



MATERIALS HOMOLOGATION HANDBOOK

Handbook of homologation processes and
references for materials

Rationale and Description of Change

This page will be removed in the official rules book, this page is intended to provide information and background to the reviewer / reader

This handbook contains the technical specifications, test methods, laboratory procedures, and manufacturing standards necessary for the homologation of fencing equipment and materials used in FIE competitions.

This handbook is a companion document to the **Materials Rules (Book M)**, which governs competition-side obligations. This handbook focuses exclusively on manufacturer-side requirements, test procedures, and homologation processes.

Key Principles:

- Materials Rules Book → What is allowed in the Field of Play (referee/fencer focused)
- Materials Homologation Handbook → Equipment requirements, how it is tested and certified (manufacturer/laboratory focused)

Considerations:

Congress retains authority over all competition rules and safety standards. Under FIE Statutes Article 3.2.3, the Congress “determines the modifications to be made to the Statutes, the Rules for the competitions.” All safety thresholds (Newton values, material specifications, dimensional requirements), all equipment categories, and all competition-side rules remain in Book M and continue to require Congress approval by simple majority (Article 3.5.3). This does not change.

The SEMI Commission gains the flexibility it needs for purely technical procedures. The Statutes already envision SEMI having authority over testing procedures. The two-book model simply gives this existing mandate a proper home — a dedicated Handbook that SEMI can update as technology evolves, rather than requiring test procedures to go through the full Congress rule-change process.

The Executive Committee provides institutional oversight. This means technical updates are not unilateral — they require the institutional approval of the same body that manages FIE operations. The Executive Committee also has emergency decision-making authority (Article 5.5.2) after consulting the relevant commissions, providing an additional mechanism for urgent safety updates.

The Handbook is still fully binding. Book M explicitly requires compliance with the Handbook. Manufacturers who do not comply with the Handbook cannot obtain FIE homologation and cannot sell FIE-certified equipment for use in official competitions.

The Handbook is not optional guidance — it is a mandatory technical document required by the competition rules. It should be considered as having the same binding force as any FIE regulation, even though it follows a different approval pathway.

The Handbook does not affect tournament operations. This is a critical point. The content being delegated to the Handbook — laboratory test methods, manufacturing specifications, sampling plans, homologation administrative procedures — has no impact on how tournaments are organized or how competitions are run. Referees do not apply these procedures. The Handbook’s audience is exclusively manufacturers, suppliers, and testing laboratories.

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MATERIAL HOMOLOGATION HANDBOOK

Chapter 1: Homologation General Requirements

Part 1: Homologation Framework

mh.1 — General Provisions

1. Purpose and Scope

1. This handbook establishes the procedures, technical standards, and test methods required for the homologation of fencing equipment and materials.
2. The homologation system ensures that equipment used in FIE competitions meets safety, quality, and performance standards.
3. All standards in this handbook may be modified.

2. Relationship with Materials Rules

1. The Materials Rules (Book M) governs what equipment is permitted in competition and establishes functional requirements.
2. This handbook governs how equipment is manufactured, tested, certified and verified for compliance with those requirements.
3. Equipment must comply with both documents to be used in FIE competitions.

3. Mandatory Homologation

1. Homologation is mandatory for FIE competition equipment (see M Book, m.64).
2. This Handbook details the procedures for obtaining and maintaining homologation.

4. Periodic Compliance Verification

The periodic review requirements, including frequency and method of evaluation is defined for each weapon and category of equipment.

mh.2 — Field of Application

1. Equipment Requiring Homologation

1. Homologation is compulsory for all categories of equipment listed in the Materials Rules (m.66).
2. The FIE Executive Committee may extend this list at any time.

2. Additional Equipment Requiring Homologation

1. The list in m.66 is not exhaustive.
2. The FIE Executive Committee may extend the list at any time to include additional equipment or materials.

Part 2: Homologation Process

mh.3 Application Procedure

1. Initial Application

1. The homologation request must be submitted electronically to the SEMI President and the FIE office.
2. The request must contain all documents specified in the relevant technical sections of this handbook.
3. Applications must be complete and include, but not limited to:
 - a. Current letterhead with updated applicant and company contact details.
 - b. Technical drawings and specifications.
 - c. Manufacturing process descriptions.
 - d. Material certifications.
 - e. Proposed testing protocols.
 - f. Safety documentation.
 - g. Laboratory results (mh.4).

2. Initial Review

1. The SEMI President will review the application and check:
 - a. If applicant is in good standing with their required FIE fees.
 - b. If applicant contact details are current.
2. The FIE Office will contact the President of SEMI if the applicant is in good standing (fees).

3. SEMI Initial Review

1. The President of the SEMI or their designee checks the application request for:
 - a. Completeness of the application.
 - b. Completeness of documentation.
 - c. Requirement for samples.
2. The President of SEMI or the assigned SEMI designee must reply within 14 days to the applicant.

4. SEMI Sample Submission (Post Laboratory Tests)

1. Samples(s) of equipment must be sent to the President of the SEMI or their designee for analysis with respect to fencing use and to review references.
2. Reviews would include but not be limited to:
 - a. Critical safety points

- b. Application and position of label
- c. Application of use
- d. Conformity to this handbook and the Materials Rules.

