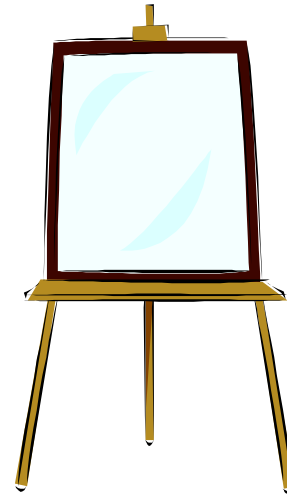


# Testing of weighing instruments



## Contents:

- Different roles of SP
- Scope of accreditation
- Facilities for tests
- Typical delivery times
- Directives related to weighing instruments
- Service commitments



# Roles of SP – mass, force and pressure



- **We are:**

- the notified body in Sweden for type approvals of NAWI (and will soon be notified for MID)
- accredited for testing according to all different OIML recommendations for NAWI and AWI
- accredited for testing automatic instruments for axle weighing of road vehicles in motion
- authorised to issue OIML certificates
- the Swedish national metrology institute for the quantities mass, force, torque, pressure and vacuum

# Accreditation for testing of weighing instruments



<b>OIML R 50</b>	Belt weighers
<b>OIML R 51</b>	Checkweighers, graders, postal scales, weighing systems used in vehicles, ...
<b>OIML R 60</b>	Load cells
<b>OIML R 61</b>	Gravimetric filling instruments
<b>OIML R 76</b>	Nonautomatic weighing instruments NAWI (EN 45501)
<b>OIML R 106</b>	Rail-weighbridges
<b>OIML R 107</b>	Totalizing hopper weighers
<b>OIML R 134</b>	Weighing vehicles in motion (total vehicle)
<b>WIM-CD</b>	Axle weighing of road vehicles in motion

# Facilities for tests of Automatic Weighing Instruments (AWI)



## Tests in laboratory

- Tests of functionality and software of modules, sub-assemblies or the complete instrument
- EMC and influence factor tests

## Tests in the field

- In any country where a suitable reference instrument and/or weights can be found (location: end user or manufacturer)
- Type approval Certificate (TAC), Test certificate (TC) and OIML Certificate
- Delivery time **6 weeks** (documentation, laboratory tests and certificate)
- Delivery time for field tests depends on test location

# Facilities for tests of Non-Automatic Weighing Instruments (NAWI)



## Tests in laboratory

- Tests of functionality, performance and software of modules or the complete instrument
- EMC and influence factor tests
- All sizes of instruments

## Tests in the field

- In any country where a suitable reference instrument and/or weights can be found (location: end user or manufacturer)
- TAC, TC and OIML Certificate
- Delivery time from **3 weeks** (documentation, laboratory tests and certificate) if TCs for all modules are available (excluding field tests)
- Delivery time for field tests depends on test location

# Facilities for tests of indicators, WELMEC 2.1



- Up to 10 000 scale intervals
- Verification scale interval below 1  $\mu\text{V}$
- Temperature range  $-40\text{ }^{\circ}\text{C}$  to  $+70\text{ }^{\circ}\text{C}$
- TC and Test Reports (TR)
- Delivery time **5 weeks**

# Facilities for tests of POS devices, WELMEC 2.2



- Functionality and disturbances
- TC and TR
- Delivery time **4 weeks**
- SP is responsible in WELMEC for the guide 2.2

## Facilities for tests of software, WELMEC 2.3



- Evaluation of software
- TC and TR
- Delivery time **3 weeks**



# Facilities for tests of storage devices, WELMEC 2.5



- Evaluation
- TC and TR
- Delivery time **2 weeks**

# Facilities for tests of load cells, OIML R 60

- Class B, C and D
- Capacities up to 100 tonnes
- All types
- Temperature range  $-20\text{ °C}$  to  $+70\text{ °C}$
- Humidity, barometric pressure
- Test Certificates (TC) and OIML Certificates
- Delivery time **6 weeks** (**3 weeks** if 2 load cells are delivered for test)



# Facilities for climatic testing

## Accredited testing services:

- Temperature/humidity -  
IEC 60 068-2-1, -2, -3, -13, -14,  
- 30, -38, -56  
IEC 60 945, GR-63-CORE, Lloyds  
Register, DNV Certification Notes,  
E10/IACS
- IP-classification – IEC 60 529,  
Lloyds Register

## Equipment:

- Wide range of climatic chambers  
with sizes up to 22 m<sup>3</sup>
- Temperature range –70 °C to  
+175 °C (walk-in chambers range  
–70 °C to +90 °C)
- Humidity range 5 % rh to 98 % rh



# Facilities for mechanical testing

## Accredited testing services:

- Vibration - IEC 60 068-2-6, -50, -51, -64
- Shock and bump – IEC 60 068-2-27, -29
- Drop, topple and free fall - IEC 60 068-2-31, -32
- IEC 60 945, GR-63-CORE, Lloyds Register, DNV Certification Notes, E10/IACS

## Equipment:

- Electrodynamic vibrators – max limits:
  - ✓ force 53 kN,
  - ✓ acceleration 100 g peak, 50 g RMS,
  - ✓ amplitude 50 mm peak-peak,
  - ✓ frequency 5 – 2000 Hz,
  - ✓ load 7250 kg (horizontal), 700 kg (vertical)
- Shock testing equipment – max limits: acceleration
  - ✓ 20-1500 g,
  - ✓ pulse 20-0,5 ms



