
**Corrosion of metals and alloys — Corrosion
fatigue testing —**

Part 1:
Cycles to failure testing

*Corrosion des métaux et alliages — Essais de fatigue-corrosion —
Partie 1: Essais cycliques à la rupture*



Contents	Page
1 Scope	1
2 Normative reference	1
3 Definitions	1
4 Test.....	3
4.1 Principle	3
4.2 Specimens	3
4.3 Environmental considerations.....	8
4.4 Stressing considerations.....	8
5 Apparatus	9
6 Procedure	9
7 Test report	10
Annex A (informative) Bibliography	12

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 11782-1 was prepared by Technical Committee ISO/TC 156, *Corrosion of metals and alloys*.

ISO 11782 consists of the following parts, under the general title *Corrosion of metals and alloys — Corrosion fatigue testing*

- *Part 1: Cycles to failure testing*
- *Part 2: Crack propagation testing using precracked specimens*

Annex A of this part of ISO 11782 is for information only.

Introduction

The study of cycles to failure testing uses plain or notched specimens to provide data on the intrinsic corrosion fatigue crack like behaviour of a metal or alloy and can be used to develop criteria for engineering design to prevent fatigue failures.

The study of cycles to failure can be applied to a wide variety of product forms including plate, rod, wire, sheet and tubes as well as to parts joined by welding.

The results of corrosion fatigue testing are suitable for direct application only when the service conditions exactly parallel the test conditions especially with regard to material, environmental and stressing considerations. The combination of material/load/environmental may not be directly comparable to the application. For these cases engineering judgement must be applied.

Corrosion of metals and alloys — Corrosion fatigue testing —

Part 1:

Cycles to failure testing

1 Scope

1.1 This International Standard provides guidance and instruction on corrosion fatigue testing of metals and alloys in aqueous or gaseous environments and is concerned with cycles to failure testing. Crack propagation testing is considered in ISO 11782-2.

1.2 Corrosive or otherwise chemically active environments can promote the initiation of fatigue cracks in metals and alloys and increase the rate of fatigue crack propagation. Corrosion fatigue processes are not limited to specific metal/environment systems and reliable estimates of fatigue life for all combinations of loading and environment cannot be made without data from laboratory tests.

1.3 This International Standard is not intended for application to corrosion fatigue testing of components or parts; nevertheless many of the general principles will apply.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 11782. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 11782 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7539-1:1987, *Corrosion of metals and alloys — Stress corrosion testing — Part 1: General guidance on testing procedures*.

3 Definitions

For the purposes of this part of ISO 11782, the following definitions apply.

3.1 corrosion fatigue: Process involving conjoint corrosion and alternating straining of the metal, often leading to cracking.

NOTE — Corrosion fatigue may occur when a metal is subjected to cyclic straining in a corrosive environment.

3.2 stress amplitude, S_a , in fatigue loading: One half of the range of a cycle (also known as the alternating stress):

$$S_a = \frac{S_{\max} - S_{\min}}{2}$$