5. SEMI Final Review

1. After successful physical review of samples, applications are forwarded to SEMI Commission members for final approval by vote.
2. If the SEMI Commission approves the application, the applicant is notified of the approval.

6. Certificate Issuance

1. A homologation certificate is issued upon successful completion of all stages.
2. The certificate specifies, but not limited to:
 - a. Equipment type and model.
 - b. Certificate number.
 - c. Location of labels.
 - d. Image of FIE label.
 - e. Manufacturer name and contact details.
 - f. Date of homologation.
 - g. Homologation validity period, where applicable.
 - h. Key specifications, where applicable.
 - i. Any conditions or limitations.

7. Failure or Deference of Application

1. Applications that fail at any time during the process are notified with explanations for rejection.
2. Applications can also be determined to be deferred for a period, with agreement of the applicant.

8. Application Deferral

1. Equipment failing to pass tests may be deferred to the following:
 - a. Modifications based on SEMI instructions.
 - b. If equipment modification is minor that it does not materially change the original submission, the process can continue without resubmission.
 - c. If equipment modification substantially alters the design and materially changes the original submission, the application process will require a new submission.

mh.4 Third Party Testing Requirements

1. Independent Testing Requirement

1. Testing must be conducted by institutes approved by the SEMI Commission (see Materials Rules, m.67).
2. The current list is published through official FIE channels.

2. Required Testing Documentation

Test results must be electronically submitted to the President of SEMI and their designee by:

1. The applicant; AND
2. Separately from the independent testing institute of the manufacturer's choice.

mh.5 Provisional Homologation

1. Provisional homologation may be granted under the conditions specified in the Materials Rules (m.67).
2. Results from competition testing form part of the final homologation evaluation.

mh.6 Publication of Homologation

Publication of homologation decisions follows the provisions of the Materials Rules (m.67).

mh.7 Modification Management

1. Validity and Homologation

Homologation validity is established in the Materials Rules (m.68).

2. Mandatory Reporting

1. Modification reporting obligations are established in the Materials Rules (m.68).
2. Any change to homologated equipment or its manufacturing process must be reported and may require re-homologation as specified therein.

mh.8 Re-homologation Procedure

1. Re-homologation Requirements

1. When re-homologation is required under the Materials Rules (m.68), the following applies:
 - a. Modified equipment.
 - b. Changes in manufacturing process that materially alters the original design
2. No abbreviated or expedited process is available for modifications.
3. The manufacturer must not produce or commercialize modified equipment without proper homologation approval.

Part 3: Quality Control and Compliance

mh.9 Quality Control

Quality control is exercised in accordance with the Materials Rules (m.73)

1. Samples

Samples may be obtained from a variety of sources such as retail, competition, from manufacturers, or from Federations.

2. Non-conformity of Quality

Actions taken by the FIE for non-conformity may include:

1. Warning to manufacturer
2. Requirement for corrective action
3. Application of penalties
4. Suspension of homologation
5. Withdrawal of homologation

Part 4: Penalties

mh.10 Penalties for Non-conformity

1. Grounds for Penalties

Penalties may be imposed on the grounds set out in the Materials Rules (m.72, m.73), including but not limited to:

1. Manufacturers make false claims about homologation status.
2. Equipment bears FIE marks without valid homologation.

2. Types of Penalties

1. Financial penalties
2. Suspension of homologation
3. Withdrawal of homologation
4. Prohibition from future homologation applications for a specified period
5. Public notification of non-conformity

Part 5: Marks, Expenses, and Administration

mh.11 FIE Emblem and Trademark

1. The FIE emblem and its use on homologated equipment are governed by the Materials Rules (m.70).

2. Manufacturers must comply with all trademark and labeling obligations therein.

Part 6: Label of Quality

mh.12 Label of Quality Specifications

1. General Requirements

1. The quality label must be:
 - a. Indelible
 - b. The included FIE emblem is circular in shape
2. The quality label must include the following data:
 - a. The emblem of the manufacturer
 - a. The date (year and month) of manufacture
 - b. The emblem of the FIE
 - c. For protective clothing: Newton resistance rating (e.g., "800N")
 - d. Any additional information required by specific equipment standards
 - e. Any additional information required by the FIE

2. Size Requirements

1. For masks: diameter of 25 mm
2. For uniforms (jackets, breeches, under-plastrons): diameter of 50 mm
3. For blades: 7 mm wide

3. Placement

1. The label must be placed in a location where it:
 - a. Is clearly visible for inspection
 - b. Does not interfere with the function of the equipment
 - c. Cannot be easily removed or tampered with
2. Specific placement requirements are defined in the relevant equipment sections of this handbook

Part 7: Expenses

mh.13 Fees and Expenses

All expenses related to homologation are borne by the applicant (Materials Rules, m.71). In addition:

1. Fees paid for homologation applications are non-refundable even if homologation is denied.
2. Manufacturers bear all costs associated with failed tests and re-submission.

3. Fee amounts and payment schedules for all homologation activities are determined by the FIE.
4. Fee amounts and requirements are published through official FIE channels.

