



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 37306.2-2019

**Metallic materials -- Fatigue testing -- Variable amplitude fatigue
testing -- Part 2: Cycle counting and related data reduction
methods**

Issued on: March 25, 2019

Implemented on: February 1, 2020

Issued by: SAMR; SAC

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20 times the maximum frequency.

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Foreword

GB/T 37306 "Metal material fatigue test variable amplitude fatigue test" is divided into two parts.

--- Part 1. General, test methods and reporting requirements;

--- Part 2. Loop count and related data reduction methods.

This part is the second part of GB/T 37306.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This part uses the translation method equivalent to ISO 12110-2.2013 "Metal material fatigue test variable amplitude fatigue test part 2.

Loop Count and Related Data Reduction Methods.

The documents of our country that have a consistent correspondence with the international documents referenced in this part are as follows.

--- GB/T 37306.1-2019 Metallic materials - Fatigue test - Amplitude fatigue test - Part 1. General, test methods and

Reporting requirements (ISO 12110-1.2013, IDT).

This section has made the following editorial changes.

--- Amend "Figure A.6" in the second paragraph of A.3.2 of Appendix A to "Figure A.7";

--- "See Tables C.1 and C.2", "See Table C.3" and "Parameters" in A.3.4.2.1, A.3.4.2.2 and A.3.4.2.3 of Appendix A.

See Table C.4" revised to "see Figure C.1 and Figure C.2", "see Figure C.3" and "see Figure C.4";

---In the corresponding position in Appendix A, reference is made to Figure A.11, Appendix B, Appendix C, Table C.1, Table C.2, Table C.3, Table C.4 and

Table C.5;

--- Add a corresponding reference to Table C.8 in Appendix C.

This part was proposed by the China Iron and Steel Association.

This part is under the jurisdiction of the National Steel Standardization Technical Committee (SAC/TC183).

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Metal material fatigue test variable amplitude fatigue test

Part 2. Loop Counting and Related Data Reduction Methods

1 Scope

This part of GB/T 37306 specifies methods for cyclic counting and data reduction for variable amplitude fatigue testing.

Cycle counts are binding for each test or test series, and various methods of data reduction are optional.

This section supports ISO 12110-1, which contains general requirements for variable amplitude fatigue tests, test methods, and reporting requirements.

This section applies to all load types and the term "load" refers to force, stress or strain.

The following items are outside the scope of this section.

--- Constant amplitude fatigue test with isolated overload or underload phenomenon;

---Experiment of parts or structural parts;

--- Environmental effects such as corrosion, temperature-dependent creep caused by frequency and waveform effects;

--- Multi-axis loading.

Note 1. Phase is critical when performing constant amplitude or variable amplitude controlled loading multi-axis tests.

Note 2. Frequency changes during cycling are outside the scope of this section, and subsequent chapters only deal with constant frequency cycling.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article.

Pieces. For undated references, the latest edition (including all amendments) applies to this document.

Metallic materials -- Fatigue test -- Fatigue test -- Part 1 . General rules, test methods and reporting requirements

(ISO 12110-1, Metallic materials-Fatiguetesting-Variableamplitudefatiguetesting-Part 1.

Generalprinciples, testmethodandreportingrequirements)

3 Terms and definitions

The following terms and definitions defined by ISO 12110-1 apply to this document.

3.1

Average load crossing number meancrossing

Within a given length history, the load-time history passes through the average load with either a positive or negative slope, or both.

The number of levels.

Note. For the purpose of cycle counting, the average number of load passes can also be defined as the reference load level level.

3.2

Range range

Algebraic difference between two consecutive foldback points.

Note 1. In the case of variable amplitude loading, the definition of the range varies depending on the counting method used. For example, the "total range" is defined as the highest of a given load-time history.

The algebraic difference between the peak and the lowest valley (the absolute maximum and the absolute minimum, respectively).

Note 2. When using different methods for cycle counting, the difference between the peak

and valley values of the discontinuous load is usually used as the range. But in practice, the definition of "scope"

It has been broadened and therefore can include such continuous load peak and valley types.

3.3

Reference load referenceload

The load level set for counting, the load change is superimposed thereon.

Note 1. The reference load can be the same as the average load of the load-time history, but this is not required.

3.4

Turnback point reversal

The point at which the first derivative of the load-time history changes sign (from positive to negative or from negative to positive).

Note 1. The return point appears on the peak or valley.

3.5

Irregular factor

Characterization of signal irregularities, ie the number of cycles without crossing the mean, $I=N_0/N_p$.

Note 1. N_0 is the average number of load penetration stages.

Note 2. N_p is the number of peaks.

3.6

Average load level mean-loadlevel

The average of the peak and valley values.

4.1 General

Loop counts are often used to reflect irregular load-time history. It can give a simulation of the actual sample or component being studied.

The number of different size loops for the case.

Note. The definition of the loop varies depending on the loop count method used.

Cycle counts can also be cycle counted for load-time history of forces, stresses, strains, deflection angles, or other loading parameters.