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# VT ElektroPlast

**ONE COMPANY – INFINITE POSSIBILITIES**


Test & Measuring Lab

**www.vtep.videoton.hu**

# HISTORY & OVERVIEW

- 2010 - test lab was established based on increased demand of internal and external tests
- located in a separated building, in 140 $m^2$
- belongs to the Central Quality Department
- provides every necessary service: high-powered electricity, tap water, air-pressure system, air conditioner
- continuous support in automatized tester development
- continuous improvement of test equipment, methods and processes
- most of the life-time testers were designed and built by own engineers

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# HISTORY & OVERVIEW

We test products before and after they are launched to the markets; from design to mass production phase

## Test types

- product design tests
- product release test
- battery tests in separated test lab
- product functionality-related tests
- product performance-related tests
- RoHS compliance
- approbation pre-tests
- internal tests for investigation of quality problems
- climatic tests in temperature and humidity chambers

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# HISTORY & OVERVIEW

- a technician performs the tests and he maintains the devices
- an engineer is responsible for leading the test lab and managing the activities
- contact with customers
- report the results of tests
- quick feedback to production if it is necessary

An internal SOP (Standard Operation Procedure) defines acts, roles and responsibilities of Test Laboratory. (QA 2010-01)

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# TESTS – BATTERY TESTS

**Description**

In the separated battery test lab we are able to execute battery cell and pack tests (even in fire protected climatic chamber):

- (abnormal) charging
- (forced) discharging
- capacity test
- short circuit analysis
- engineering / functional tests

We are able to measure and record during the test: voltage, internal impedance, temperature.

Beside these, we can do drop test, as well.

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# TESTS – BATTERY TESTS

Videoton has a strong relationship with external labs like TÜV Rheinland InterCert Kft. Having this relationship and using our experience in validation process according to UN38.3 and IEC62133:2-2017, Videoton Elektro-PLAST Kft. is capable to support the whole validation process.

We can perform preliminary tests and measurements like Drum test, short circuit and overcharge tests, etc. before sending samples TÜV or to another external lab.

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# TESTS – APPROBATION AND BATTERY TESTS

## Equipment

- programmable AC Power Source (Chroma 6530, Chroma 63113A)
- insulation/Current Leakage tester (GW Instek GPI-745A)
- digital power meter (Yokogawa WT210 + GPIB)
- digital multimeter (Picotest M3500A, Keysight 34461A)
- Hi-pot tester (Hioki 3561-01)
- force/torque meter (Mecmesin AFG 500)
- static torque wrench (Mecmesin TW15)
- contactless RPM meter
- We have FLIR E50 type thermal imaging camera


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# TESTS – BATTERY CLIMATE TESTS

Our own programmable temperature and humidity chamber is suitable for climatic and ageing tests, especially for batteries, with fire protection system.

**Specification**

- model: ACS Discovery my DM600
- volume: max 600L
- temperature range: -40 / +180 ºC
- humidity range: 10 - 98% RH


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# TESTS – OTHER CLIMATE TESTS

Our own programmable temperature and humidity chamber is suitable for climatic and ageing tests

**Specification**

- model: WTH-L420
- volume: 420L
- temperature range: -20°C…+100°C
- humidity range: 30%... 95% RH
- total permitted load: 60 kg

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# TESTS – PORTABLE XRF FOR RoHS TESTS

- the XRF analyser helps to define concentrations of certain specific hazardous materials in electrical and electronic products in order to submit the products to RoHS regulations
- furthermore, it can help to define raw materials of samples, especially alloys
- the XRF technology is a quick and cheap way to analyse substances and filter hazardous materials


**Features**

- model: NITON XL3t 700
- the first portable XRF tester by NITON

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# TESTS – KITCHEN PERFORMANCE TESTS

Kitchen appliances can be tested from an early phase of development or pre-serial phase and even in the mass production.


**Features**

- extended foodstuff supply chain
- wide range of experience in kitchen tests
- pre-prepared raw material on the spot
- we can log and record the data of some tests with special hardwares and softwares

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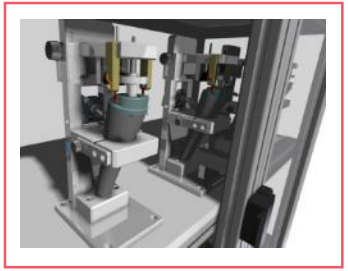
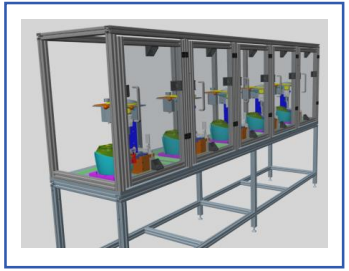
# TESTS – ENDURANCE TEST

**Main characteristics of different life-time testers**

- proper for skincare and personal care products; household appliances; cleaning centers
- working with pneumatic and air-pressure system
- one of testers works with circulating water
- parameters are adjustable manually or via software
- data are logged and recorded





