments to the vertical position of your profilometer !!!**

The following procedure must be observed when performing measuring process with your profilometer. Slightly press the slider from the top using your forefinger in order to achieve a smooth movement of this slider complete with the stylus. After relieving the slider the slider stops automatically at a corresponding position due to a pressure spring. Also the stylus is being held at a chosen position due to a pressure spring. Press the stylus to the rail end just lightly, applying no useless impacts. The rule (X-axis) together with the stylus (Y-axis) form a coordinate system (in 1.0 mm) where you can read figures estimated to 0.5 mm.

**Proper and trouble-free operation is guaranteed if the following climatic conditions are observed:**

- Temperature of the working environment must not exceed  $-5^{\circ}$  to  $50^{\circ}\text{C}$  range,
- Relative humidity of the environment is max 95%, while absolute humidity of the environment must not exceed  $40\text{ g}\cdot\text{m}^{-3}$ ,
- Storage temperature of the measuring equipment is from  $-50^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$ .

#### **Surface Finish:**

The surface finish of duralumin parts (webs and slider) is ELOX. These parts need to be protected against any extreme mechanical damage (falls, unexpected loading). Steel parts (stylus, rule, spring tips ...) are protected against corrosion and assumed abrasive wear through zinc coating or hard plating. Never leave your frog profilometer under rain conditions or humid environment not meeting those conditions for its trouble-free operation (relative humidity of the environment only up to max 95% with its absolute humidity not exceeding  $40\text{ g}\cdot\text{m}^{-3}$ ). The anticorrosive surface finishings applied on "MECHANICAL FROG PROFILOMETER" do not require any operational maintenance such as lubrication. Keep the complete equipment clean and tidy (using technical petrol for instance). The stylus and the spring tips are made of tool steel (19312), heat treated, and their frictional resistance has been enhanced as well.

#### **Calibration and Guarantees:**

The calibrations, guarantee or off-guarantee inspections are carried out by Komerční Železniční Výzkum (Commercial Rail Research Company) at the Company's place of business at least every 12 months. These inspections include cleaning, adjusting, any repairs and calibrations of the "MECHANICAL FROG PROFILOMETER". The client shall not (in order not to lose any claim for guarantee) under any circumstances meddle in the measuring equipment or make any modifications thereof.

#### **Ranges and Measuring Accuracy**

**Measuring range within X-axis** is determined by mechanically adjustable stop. Standard range equals to X 0 to 500 mm. Accuracy of the origin of coordinate system equals to 0 to  $\pm 0,04\text{mm}$ . Frog's cross profile is read at X-axis divided by 1mm. Reading accuracy of X-coordinates is 0,5mm.

**Measuring range within Y-axis** is determined by tip's mechanical stops and equal to +5mm to -25mm. Reading accuracy within Y-axis divided by 1mm equals to 0,5mm.

#### **Basic Specifications of the PROFILOMETER**

Weight: ca 2,5 kg. Length 600mm. Height 250mm. Attended by: one operator.