Part 8: Grounds for Withdrawal or Suspension

mh.14 Grounds for Withdrawal or Suspension

Homologation may be withdrawn or suspended on the grounds specified in the Materials Rules (m.72)

mh.15 Publication of Withdrawal/Suspension

Publication of withdrawal or suspension decisions is governed by the Materials Rules (m.72).

Part 9: Reinstatement of Homologation

mh.16 Reinstatement of Homologation

1. Withdrawn or suspended homologation may be reinstated upon:
 - a. Correction of deficiencies
 - b. Successful re-testing
 - c. SEMI Commission approval
2. Reinstatement requires payment of all associated fees and expenses.
3. Publication of reinstatement follows the Materials Rules (m.72).

Chapter 2: Equipment Specific Homologation Standards

Part 1: Blade Standards

mh.17 Specification for the Manufacture of Fencing Blades

1. Purpose and Scope

1. This section specifies the steel that may be used for the construction of blades for fencing, its quality, its manufacturing process, and the controls and tests to be conducted.
2. All blades used in FIE competitions must conform to the requirements of this section and to the competition-side requirements of the Materials Rules.

2. General Conditions

1. There are two approved methods of blade manufacture:
 - a. By forging a steel cylinder (Cross-section type A);
 - b. By folding a sheet of steel (Cross-section type B).
2. The steel used for the manufacture of fencing blades must have:
 - a. Ability to withstand high levels of exertion.
 - b. A high degree of resistance to breaking
 - c. Low susceptibility to corrosion.
3. The steel must conform to the applicable European standard (ISO) regarding quality.

3. Characteristics of the Material

1. The structure of the steel, after treatment and manufacturing processing to obtain the finished product, must be smooth and homogeneous.
2. Faults in the interior or on the surface of the finished product are not permitted.
3. Having definitively established the type of steel being used, the appropriate heat treatments are compulsory.

4. Mechanical Characteristics

1. The mechanical characteristics of the steel, after heat treatment, must conform to the requirements in Table I.

Table 1: Mechanical Characteristics of Steel

Parameter	Rp 0.2 (N/mm ²)	Rm (N/mm ²)	A (%)	Z (%)	KV (Joule/cm ²)	K _{1c} (MPa)	HV
Minimum Value	≥ 1900	≥ 2000	≥ 7	≥ 35	≥ 27	≥ 70	≥ 500

5. Chemical Composition

1. The allowable limits of the composition of the different elements and impurities for the different types of steel are listed in Table 2.

Table 2: Chemical Composition of Steel (in percentages)

Element	GMG	Other types*
C	≤ 0.03	*
S	≤ 0.0005	*
P	≤ 0.005	*
Si	≤ 0.10	*
Mn	≤ 0.10	*
Cr	≤ 0.50	*
Ni	18- 20	*
Mo	4-5	*
Cu	≤ 0.30	*
Sn	≤ 0.005	*
AL	≤ 0.05	*
B	≤ 0.003	*
Co	8 - 13	*
Ti	0.5- 2.0	*
Ca	0.005	*
Zr	≤ 0.02	*

**Types of steel still the subject of experiment must be included in this table, as they must conform to the characteristics detailed in the mechanical characteristics above.*

6. Manufacturing Process

The products must be subjected to a manufacturing process corresponding to those indicated for the different types of steel in Table III.

Table 3: Manufacturing Process

Type of Steel	Process
GMG	1. Forging at temperatures between 1150°C and 950°C 2. Air-cooling with the blades spaced apart 3. Mechanical machining (removal of extra thickness by reworking) 4. Homogenization at 950°C ± 10°C for 1 hour 5. Immersion heat treatment at 820°C ± 10°C for 1 hour 6. Air-cooling with the blades spaced apart 7. Ageing at 480°C for 9 hours 8. Air-cooling with the blades spaced apart 9. Cold finishing
*	

**Types of steel still the subject of experiment must be included in this table, as they must conform to the characteristics above*

mh.18 Blade Tests and Examinations

1. Tests and Examinations of Material

1. The tests and examinations to which the steel must be subjected are as follows:
 - a. Chemical analysis
 - b. Traction test
 - c. Ductility tests
 - d. Fracture resistance tests

2. Chemical Analysis (Material)

1. The sample must have a minimum mass of 50 g.
2. The chemical composition in percentage terms must conform to that laid down in Table 2 for the corresponding type of steel.

3. Traction Test (Material)

1. The test must be conducted on a test sample of circular section whose dimensions are indicated in the test device specifications (Table 4), taken from materials that have been subjected to the same heat treatment as specified for materials for the manufacture of the blades.
2. The tensile strength values must conform to those laid down in Table 1.

Table 4: Test Devices for Traction and Tensile Strength – Recommended Thicknesses

Rp0.2 / E Range	Thickness B (mm)
0.0050 to 0.0057	75
0.0057 to 0.0061	63
0.0062 to 0.0064	50
0.0065 to 0.0067	44
0.0068 to 0.0070	38
0.0071 to 0.0074	32
0.0075 to 0.0079	25
0.0080 to 0.0084	20
0.0085 to 0.0090	12.5
0.0100	6.5

4. Tensile Test (Material)

1. The test must be conducted on a test sample with a groove in the form of a “V”, taken in the longitudinal direction from materials that have been subjected to the same heat treatment as specified for materials for the manufacture of the blades.
2. The value must conform to that laid down in Table 1.

