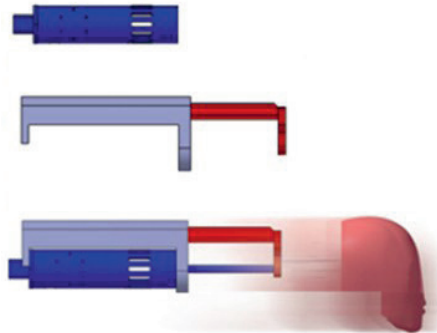


Universal Impactor Test System

- Best in class accuracy by high speed closed loop control
- Low operating cost (\$ 1/Launch)
- High availability and low maintenance costs through hydraulics-free design
- Fast change between different launchers & tests (<30 min)
- Direct adjustment of speeds without any pretest required

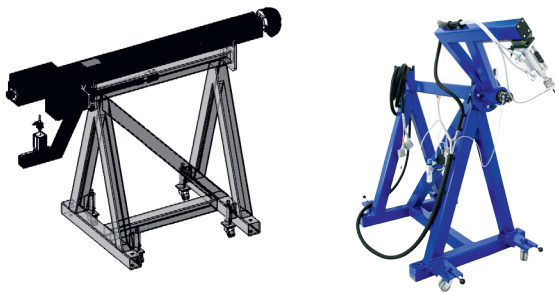
Universal Impactor Test System



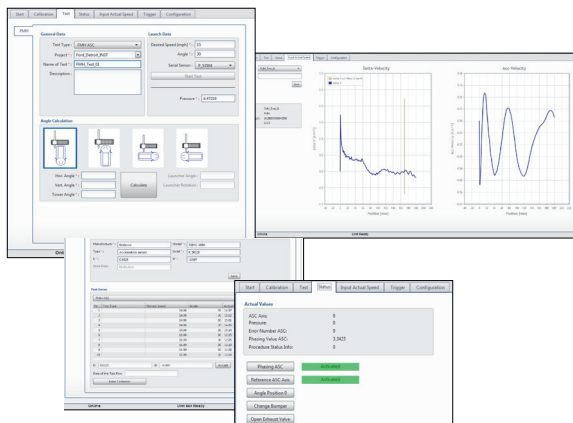
Launcher equipped with ASC



Control Unit UIT System



Calibration Tool Ejection Mitigation



Unisoft Software

Advanced Speed Control (ASC)

In addition to the nitrogen driven launcher a small electronic engine unit is used as a high speed closed loop control solution (up to 80 control loops over the launch process) to reach the target velocity "first shot right" with a minimum tolerance of ± 0.2 km/h.

Gravity and Angle Compensation

The test system automatically performs gravity and angle compensation for free flight objects to guaranty a minimum deviation from the target location.

No Hydraulics

- Low maintenance cost & minimum downtime

Hydraulic systems have the disadvantage of high maintenance costs and long downtimes due to necessary services. Over their lifetime many hydraulic systems tend to leak oil and perform with reduced accuracy.

- Quick change between different launchers

To change a launcher on a hydraulic system, requires detaching the hydraulic lines. The issue with this procedure is that hydraulic oil leaks out of the system and then the air needs to be bled out of the system. This takes two people about 3 to 4 working hours. To change a launcher on the Microsys fully pneumatic system needs less than 30 minutes.

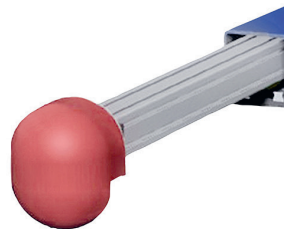
System Control by Unisoft Software

Like all Microsys products the ASC launcher is controlled by the flexible and user friendly software „Unisoft“, which reduces the time and cost for training of technical personnel. Furthermore different configurations on customer request are possible. The control system consists of standardized components that are available all around the world and enables a fast and easy support workflow.

If used with the Microsys Universal Impactor Test System, all adjustments needed for the positioning of the system prior to the firing can be completed by means of a wireless remote control. The system adjustment is possible via two joy-sticks, mounted on the remote control itself.

Wireless Remote Control

The wireless remote control is used to close doors, move seats and remove parts without interference and without any danger to damage the remote control cable. The large display and programmable buttons on the own build remote control allow easy interaction with the test equipment and free position.



The **Universal Impactor Test System** provides the customer with all the flexibility it needs during daily testing, and it can easily be updated for future legislation or customer specific requirements.



Calibration & Safety Equipment

All required safety and calibration equipment is included in the system price.