MTm testing of weighing instruments

# Facilities for EMC tests

## EMC chambers

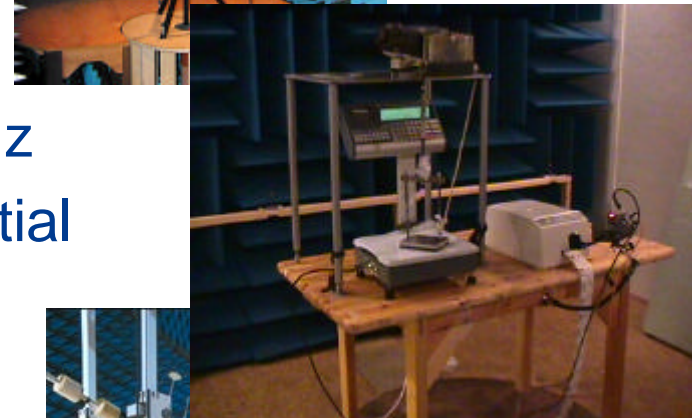
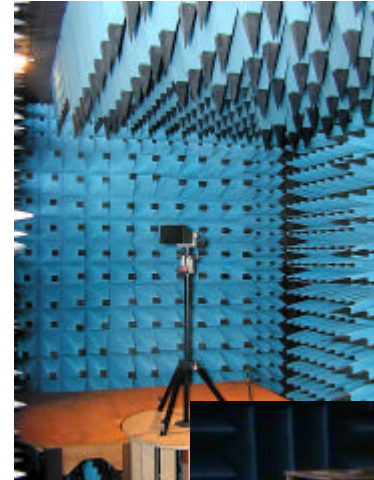
- Test object up to 60 000 kg

## Immunity

- Field strength up to 200 V/m
- Frequency range up to 18 GHz
- Transients: Industrial, residential and vehicle environments

## Emission

- Radiated and conducted
- Frequency range up to 40 GHz



MTm testing of weighing instruments

# Testing during development phase

## Testing of hardware modules

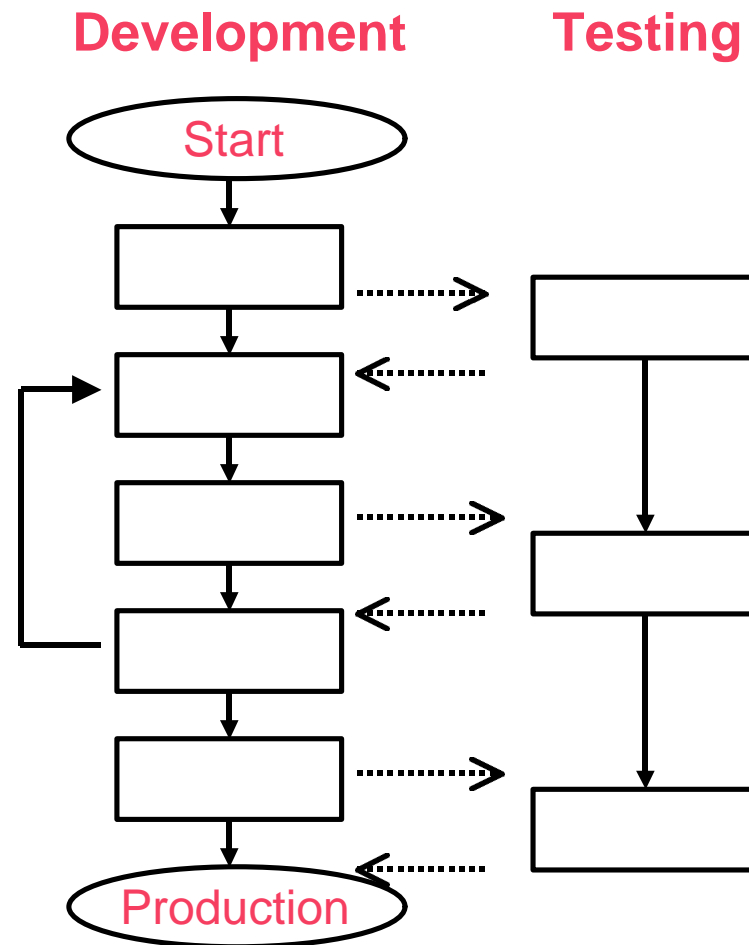
- Climate testing
- Vibration testing
- EMC testing
- Functionality testing

## Evaluation of software

- Functional specifications
- Validation
- Design review

## Other support

- Interpretation of requirements
- Technical file



# Possibilities for type approvals



## Issued in

English and Swedish

## Documentation in

French, German or English

All Scandinavian languages including Finnish

# Directives related to weighing instruments



- EMC directive (89/336/EEC)
- **Low voltage directive (73/23/EEC)**
- Machinery directive (98/37/EC)
- ATEX directive (94/9/EC)
- Medical devices directive (93/42/EEG)
- Prepackages (75/106/EEG and 76/211/EEG)
- **SP is notified for all these directives and is able to issue relevant certificates**



# Service commitments by SP



- **Advice** to applicants about technical requirements and possibilities for approvals at different markets
- **Fixed price** if the documentation is sufficient and the instrument passes all tests
- **Delivery time promise** >> if there is a delay of more than five working days caused by SP a price reduction of 10 % will be given
- The customer:
  - will receive regular project progress reports by e-mail
  - will receive all test data
  - is allowed to be present during tests
- After sales service e.g. questions connected to reverifications in other countries about the issued approval

