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**Restrained joint systems for ductile  
iron pipelines — Calculation rules for  
lengths to be restrained**

*Systèmes d'assemblages verrouillés pour canalisations en fonte  
ductile — Règles de calcul pour les longueurs à verrouiller*



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ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

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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)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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*.

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).



# Restrained joint systems for ductile iron pipelines — Calculation rules for lengths to be restrained

## 1 Scope

This document specifies a computation method used to determine the length of the ductile iron pipes to be restrained, when used for conveying raw water, drinking water, sewerage under pressure.

This computation method takes into account all common pipeline route changes, including changes in the diameter of the pipeline itself and dead ends at the extremity of the pipeline, the outside diameter of the pipe, the system test pressure (to estimate the thrust), depth of cover, the characteristics of the soil surrounding the pipe and trench backfilling methods for a worldwide usage. The characteristics of the restrained joint are not covered by this document but can also be considered to determine the restraining length using any appropriate method.

The computation method defined in this document is applicable to all types of restrained joint systems, with their operating pressure ratings of ductile iron pipelines complying with ISO 2531, ISO 7186 and ISO 16631.

NOTE 1 ISO 10804 deals with actual design of the joint for various operating pressures of the pipeline.

NOTE 2 National standards or established calculation methods can be used instead of this ISO standard.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2531, *Ductile iron pipes, fittings, accessories and their joints for water applications*

ISO 7186, *Ductile iron products for sewerage applications*

ISO 10804, *Restrained joint systems for ductile iron pipelines — Design rules and type testing*

ISO 16631, *Ductile iron pipes, fittings, accessories and their joints compatible with plastic (PVC or PE) piping systems, for water applications and for plastic pipeline connections, repair and replacement*

## 3 Terms, definitions and symbols

### 3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2531, ISO 10804 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

#### 3.1.1

##### **mechanical flexible joint**

flexible joint in which sealing is obtained by applying pressure to the gasket by mechanical means