Vehicle Coordinate Mode

The system supports two types of coordinate systems:

- Equipment coordinate system
- Vehicle coordinate system

The vehicle coordinate system can be learned in by contacting three known reference points on the test object.

Repositioning Function

When the test system moves or rotates the software records and shows the coordinates of the positions. Once a test position has been predefined, the system can automatically save and reposition to the last 10 configurations.

User Training

- Microsys offers a wide range of user training to support the customer during the system installation, testing and during the engineering process:

Customer On-Site Training

- Basic understanding of system components
- System setting, testing, maintaining, troubleshooting
- Control software and relevant setting
- Hands on testing according to the relevant legislations and technical requirements
- Impactor calibration training

User to User Training

During "User to User" training experienced Microsys test engineers train customers to:

- Understand and work with the regulations
- Prepare and test the vehicle
- Perform pre and post processing of test data

Crash Simulation Training (LS-Dyna, Pamcrash)

During "Crash Simulation Training" experienced Microsys simulation engineers train customers in:

- Pedestrian Protection Simulation
- Free Motion Headform Simulation
- Pendulum Impact Simulation
- Any safety related CAE Simulation on customer request

Universal Impactor Test System

System Description

The Microsys Universal Impactor Test System is the best and most flexible solution for interior and exterior impactor testing.

Basic System Specifications

- Work and control medium: technical Nitrogen N2
- Supply pressure N2: up to 16 bar
- Control system: B&R
- Required power supply: 3-phase AC 2.5 kW
- Standard weight: approx. 5 000 kg

System Performance

- Accuracy of speed at the impact: <math>< 1\%</math>
(on customer request down to): ± 0.2 km/h
- Accuracy of velocity measurement: ± 0.036 km/h
- Trigger and running precision: ± 1 ms
- Testing angles: all axes fully rotatable

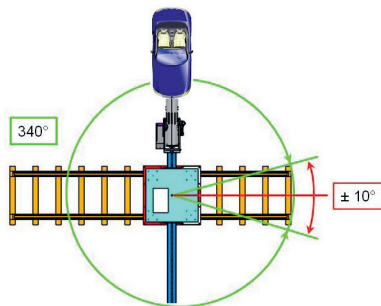
System Performance: Productivity

The following is the typical number of tests can be performed by a team of 1 system operator and 1 assistant within an 8 hour period:

- Headform tests: 8 - 10 tests/day
- Legform tests: 5 - 6 tests/day
- Upper leg tests: 5 - 6 tests/day

(These numbers take into account the required time for changing test parts between two tests and the time needed for light and camera position changes - technically 1 test per minute is feasible)

Travel of System

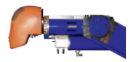


- X-direction: 2 100 mm/accuracy <math>< 0.1\text{ mm}</math>
- Y-direction: 4 000 mm/accuracy <math>< 0.1\text{ mm}</math>
- Z-direction: 2 200 mm/accuracy <math>< 0.1\text{ mm}</math>
- Rotation: 340° /accuracy <math>< 0.1^\circ</math>
- Accuracy of impact location: ± 0.5 mm
(All travel can be modified to customer request)

Load Cases & Launcher Type

Free Motion Headform:

- FMVSS 201u/TP 201U



Launcher XS

Pedestrian Protection Headform:

- 2009/78/EC (ECE-R127)
- Euro NCAP - Pedestrian Protection Protocol
- GTR 9 - Pedestrian Protection
- TRIAS 63-2004 Japanese Pedestrian Protection
- GB 24550



Launcher M

Pedestrian Protection Lower and Upper Legform:

- 2009/78/EC (ECE-R127)
- Euro NCAP - Pedestrian Protection Protocol
- GTR 9 - Pedestrian Protection
- JARI Flex PLI
- GB 24550



Launcher L



Launcher L



Launcher M

Ejection Mitigation:

- FMVSS 226
- Customer specific

H - Pendulum and Knee Pendulum:

- ECE-R21, -R80, -R25
- ECE-R17
- TRIAS 20
- 74/60/EC
- GB 11552
- FMVSS 201
- Customer Specific



H Pendulum



Knee Pendulum

Body Block:

- ECE-R12
- FMVSS 203
- GB 11557



Launcher L

Linear Impactor:

- ECE-R12
- FMVSS 203
- GB 11557



Launcher L

Pedestrian Protection Active System Objects:

- Any user defined object could be launched as specified below:
- Velocity up to 55 km/h (depending on the mass)
- Mass up to 20 kg (depending on the velocity)



e.g. PDI-2

* according to the latest revision status