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**Inspection of non-metallic inclusions of steel -
Etching test method of tower samples**

钢中非金属夹杂物的检验

塔形发纹酸浸法

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Inspection of non-metallic inclusions of steel - Etching test method of tower samples

1 Scope

This Standard specifies the selection and preparation of samples, hairline inspection method, representation and assessment of inspection results, and test report, etc. for the use of etching test method of tower samples for inspection of non-metallic inclusions of steel.

This Standard is applicable to the inspection of the number, length, and distribution of hairlines in steel by etching test of tower samples of steel with a diameter, side length, or thickness of 16 mm ~ 150 mm. Other products or specifications may refer to.

2 Normative references

The following documents are indispensable for the application of this document. For the dated references, only the versions with the dates indicated are applicable to this document. For the undated references, the latest version (including all the amendments) are applicable to this document.

GB/T 226 Test method for macrostructure and defect of steel by etching

GB/T 8170 Rules of rounding off for numerical values & expression and judgement of limiting values

3 Terms and definitions

The following terms and definitions are applicable to this document.

3.1 Hairlines

The streaks formed by the non-metallic inclusions in steel extending in the forging-rolling direction during processing and deformation.

4 Selection and preparation of samples

4.1 Sampling method

Table 1 (continued) (in millimeters)

Step No.	Dimensions of each step, D_i (T_i)	Length, L^a
3	0.60D (0.60T)	50
Note: D - Diameter of round steel, side length of square steel; T - Thickness of flat steel or steel plate.		
^a Through the negotiation between the supplier and the buyer, it can be sampled according to the step length of $L_1=60$ mm, $L_2=72$ mm, and $L_3=90$ mm.		

4.3.3 The sample processing shall adopt a reasonable cutting process, to prevent overheating. The surface roughness R_a of the sample after processing shall be $\leq 1.6 \mu\text{m}$.

4.3.4 The surface etching of the sample shall be in accordance with the provisions of GB/T 226.

5 Hairline inspection method

5.1 The number, length, and distribution of hairlines on the entire surface of each step are observed and inspected with the naked eye, and if necessary, a magnifying glass of not more than 10 times can be used for inspection.

Note: It shall be noted that, during the inspection, the hairline is a non-metallic inclusion streak, which shall be separated from the segregation line and the loose stripe zone after etching. The latter is not included in the inspection results.

5.2 The test and inspection results shall comply with the provisions of GB/T 8170. The numerical values shall be rounded to single digit.

6 Representation and assessment of inspection results

6.1 The inspection results of hairlines shall include:

- Number of hairlines on each step;
- The total length of the hairline on each step, in millimeters (mm);
- The total number of hairlines on each sample;
- The total length of the hairline on each sample, in millimeters (mm);
- The maximum length of the hairline on each sample, in millimeters (mm).

6.2 The starting-calculation length of the hairline shall comply with the

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