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**Earthquake-resistant and subsidence-resistant design of ductile iron pipelines**

*Conception de canalisations en fonte ductile résistant aux tremblements de terre et aux phénomènes de subsidence*

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## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 5, *Ferrous metal pipes and metallic fittings*, Subcommittee SC 2, *Cast iron pipes, fittings and their joints*.

This second edition cancels and replaces the first edition (ISO 16134:2006), which has been technically revised.

The main changes compared to the previous edition are as follows:

- the classification of pipelines components in [Table 3](#) is modified;
- the relationship between seismic intensity and ground surface acceleration in [Table B.1](#) is modified;
- the calculation method of checking the safety of pipeline against ground deformation is added in [5.3](#).

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

Buried pipelines are often subjected to damage by earthquakes. It is therefore necessary to take earthquake resistance into consideration, where applicable, in the design of the pipelines. In reclaimed ground and other areas where ground subsidence is expected, the pipeline design must also take the subsidence into consideration.

Even though ductile iron pipelines are generally considered to be earthquake-resistant, since their joints are flexible and expand/contract according to the seismic motion to minimize the stress on the pipe body, nevertheless there have been reports of the joints becoming disconnected by either a large quake motion or major ground deformation such as liquefaction.

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