5. Fracture Toughness Test (K_{1C}) — Material

1. The K_{1C} value of the steel must be measured by traction on a CT sample which has the dimensions indicated in Table 4, made from materials subjected to the

same thermal treatment as required for the blades, notched mechanically initiating a fatigue crack at the apex of the notch.

2. The test must be conducted according to the methods indicated by the standard ASTM E 399.
3. The value must conform to that laid down in Table 1.

6. Characteristics of the Finished Product - Shape

The blades, classified according to the type of weapon, must have the shapes indicated in this handbook and satisfy the conditions established by the FIE Materials Rules.

7. Characteristics of the Finished Product - Surface Defects

The blades must be free of surface faults which could compromise their use (folds in lamination, cracks, splinters, decarbonization).

8. Characteristics of the Finished Product - Surface Roughness

1. At the conclusion of their manufacturing process the blades must be subjected to finishing to ensure a surface roughness of ≤ 0.1 mm.
2. The grinding marks must only extend in the longitudinal direction of the blade.

9. Tests and Examinations (Finished Product)

The tests and examinations to which finished blades must be subjected are as follows, but not limited to:

- a. Chemical analysis
- b. Traction test
- c. Ductility test
- d. Test of fracture toughness (K_{IC})
- e. Hardness test
- f. Microscopic examination of the structure
- g. Corrosion test
- h. Non-destructive control
- i. Fatigue resistance test

10. Chemical Analysis (Finished Product)

1. The sample must have a minimum mass of 50 g.
2. The chemical composition in percentage terms must conform to that laid down in Table 2 for the corresponding type of steel.

11. Traction Test (Finished Product)

1. The test must be conducted on a sample of circular section (see Figure 1).

2. The values of the tension characteristics must conform to those laid down in Table 1.

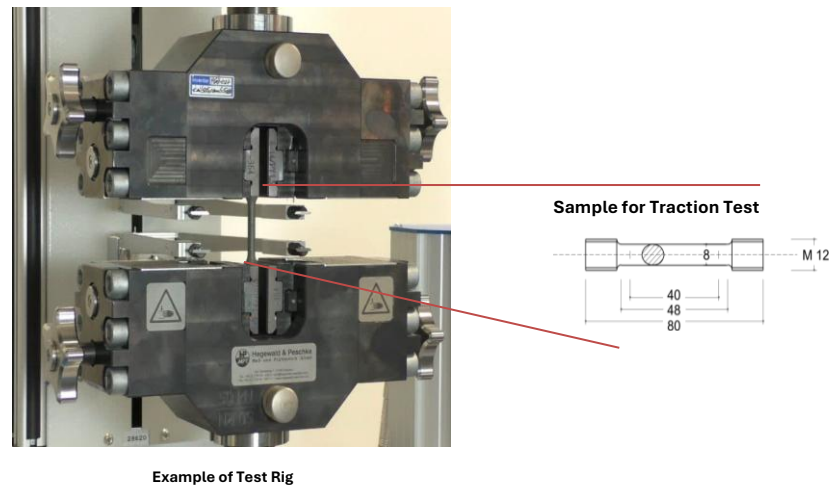


Figure 1: Example Traction Sample and Test Rig

12. Tensile Test (Finished Product)

1. The test must be conducted on a sample taken from the blade.
2. The value must conform to that laid down in Table I.

13. Fracture Toughness Test (K_{1C}) (Finished Product)

1. The K_{1C} value must be established by testing on the traction test samples.
2. The results must conform to the reference standards.

14. Hardness Test (Finished Product)

The hardness of the material, determined on the exterior surface of the finished product, must conform to that laid down in Table I.

15. Microscopic Examination of the Structure (Finished Product)

1. The examination must be carried out at 500 magnifications on a sample taken from the blade.
2. The structure submitted must be smooth and homogeneous, conforming to grain dimensions of 7–8 microns in accordance with the standard of reference and corresponding to that resulting from the heat treatment specified in Table 3 for the corresponding type of steel.

16. Non-Destructive Control (Finished Product)

1. Before being put on the market, all blades must be subjected to a non-destructive control, using an electromagnetic apparatus employing Foucault currents, to explore for surface and below-surface faults.
2. This control is compulsory and must be carried out over the entire surface of the blade.

17. Alternate Bending Test (Optional)

1. To examine the behavior of blades and the effects induced on the material when the blades are deformed in a plastic manner by the method of alternate bending, new blades selected at random and supplied from actual production lots must be subjected to test using the special equipment indicated in this handbook.
2. The test consists of:
 - a. Making a section of the blade bend plastically, in one direction with a radius of inflexion of 60 mm
 - b. Bending plastically in the opposite direction with a radius of inflexion of 100 mm, to obtain an approximate straightening.
3. The section of blades involved in the test must be approximately 155 mm long, of which 60 mm from the point must not sustain any deformation.
4. A cycle consists of one bending plus one straightening. The result of the test is represented by the number of cycles completed before the blade breaks.
5. To check safety conditions during the normal use of blades, the samples tested must be subjected to a series of alternate bends at a frequency of not more than 1 Hz (1 Hz = 1 cycle per second), verifying that the blade does not break before:
 - a. 400 cycles for foil;
 - b. 150 cycles for épée.
6. This test is not suitable for sabre blades.

