

## DOOR TESTING PROCEDURE FOR THE DETERMINATION OF QUALITY

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### ABSTRACT

*As part of the studies and research undertaken at the National Institute of Wood Bucharest, methodologies were elaborated in order to determine the physical and mechanical characteristics of doors. These are also in the process of alignment to the International and European Norms. The work presents a procedure of wooden door testing in laboratory conditions. The procedure emphasises the main steps and operations, respectively the stages of door testing with a view to the value determination of the main characteristics. The verification and the testing is performed by means of devices, installations and equipment of the laboratory for door and window testing of N.I.W.(I.N.L.) Bucharest. The procedures and the installations of this laboratory have been elaborated and improved in time, as part of the studies and experiments performed for the research contracts.*

### 1. OBJECT

The procedure establishes the methods for verifying the quality of wooden doors equipped with accessories, mounted in civil and industrial constructions. The procedure can be also used for doors made of other materials. The accessories and the equipment for doors are mounted on products and are tested at the same time and by the same procedure.

### 2. APPLICATION FIELD

The procedure is applied in the door and window testing laboratory of the Institute, and is used by the Institute employees, by the quality responsible and by persons from the exterior representing inspection and accreditation organisms, authorized for control with the approval of the laboratory head and of the Institute management.

### 3. REFERENCE DOCUMENTATION

- |     |                |   |
|-----|----------------|---|
| [1] | SR EN 24: 1996 | The measuring of the general planeness of door sheets.  |
| [2] | SR EN 25: 1996 | The measurement of dimensions and rectangularity defects of door sheets.  |
| [3] | SR EN 43: 1998 | Door testing methods. The behaviour at humidity variations of doors sheets placed in uniform successive climate conditions. |

[4] SR EN 79: 1998	Doors testing methods. The behaviour of door sheets placed between rooms of different climate conditions
[5] SR EN 85: 1998	Door testing methods. Door sheet testing at percussion with hard bodies.
[6] SR EN 08: 1996	Door testing methods. Testing of the door sheet deformation in its plane.
[7] SR EN 129: 1999	Door testing methods. Testing of the door sheet deformation at torsion.
[8] SR EN 130: 1997	Door testing methods. The determination of rigidity modifications of door sheets at repeated torsion
[9] SR EN 162: 1997	Door testing methods. Door sheet testing at the impact with a heavy and soft body.
[10] STAS 799: 1988	Wooden doors and windows General technical conditions of quality.
[11] *STAS 6161/2 – 1989	Constructions acoustics. The measurement of the insulation capacity to noise. Measuring method.
[12] *STAS 7771/1 - 1981	Safety measures against fire. The determination of the resistance to fire of the constructive elements.
[13] *STAS 7771/2 - 1975	Safety measures against fire. The determination of the resistance to fire of windows.
[14] STAS 9266 – 1998	Timber. Determination of humidity.
[15] STAS 9317/1 - 1987	Joinery for civil and industrial constructions. Methods for quality verification
[16] STAS 9322 – 1989	Doors and windows. Classification and terminology
[17] *STAS 12057 – 1982	The measurement of the resistance to thermal transfer of the closing elements of buildings.
[18] MC - T – I.N.L.	The quality manual for I.N.L. labs.
[19] PG - T – I.N.L. – 01	The general procedure of elaboration, spreading and control of a working procedure.
[20] PG – T – I.N.L. – 02	The general procedure of order reception and testing performance
[21] PG – T – I.N.L. - 03	The general procedure of elaborating testing reports

#### 4. TERMINOLOGY

Terminology for doors – according to STAS 9322 – 1989

Quality terminology – according to MC – T – I.N.L.

#### 5. PROCEDURE RULES

**5.1. Initiation conditions** – according to PG – T – I.N.L. 02

#### 5.2. Testing preparations

For the testing, the following are prepared

- STAS 9317/1 – 1987

- STAS 9266 - 1989

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For the balcony doors the PS - TB - INL 02 procedure is applied.

\* The fire and acoustic testings for windows are not executed in I.N.L. Bucharest, these representing the object of collaboration with specialized labs, which have the equipment specified in the mentioned standards and have the authorization of the Fire Department (STAS 7771/2 – 1982, paragraph 8.2). These determinations are performed in collaboration with INCERC Bucharest.

