

EDS

Engineering,
GM DAEWOO Auto & Technology.
Standards

PRODUCT ANALYSIS AND TOLERANCE OF WROUGHT STEEL

EDS-T-7187

ISSUED DATE: 2002. 03. 28

REVISED DATE: 2006. 06. 19

VERSION: 2

1. PURPOSE

The purpose of this standard is to define product analysis method and variation tolerance of killed steel including compressed or forged carbon steel, alloy steel, stainless steel or thermal endurance steel (hereinafter 'steel').

2. APPLICATION SCOPE

Application of this standard shall follow specifications of each product.

3. TERM

3.1. Ladle Analysis: Ladle analysis is conducted on analysis samples collected while the molten metal is being poured into a mold. The value represents average chemical components of the same molten steel.

3.2. Product Analysis: Product Analysis is performed on analysis samples collected from compressed or forged products. Analysis values can be different from Ladle Analysis values and may show differences between different samples.

3.3. Product Analysis Variation Tolerance: Product Analysis Variation Tolerance defines allowed variation of individual product analysis values where Ladle Analysis values are within specified range.

4. ANALYSIS SAMPLE COLLECTION METHOD

4.1. Product Analysis samples are collected from a position which can represent average chemical components on original steel cross section.

4.2. Analysis samples shall not contain scale, corrosion, paint, skin metal, decarburized layer or other pollutants. In addition, samples taken from mechanical fabrication shall follow KS D 1801- 2.1. Analysis samples shall not use those with corrosion, oxidation, or pollution during storage.

4.3. When collecting chemical component samples of product analysis from steel material, it can be taken at any of the following times. Here, if 4.3.1, 4.3.2 or 4.3.3 cannot be used for analysis sample collection, an appropriate method based on 4.1 and 4.2 can be used for sample collection. Here, sample collection method can be determined through consultation of the manufacturer and the user.

4.3.1. For large diameter steel material: Analysis samples of large diameter material including bloom, billet, slab or single steel product shall be taken in principle using a drill parallel with steel length from the center of its cross section and middle of the outer surface, or from a side surface perpendicular to the steel side surface at a mid point between the center and the outer surface. Here, the drill diameter shall be 12mm or larger. For steel material with vacant interior such as a thick steel pipe, take samples from middle of interior and outer surfaces.

4.3.2. For a small cross section steel material: When the above method cannot be used for a thin steel material such as sheet steel, rod, flat steel, form steel, beam, steel line or steel pipe, cut entire cross section or a surface

from the center to a side using mechanical fabrication, or penetrate a side to the center using a drill for sample collection. Here, the drill used shall have diameter of 6mm or larger. Larger diameter is preferred. Here, in case of a welded steel pipe, avoid welded areas.

4.3.3. Coiled thin steel plate: Take a test sample of width 50mm or larger across the entire width perpendicular to the direction of rolling. Wash this piece in acid or grind it to remove scales and attached matters from surface. Fold this piece several times from middle of lengthwise direction, fold it to a suitable size. Analysis sample can be made by machine cutting lengthwise of the original test piece or collected by drilling with a large diameter of 6mm or larger from its surface through its entire thickness. For thin sheet steel in particular, two or more test pieces should be folded and bent for taking samples.

4.4. When taking spectrometry samples from steel material, follow 4.1 and take analysis samples suitable for KS D 1650 and KS D 1660 from a position based on 4.3.1 and 4.3.2. Here, if spectrometry samples are not collected according to 4.1, such analysis shall not be performed.

5. PRODUCT ANALYSIS VARIATION TOLERANCE

5.1. Product Analysis Variation Tolerance shall follow Table 1~4.

For carbonated steel, apply Table 1 and Table 2; apply Table 3 to alloy steel (excluding stainless steel and heat endurance steel); apply Table 4 to stainless steel and heat endurance steel. Such applications shall follow each product's specifications.

5.2. Values from product analysis that are beyond the max and min values of chemical component specifications shall not exceed the sum of upper limit plus max value or lower limit minus the min value of variation tolerances in Table 4. Here, if chemical component specifications are specified, they are taken as the min value. Also, if only min value is specified, it is taken as the min value of chemical component specifications.

5.3. Variation tolerances of a single type of steel material shall use the entire or part of a table and shall not mix values from two or more tables.

6. RECOLLECTION AND RE-ANALYSIS OF TEST SAMPLES

6.1. If analysis results do not satisfy this standard, analysis samples can be retaken and another analysis can be performed based on agreement by vendor and customer.