18. Fatigue Resistance Test of Blades (Finished Product)

1. To examine the behavior of the blades during normal fencing activity, the blades to be tested must undergo a test of their resistance to metal fatigue, with a special apparatus, either mechanical or pneumatic, homologated by the FIE SEMI Commission.
2. The test consists of bending the blade without exceeding the limit of elasticity of the material, i.e. to the point where a bend of approximately 220 mm is reached, corresponding to a shortening of the blade by approximately 250 mm, and then allowing it to straighten.
3. The test machine must be able to allow the bending and straightening of the blade at a frequency of 1 Hz (1 Hertz = 1 cycle per second).
4. The test benches are designed to reproduce the stresses to which a blade is subjected to normal fencing activity. The stress does not go beyond the limits of the elasticity of the blades; a permanent deforming of the blade should not take place.
5. The number of bends to which a blade is subjected before breaking defines its resistance to metal fatigue.
6. The test benches can be used for bending either without impact (with the end of the blade attached to a revolving support) or with impact (with the end of the blade unattached).
7. The test should continue until the blade breaks. For the result to be acceptable, it must be ascertained that the blade does not break before:
 - a. 18,000 cycles for foil blades;

- b. 7,000 cycles for épée blades;
 - c. 20,000 cycles for sabre blades.
- 8. For the test to be considered positive it is necessary that at least 8 blades exceed the given values.
- 9. For sabre blades, it is mandatory that at least 8 blades break at ≥ 120 mm from the tip.

19. Evaluation of Progressive Fracture Surface

1. The surface of the fracture obtained at the moment of breaking in the fatigue tests above must be analyzed to measure the extent of the surface over which the rupture has developed progressively.
2. The measure must be expressed as a percentage of the surface of the entire section subject to the test.
3. The acceptability of the mechanical characteristics of the blade is confirmed when the measured percentage value is not lower than:
 - a. 15% for foil;
 - b. 6% for épée.

Table 5: Results of Tests and Examinations

Reference	Examination or Test	Required Result
Material & Finished	Chemical analysis	Must conform to Table 2
Material & Finished	Traction test	Must conform to Table 1
Material & Finished	Tensile test	Must conform to Table 1
Material & Finished	Test of fracture resistance	Must conform to Table 1
Finished only	Hardness test	Must conform to Table 1
Finished only	Microscopic examination	Must conform to mh.18 microscopic examination requirements
Finished only	Non-destructive test	Must conform to mh.18 non-destructive control requirements

mh.19 Periodic Testing and Marking of Blades

1. Periodic Testing

1. The blades, after the first homologation, remain valid under the condition that the manufacturers send the blades for a periodic test at least once every two years.
2. One of these tests must be made between 6 and 9 months before the Olympic Games.
3. These periodic tests must be carried out at least once every two years in simplified mode. Three blades will be tested for the following:
 - a. Fatigue resistance (by bending)

- b. Quality of the steel
 - c. Chemical test
 - d. Traction test
 - e. Tensile test
 - f. Test of fracture resistance (K_{1C})
- 4. If the periodic tests are not done for 4 years, the blade will be removed from the FIE official blades list. The manufacturer may request a new complete homologation process.

2. Occasional Checks

1. The SEMI Commission alone may:
 - a. Carry out occasional checks on blades (three blades);
 - b. At World Championships, obtain a selection of blades bearing the official FIE guarantee stamp;
 - c. Have the blades tested at the approved laboratories, distributing the work evenly between them.
2. Should the blades fail the tests, the manufacturers will pay for the blades and the costs of the tests, their homologation will be annulled, and the manufacturer will have to submit ten further blades for a new homologation process.
3. There will be no certificate issued for the occasional check.

3. Marking

1. The identification mark of the manufacturer and the date of manufacture (year and month) must be applied on each blade by cold-stamping near the entry into the guard, to a maximum depth of 0.5 mm.

Part 2: Mask Manufacturing Standards

mh.20 Standards for the Materials for the Mesh of Fencing Masks

1. Purpose

1. These specifications concern the technical quality of the round cold-drawn wire of carbon stainless steel intended for the manufacture of the mesh of fencing masks, the processes of its production, and the controls and tests to carry out in its use.

2. General Conditions of Raw Material

1. The steel intended for the manufacture of the mesh of fencing masks must possess excellent qualities of strength and a high level of elasticity and plastic deformation, as well as a very good resistance against corrosion.

3. Chemical Composition

1. The composition of the machined wire used to manufacture the mesh must include the following elements, in percentage terms.

2.