- SR EN 24: 1996
- SR EN 25: 1996
- SR EN 108: 1996
- SR EN 130: 1997
- SR EN 162: 1997
- SR EN 43: 1998
- SR EN 79: 1998
- SR EN 85: 1998
- SR EN 125: 1998
- the testing devices and equipment must be in perfect functioning state
- the tested products, according to STAS 9317/2 – 1987, paragraph 2 - the registration sheet of the testing parameters, according to APPENDIX 1 of the testing bulletin.
- the product documentation which specifies the reference level of the values of the testing parameters.

### 5.3. Working procedure

The verification of the door sheets is performed as follows:

- **the defects of the general planeness** – according to SR EN 24: 1996
- **dimensions** – according to STAS 9317/2: 1987, point 2.1
- **execution** – according to STAS 9317/2: 1987, point 2.7
- **the wooden material** – according to STAS 9317/2:1987, point 3.2
- **humidity** – according to STAS 9317/2: 1987, point 3.3
- **local planeness** – according to STAS 9317/2: 1987, point 3.6.

The measurement of the dimensions and of the rectangularity defects of the door sheets is done according to SR EN 25: 1966.

The equipment and the necessary devices used for these verifications are the following:

- working place for windows and doors verifications
- working table for the verification of doors and windows;
- metallic rule – INL, tape measure
- caliper 0-150mm or 0-300mm, div. 0.1mm
- indicator dial 0-100mm, div. 0.1mm, RDG
- Feutron electric humid-meter – 2003 (0 - 40%, div. 1%)
- **the behaviour of the door sheets at uniform successive climates**, at humidity variations, according to SR EN 43: 1998
- **the behaviour of the door sheets placed between two rooms of different climate conditions**, according to SR EN 79: 1998

The stand of door sheet testing at temperature and humidity variations is used.

The following tests are performed:

- **shock tests** – according to SR EN 85: 1998

The following equipment and devices are used:

- working stand for testing at static bending, percussion with a hard body and with the sand-sack, transversal shearing I.N.L.

- indicator dial 0-100mm, div 0.1mm
- caliper 0-150mm or 0-300mm, div 0.1mm

- **door sheet testing at deformation in its plane** - according to SR EN 108: 1996.
- **door sheet testing at torsion** - according to SR EN 129: 1999
- **the determination of the door sheet rigidity modifications at repeated torsions** – according to SR EN 130: 1997

The following equipment and devices are used:

- working stand for window and door testings – I.N.L.
- caliper 0-150 mm or 0-300 mm, div 0.1 mm
- indicator dial 0-100 mm, div 0.1 mm RDG

- **the testing of the door sheets at the impact with a heavy and hard body** – according to SR EN 162: 1997

The following equipment and devices are used:

- working stand for testing at static bending, percussion with a hard body and with the sand-sack, transversal shearing I.N.L.
- indicator dial 0-100 mm, div 0.1mm RDG
- caliper 0-150 mm or 0-300 mm, div 0.1mm

- **physical-mechanical testing** – according to SR EN 9317/2: 1997

The following are determined:

- the resistance at static bending in horizontal plane – according to 3.8
- the resistance of the wooden frame at transversal shearing – according to 3.11
- the resistance at immersion into cold water – according to 3.12
- the resistance of the interior structure – according to 3.13
- the resistance at screw pulling out – according to 3.14
- the resistance at successive opening - closing actions – according to 3.15
- the resistance at handle pulling out – according to 3.16

The following equipment and devices are used:

- working stand for window and door verifications – I.N.L.
- metallic rule – I.N.L, tape measure
- caliper 0-150mm or 0-300mm, div0.1mm
- indicator dial 0-100mm, div 0.1mm RDG
- universal testing machine
- working stand for door testing at immersion

The admissibility conditions for the wooden material are presented in Table 1 and the deformations of the mechanical solicitations in STAS 799- 1988, point 2.4.2.

## **6. ATTRIBUTIONS, RESPONSABILITIES** – according to PG – T – I.N.L.

## **7. REPORTS, REGISTRATIONS, CODIFICATIONS – according to PG – T – I.N.L.**

The elaboration method of the testing report and of the appendices is specified in PG – T – I.N.L. - 03; the model of the door testing bulletin is established by common agreement between the person in charge of quality for the testing labs and the lab supervisor. The contents of the door testing bulletin is provided in STAS 9317/2 – 1987.

## **8. REFERENCES**

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