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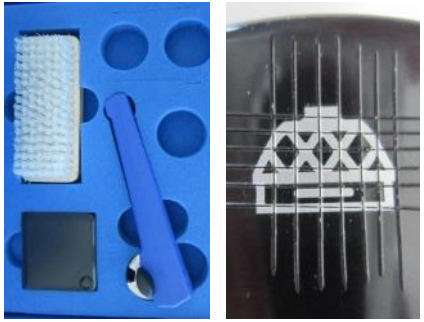
# TESTS – OTHER TESTS

fan test



abrasion test

drop test

electric strength test

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# CONFIDENTIALITY AND ACCESS CONTROL IN TEST LAB

- entrance is strictly controlled by access cards (all entry recorded)
- customer property, equipment and products are handled safely
- competitors' equipment are separated
- documents are stored electronically and protected from non-authorized access


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# MEASURING LABORATORY EQUIPMENT

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# GLOBAL PERFORMANCE CM MACHINE

**Specification**

- model: GLOBAL Performance
- software: PCDMIS CAD ++
- measuring range: X: 700 Y: 700 Z: 500
- resolution: 0,001 mm
- measurement precision: $MPE_E$ = from 1.5 + L/333 µm


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# OPTIV CLASSIC OPTICAL CM MACHINE

**Specification**

- model: HEXAGON OPTIV CLASSIC CMM
- software: PCDMIS
- measuring range: X: 300 Y: 200 Z: 200
- resolution: 0,001 mm
- measurement precision:
    - MPE (Exy): 2,8+L/150µm
    - MPE (Ez): 5+L/150µm


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# KEYENCE IMAGE MEASUREMENT SYSTEM

**Specification**

- model: KEYENCE IM-7020
- software: PCDMIS
- measuring range: X: 200 Y: 200
- resolution: 0,001 mm
- measurement precision: ±(4 + 0,02 L) µm
- sensor: 6,6 mega pixel

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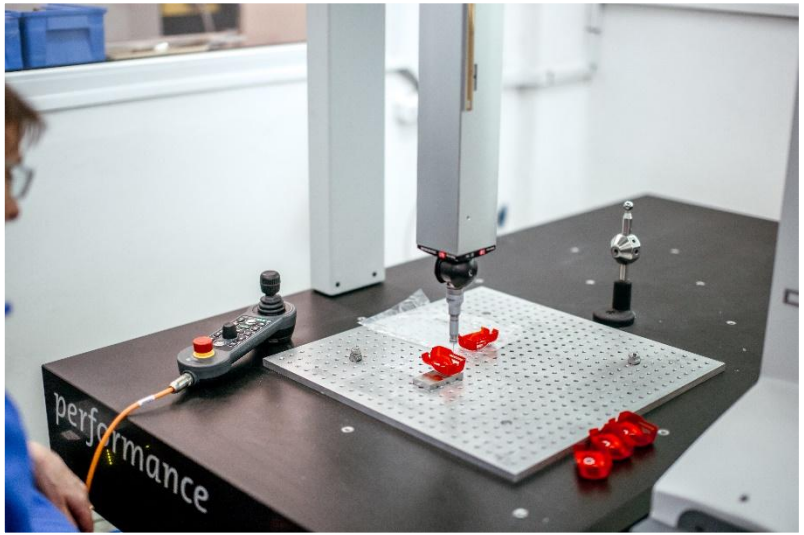
# DEA GLOBAL COORDINATE MM

**Specification**

- model: DEA GLOBAL Performance
- software: PCDMIS CAD ++
- measuring range: X: 700 Y: 1000 Z: 500
- resolution: 0,001 mm
- measurement precision: ±5,5+0,009L(mm)µm

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# TESA VISIO 300 OPTICAL CM MACHINE

**Specification**

- model: TESA VISIO 300 OPTICAL CMM
- software: PCDMIS
- measuring range: X: 300 Y: 200 Z: 150
- resolution: 0,001 mm
- measurement precision: ±(2+0,006L(mm)µm)


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# TESA COORDINATE MEASUREMENT MACHINE

**Specification**

- model: TESA SA Micro-Hite
- measuring range: X: 460 Y: 510 Z: 420
- resolution: 0,001 mm
- measurement precision: (3+4L/1000)µm

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# ATOS 3D SCANNER

As an example of the state-of-the-art technology, this device is able to create 3D model about any kind of object (sample part, tool insert etc.), which can be used for further measurement, analyses and reverse-engineering

**Specification**

- model: ATOS Core 5M Professional Line
- software: Zeiss inspect 2025
- measuring area: 185 x 140 mm
- working distance: 440 mm
- resolution: 0,01 mm
- measurement precision: ±2+0,006L(mm)µm

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# TINIUS OLSEN TENSILE TESTING MACHINE

**Specification**

- model: H20 K-W
- measuring range: 20 kN
- resolution: 0,3 N
- measurement precision: >0,5%


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# IGV KV 02 HARDNESS MEASUREMENT MACHINE

**Specification**

- model: KV 02
- measuring range: 0-70 HRC
- measurement precision: <1 HRC

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# MITUTOYO DUROMETER

**Specification**

- model: Hardmatic HH331
- measuring range: 0-100 Shore A
- resolution: 1 Shore A
- measurement precision: < ± 0,075 N