Table 6: Chemical Composition of Mask Wire

Element	Steel Type 304	Steel Type 304 L	Steel Type 321
C	0.03–0.06	< 0.03	< 0.08
Mn	< 2	< 2	< 2
Si	< 1	< 1	< 1
P	< 0.04	< 0.04	< 0.04
S	< 0.03	< 0.03	< 0.03
Cr	18–20	18–20	17–19
Ni	8–10.5	9–12	9–12
Ti	—	—	5 × Cmin (< 0.8)

3. For information, some of the most widely used types of steel satisfy more or less the following defined standards:
 - a. EURONORM 88-71 (EEC)
 - b. UNI 6901-71 (Italy)
 - c. AFNOR NF A 35-572 (France)
 - d. DIN 17440 (Germany)
 - e. BSI PD 6290 (Great Britain)
 - f. MNC 900 E (Sweden)
 - g. JIS G 4306-1972 (Japan)
 - h. GOST 5632-61 (Russia)

4. Processing the Steel and Manufacturing the Wire

1. The method of processing of the steel is entrusted to the supplier.
2. The hot processing to obtain the machined wire must be such that it can ensure a high level of consistency in the materials and an absence of discontinuity and of faults in the interior and on the surface.
3. The process of cold wire drawing, to reduce the section in order to obtain the desired diameter, must provide for adequate intermediate tempering for the manufacture of the tempered materials.
4. In any case the last step of the wire drawing must be preceded by:
 - a. A chemical solution treatment at 1050–1100°C (stainless steel tempering) for types 304 and 304 L; or
 - b. A stabilisation treatment at 850–900°C for type 321.
5. The last step of the cold wire drawing must involve a hardening process defined commercially as approximately 1/4 hard (H4), with a corresponding reduction in section of $\leq 15\%$ and carried out in such a way as to ensure the materials possess the minimum values of the mechanical characteristics indicated in this section.

5. Dimensions of the Wire and Tolerance

Table 7: Dimensions and Tolerance of Steel Wire

Diameter (mm)	Tolerance ¹ (mm)	Section (mm ²)	Weight per 1000 m (kg)
1.0	± 0.02	0.725	6.28

1.1	± 0.02	0.950	7.50
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- 1 - The lack of roundness of the wire must not exceed half the tolerance.

Note: Intermediate values of the diameter of the wire are allowed on condition that they conform to the tolerances indicated.

6. Conditions of Supply

The wire must be supplied bare with a polished surface: the surface must not show any faults such as scratches, pockmarks or other imperfections.

7. Mechanical Characteristics

The values of the mechanical characteristics of the wire, established at ambient temperature by the traction test, must be higher than the minimum values shown in Table 8.

Table 8: Mechanical Characteristics of Mask Wire

Parameter	Minimum Value
Combined loading of breakage R (N/mm ²)	min 700
Combined loading of gapping at proportionality < 0.2% Rp(0.2) N/mm ²)	min 700
Stretching at breakage A50 (%)	min 18

8. Tests and Examinations

1. Traction Test

This test must be conducted on samples obtained directly from the wire and in accordance with the conditions indicated by the standards of each country.

2. 180° Bending Test

- The test consists of bending the wire to 180° on a 2 mm diameter mandrel.
- After the test the wire must not show any small cracks at the point where the bend occurs.

3. Micrographic Examination of the Structure

- The examination is conducted on a cross-section of the wire (encased in sufficient resin) at a magnification of $\times 200 - \times 500$ after polishing and etching with 10% oxalic acid in accordance with the ASTM 262-70 standard or equivalent.
- A stainless structure with martensite bands must be observed; no chrome carbon precipitates may be present on the grain boundaries (see acceptable structure in accordance with the ASTM standard: "steep structure").
- The manufacturers must also send to the laboratories a square bar of 25 mm by side and with a length of 350 mm.

9. Required Documents

1. For the product corresponding to these rules the following documents must be delivered by the manufacturer:
 - a. Certificate of conformity of the chemical composition;
 - b. Certificate of control of the mechanical characteristics and the results of the bending test and the micrographic examination.

mh.21 Shape, Dimensions, and Construction of Fencing Masks

1. Purpose

These technical specifications concern the shape, the dimensions, the methods of production of the essential constituent elements of protective fencing masks, as well as the technical quality of the materials intended for their manufacture.

2. General Conditions

All the materials of which fencing masks are made and the corresponding manufacturing processes must ensure an excellent mechanical resistance, a high degree of visibility and comfort for the fencer, and a sufficient resistance to wear and tear and ageing.

3. Shape and Dimensions of Masks

1. The shape of masks is indicated schematically in Figure 1 (viewed from the front, from the side and from above).
2. The dimensions of the frontal grill depend on the dimensions of the mask.
3. The dimensions of the side grill must be as follows: the height corresponding to $\frac{3}{4}$ that of the front grill; the width being between 10 and 12 cm.

