NON DESTRUCTIVE MATERIAL TESTING

RM TESTINGS

Rail testing train

TESTING PROCESSES

- **VT: Visual testing**
- **PT: Dye penetrant testing**
- **MT: Magnetic particle testing**
- **UT: Ultrasonic testing**
- **RT: Radiography testing**
- **ET: Eddy current testing**

RM TESTING STANDARDS

- **MSZ EN 15085**

  Railway applications - Railway rolling stock and welding of vehicle components

  1. part: General requirements

  2. part: Requirements for welding plants and certification

RM TESTING STANDARDS

- **MSZ EN 15085**
  - **3. part: Requirements for planning**
  - **4. part: Requirements for manufacturing**
  - **5. part: Inspection, documentation**

MSZ EN 15085
2. part

- **5.1.4 Testing personal**

- The welding plant must have a sufficient number of qualified tester for the quality control within the workshop.

- The necessary inspections (VT, PT, MT, UT, RT, ET) can perform only by at least level 1 tester with correct product area, in accordance with MSZ EN 473.

MSZ EN 15085
2. rész

- The necessary inspections (VT, PT, MT, UT, RT, ET) can perform only by at least level 2 tester with correct product area, in accordance with MSZ EN 473.
- The welding supervisor or coordinatior is responsible for the inspection of the testings.
- The testing supervisor is responsible for the techical supervising of the testings.

MSZ EN 15085
2. part

- AThe NDT testings can perform by external tersers also with certificate acc. to DIN EN 473.
- The welding coordinator educate the VT testers acc. to MSZ EN 15085–3, 5.
- Level 3 tester can perform the testing supervising for each procedure.

DIN 27201-6

4.2.3 Personal for NDT and VT testing

- Certificate acc. to MSZ EN 473 is needed.
  - VT, MT, UT: w + RM
    (MM or EM and RM, 9. sector)
  - PT, RT, ET: w + MM
    (MM or EM and RM, 6. sector)

DIN 27201-6

4.2.3 Personal for NDT and VT testing

- **The VT testers has to be educated by the welding supervisor about the criterias of DIN 6700-5!**

- **The local visual tester (SP) has to fulfill the requirements of MSZ EN 970, 4.**

DIN 27201-7

4. GENERAL REQUIREMENTS

- **Technically competent place**
  - **Workshops**
- **Testing personal**
  - **Qualification of testing personal**
  - **Entitled place**
  - **Requalification**
  - **Testing supervison – Level 3**
  - **Testers right**

DIN 27201-7

5. REQUIREMENTS OF TESTING PROCEDURES

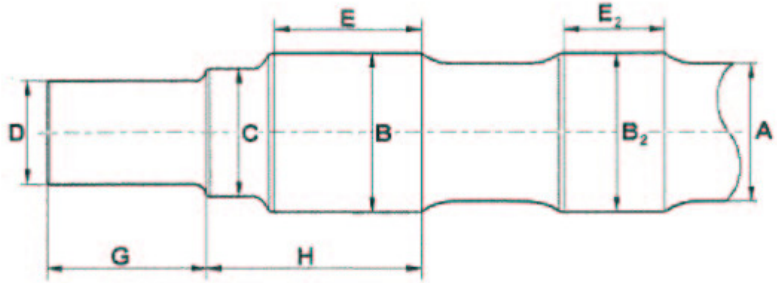
- Surface requirements

- The quality of the surface can not prevent the detection

  - VT testing ► MSZ EN 13018
  - PT testing ► MSZ EN 571-1
  - MT testing ► MSZ EN ISO 9934-1
  - ET testing ► MSZ EN 12084
  - UT testing ► MSZ EN 583-1
  - RT testin ► MSZ EN 444