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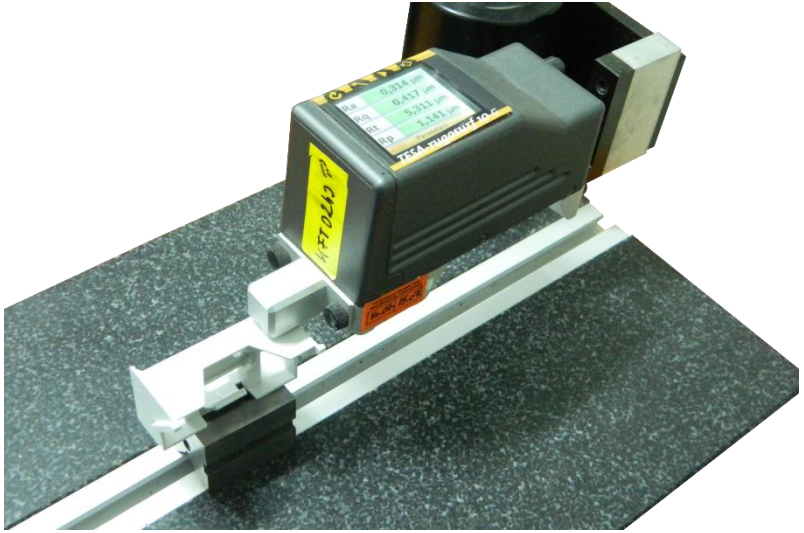
# PORTABLE SURFACE ROUGHNESS GAUGE

**Specification**

- model: TESA Rugosurf 10G
- measuring range: Ra:0-75 µm  Rt:0,05-300 µm
- resolution: 0,001 µm
- measurement precision: 0,3 µm/25 mm



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# COLOR-GUIDE GLOSS METER

**Specification**

- model: Gardner 6831
- measuring range: 400-700 nm  L:0-100
- resolution: 0,01 GU
- measurement precision:
  - 0-10 GU=±0,2 GU
  - > 10 GU=±0,5 GU


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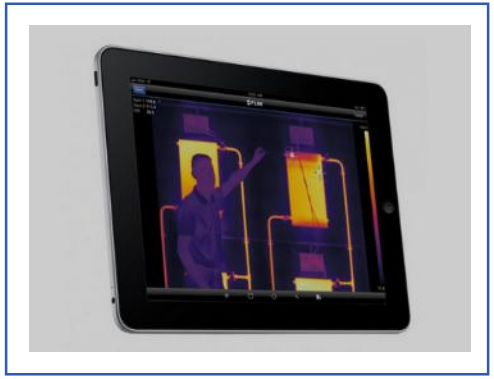
# INFRARED CAMERA

The device is proper to detect infrared energy. Temperature and heat distribution can be easily and precisely measured, therefore the heat-related problems can be evaluated.

## Specification

- model: FLIR e50
- thermal image quality: 240x180 pixel
- thermal sensitivity: <0.05°C
- temperature range: -20°C to +650°C



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# COOPERATION WITH EXTERNAL LABS / UNIVERSITIES

## TÜV Rheinland

- extended contact with the Hungarian subsidiary
- thorough material investigation to detect RoHS-banned substances
- food-contact investigation
- continuous communication in approbation-related topics (in product design phase)
- CE marking

## Budapest University of Technology and Economics

- industrial design, ergonomic studies
- functional and concept re-consideration of existing products
- (re)design human-machine interfaces
- 3D product visualizations and animations
- colour studies

# COOPERATION WITH EXTERNAL LABS / UNIVERSITIES

## Óbuda University

- the Central Research and Development Institute of Videoton has a cooperation with the Kálmán Kandó Faculty of Electrical Engineering of Óbuda University
- test of designed PCBs in EMC laboratory

## Kaposvár University

- measurement of technological parameters – physical properties
- alterations of the chemical composition – near infrared spectroscopic (NIRS) and chemical analysis
- analysis of the effects exerted on the organoleptic traits
- cooperation within the dual education system

# COOPERATION WITH EXTERNAL LABS / UNIVERSITIES

## University of Pécs (PMMIK)

- cooperation within the dual education system – at the faculty of mechanical and electrical engineering
- cooperation in R&D
- design and optimization of gear drive systems

## Széchenyi István University, Győr

- cooperation since 2005
- the packaging laboratory of the institute is a professional partner in the release testing of automotive plastic parts and subassemblies

# COOPERATION WITH EXTERNAL LABS / UNIVERSITIES

## University of Dunaújváros

- full 3D injection molding simulation of products and mold optimization by using Moldex 3D analysis software
- studies with different injection locations/types
- mold temperature uniformity check → cooling optimization
- optimization for moldability (reduced cycle time, optimal injection pressure); minimal part deformation; best visual part quality (minimal sink marks/welding lines)
- cooperation within the dual education system – at the faculty of mechanical engineering (specialization of mechatronics)

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# THANK YOU FOR YOUR KIND ATTENTION!

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