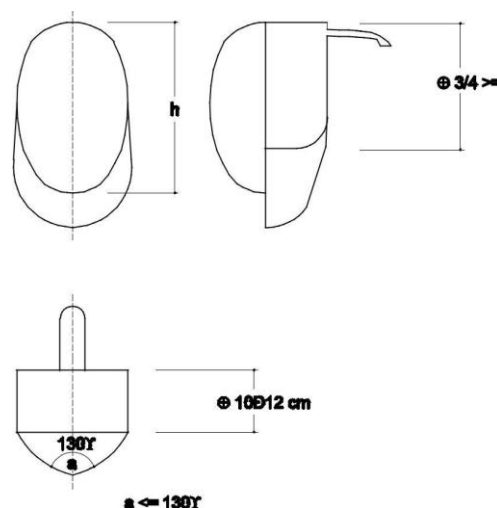


Figure 2: Mask Design

4. Essential Constituent Elements

1. The essential elements of the mask are:
 - a. Frontal grill protecting the face;
 - b. Lateral grill protecting the neck and the nape of the neck;
 - c. Strip for reinforcement and to connect the grills;
 - d. Bibs.
2. The other parts, such as the interior protecting facings, padding, elastic bands and the safety retaining devices, whose production is entrusted to the manufacturer, must conform to the conditions required for their use.
3. The rear fixing devices must ensure that the mask is located in the correct position on the fencer's head and that it remains in a perfect position, even after blows or shocks.
4. Mechanical systems for the rear device are not allowed.

5. Front and Side Mesh

1. The mesh must be made of woven material with a square aperture, with an opening of 1.9 mm, made entirely of round stainless steel wire CrNi 18-10 (the technical quality of which is addressed in Table 6).
2. In the curved zone of the grill the presence of mesh with an opening greater in size than that specified is permissible, on condition that it does not exceed 2.1 mm.
3. The frontal grill must form an interior angle of $\leq 130^\circ$, corresponding to the fold of the center line.

6. Junction of the Frontal and Lateral Mesh

1. The joining of the frontal mesh to the lateral one, by the reinforcement band, can be accomplished by a mechanical joining (for example metal wire stitching, use of rivets), or by solder.
2. In the case of solder, which in any case must be done using the usual techniques for stainless steel, the operation must be completed by a careful mechanical polishing of the soldered area, to eliminate slag and residues.
3. The mesh must be entirely covered in paint with a polymer base.
4. Any heat treatments to harden and stabilize the paint must be carried out at a temperature of $\leq 400^\circ\text{C}$.

7. Bibs

1. The bib must be formed from several layers of cloth firmly fixed to each other, of which at least one on the inside must be made of Kevlar fibre or a similar substance.
2. In any case the cloth so formed must ensure a high degree of resistance to penetration equal to or greater than 1600 Newtons, to be tested by the methods described in mh.23 (Clothing Standards).
3. The bib must also hinder the forming of stiff creases or the rolling up of the bib itself.

4. The bib must be fixed to the exterior of the grille starting from the reinforcement band onwards and extending as protection for the neck for a total height of the order of 10–12 cm.

8. Colored or Decorated Masks

1. Masks may feature colored designs on condition that they are approved by the FIE Executive Committee.
2. Approved designs are published on the FIE website and may thereafter be used in official FIE competitions.

9. Test and Certificates

1. For each model and production series of masks, the manufacturer must send three examples to the SEMI Commission to test that the mask conforms with the present specifications, as well as photocopies of the certificates delivered by the manufacturer of the mesh.
2. In the case of a positive result of this test, the manufacturer may place next to the manufacturing mark the following information: “Conforms with standard ... of the FIE” (“conforme à la norme ...de la FIE”).

Part 3: Clothing Manufacturing Standards

mh.22 Standards for the Manufacture of Protective Clothing

1. General Requirement

1. For the manufacture of fencing clothing it is obligatory to use material which is able to resist perforation by a force of at least 800 Newtons.
2. This resistance must be verified by the tests defined in this section.

2. Test Method — Resistance of Cloth Against Perforation

1. Generalities

1. The method described in this section is intended to determine the resistance against perforation of cloth used to make up fencing uniforms.
2. The perforation load is defined as the maximum value of impact registered before the sample of cloth is perforated by the test probe: the load is expressed in Newtons or in kilograms of force to one decimal place.

2. Test Equipment

1. The test takes place using a high speed dynamometer (e.g., INSTRON 1273) fitted with a moving test probe with:
 - a. A square section of 3 mm;
 - b. A pyramidal head;
 - c. An angle at the tip of 120° (see Figure 2).

2. The probe must be made of high speed or super high-speed steel, with a length of 70 mm, of which at least 50 mm juts out from the holding device (see Figure 2).
3. The travel of the point must be perpendicular to the surface of the cloth during the course of the test.
4. The speed of the probe during the test component of its travel must be more than 6 m/s.