DIN 27201-7
Wheel axles

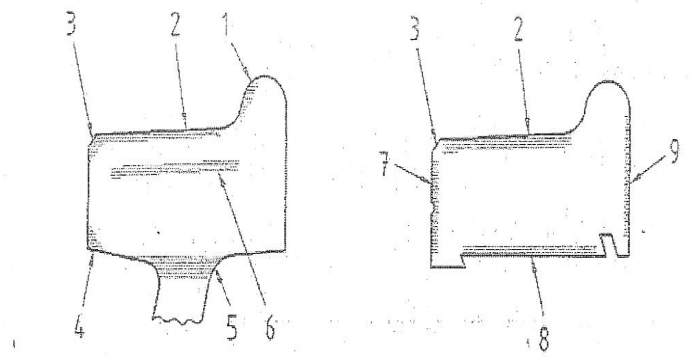
Tip.	Elj.	Szög	Irány	HH
Hossz-furat	UT	45° +	2 irány tengely-közép vég	2 mm él +12dB
Hossz-furat nélkül	UT	37°-54° 0°	2 irány tengely-közép vég	2 mm él +6 dB HVH+ 12 dB
Minden tengely	MT	-	-	2 mm lineáris jel



DIN 27201-7
Wheels

V.ter.	Elj.	V.fel.	Szög	Irány	HH
2	ET				1 mm
2	UT	9	45°	2	Ø 2 mm KTR
2	MT				2 mm
1	UT	9	60°-70°	2	Ø 2 mm KTR
3	UT	9	45°	2	Ø 2 mm KTR
4	UT	9	45°	2	Ø 2 mm KTR
4	MT				2 mm
6	UT	2	0°	1	Ø 2 mm KTR+6 dB
7-9	MT				3 mm
8	UT	2	45°	2	Ø 2 mm

1. Nyomkarima
2. Futófelület
3. Élletörés
4. Feszítőperem
5. Átmenet a gerinchez
6. Futófelűlet alatti terület
7. Külső homlokfelület
8. Furatfelület
9. Belső homlokfelület



DIN 27201-7

Bogies és vehicle frames

Eljárás	Anyag	Megjegyzés	Értékelés HH
VT	Acél, Alumínium	Nagyító, Endoszkóp	3-5 mm lineáris jelek 5-10 mm lineáris jelek
PT	Alumínium,(Acél)		3 mm lineáris jelek
MT	Acél	Járom, tekercs áramátfolyás	3 mm lineáris jelek
ET	Acél, Alumínium	Csak megfelelő felületnél	2 mm mély összehasonlító hiba
UT	Acél, Alumínium	MSZ EN 1714 szerint	MSZ EN 1712 szerint
RT	Acél, Alumínium	MSZ EN 1435 szerint	DIN 6700-5 szerint*

* A kiértékelési csoportokat a hegesztőmérnök határozza meg!

Certification procedure

1. Expand of existing certificate acc. to MSZ EN 473

- Level 1, 2: Practical exam

Test exam (RM product area)

- Level 3: Preparing a testing procedure

Test exam (RM product area)

Certification procedure

Certification acc. to MSZ EN 473 with RM industrial area

Level 1: - Practical exam (on RM test pieces)

- Verbal exam

- Test exam: General

Product area (RM industrial area)

Level 2: - Preparing a testing procedure

Practical exam (on RM test pieces)

- Verbal exam

- Test exam: General

Product area (RM industrial area)

Certification procedure

Certification acc. to MSZ EN 473 with RM industrial area

- **Level 3: Base exam:**
  - **Certification procedure**
  - **material science and manufacturing technology knowledge**
  - **4 process general exam (1 volume UT, RT)**

Certification procedure

Certification acc. to MSZ EN 473 with RM industrial area

Level 3: Main exam

- **Preparing testing procedure (with consultant, home job)**
- **Test exam (general and RM)**
- **Preparing testing procedure (by pulling task)**
- **Defending testing procedure**

Conditions of the certification

Practical exam

- Test pieces with natural defects for RM area
  - Currently we have: 54 pcs, core material 40 pcs
    in progress 30 pcs

Theoretical exam

- Test questions for RM area
- Base questionnaire is ready
- The questionnaire increase is in progress.

We have much work still needs to be done!

Thank you for your attention!