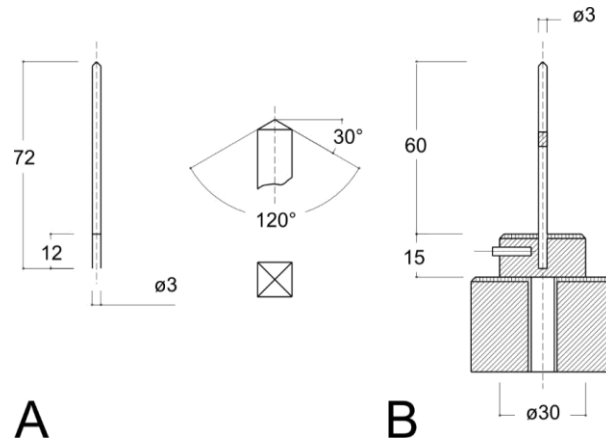


Figure 3: Test Probe

3. Test Conditions

1. The test must be conducted in a place where the temperature is 20–25°C and with a relative humidity of 50–55%.
2. The samples of cloth must be brought to the area where the test will take place at least two hours before the test.

4. Sample Preparation

1. The samples for the test must be taken from a piece of cloth around 50 cm high, free of faults and obtained at random at a distance of at least 2 m from the ends.

2. The samples must be square in shape with sides of 14–15 cm and must be fixed on a device with a double vice while leaving a section of 50 mm diameter free for the test (see Figure 3)

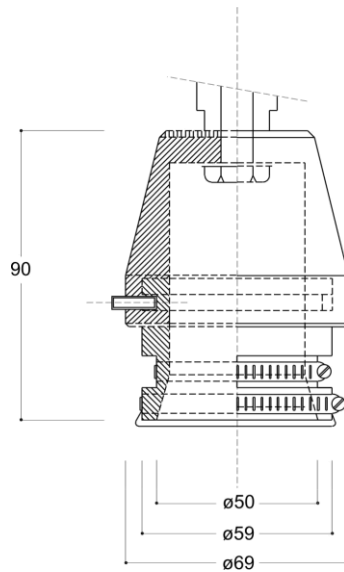


Figure 4: Fixture for Testing Cloth Resistance

3. In the case of fabrics made of several separated layers of cloth, a continuous seam must be sewn along the sides of the square of material which constitutes the sample.

5. Test Execution

1. During the test the force applied by the probe must be registered under the proper conditions of temperature and humidity.
2. The end of the scale for measuring the forces must not be more than 5000 Newtons (with a tolerance of ± 5 Newtons).
3. For each cloth, at least three samples must be tested, taken at random from the piece of cloth.

6. Reporting of Results

1. The following data must be shown on the certificate confirming that the test has been carried out:
 - a. The name of the company applying, type and brand of cloth;
 - b. The maximum force at the point of penetration for each sample and their average, and the comparative graphic traces of the test;
 - c. Specifications of the test such as but not limited to, type of dynamometer used, the type and speed of the probe in the test component of its travel, and the conditions of the test (temperature and relative humidity).

Part 4: Protective Coverage Requirements

mh.23 Protection of Fencer's Vital Parts

1. General

The following areas are considered “parts that it is vital to protect” as established by the FIE Medical Committee.

2. Protection of the Upper Body

The plastron, which is included in the jacket, must protect:

1. The neck under the bib (overlapping with the bib);
2. The two hollows above and below the collar bone;
3. The region surrounding the armpit of the sword arm;
4. The area covering the heart.

3. Protection of the Lower Body

Protection included in the trousers must cover:

1. The abdomen;
2. The groin;
3. The genital organs (inclusive of use of protective cup).

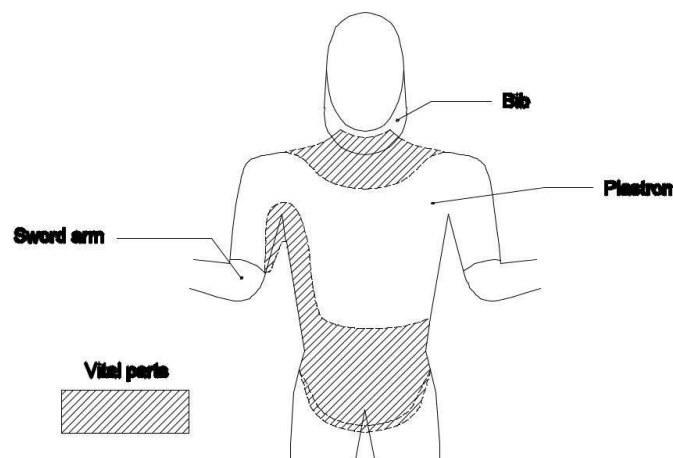


Figure 5: Visualization of Fencer's Vital Parts

Part 5: Label of Quality Specifications

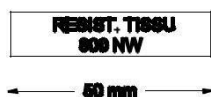
mh.24 — Detailed Label Specifications

1. Label Requirements

1. The quality label:

- a. Must be indelible;
 - b. Must be circular in shape
 - c. Must include the following data: the emblem of the manufacturer; the year and month of manufacture; the FIE emblem.
2. On blades, the label must be 7 mm wide.
 3. On masks, the label must be 25mm in diameter
 4. On clothing (jacket, breeches, and plastron), the label must be 50mm

LABELS ON UNIFORMS



LABELS ON MASKS



LABELS ON BLADES



Figure 6: FIE Quality Label Examples

2. Electronic Tracking

1. Chip label (RFID) installation requirements are currently suspended.

3. Relationship to General Label Requirements

1. The specifications in this section supplement the general label requirements set out in mh.12.