

Planning, design and installation of irrigation schemes —

Part 3: Guide to irrigation water requirements

Confirmed
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Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee AGE/30, Irrigation and drainage equipment, upon which the following bodies were represented:

- ADAS
- Agricultural Engineers' Association
- British Agricultural and Garden Machinery Association Ltd.
- British Turf and Landscape Irrigation Association
- Health and Safety Executive
- National Farmers' Union
- National Rivers Authority
- Silsoe College, Cranfield Institute of Technology
- Silsoe Research Institute
- UK Irrigation Association
- Well Drillers' Association

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Foreword

This Part of BS 7562 has been prepared by Technical Committee AGE/30 and contains recommendations on good practice in the planning, design and installation of irrigation schemes in the UK. It is intended for the use of engineers and farmers having some knowledge of the subject. It embodies the experience of engineers successfully engaged on the design and construction of irrigation schemes so that other reasonably qualified engineers may use it as a basis for the design of similar irrigation schemes.

This Part of BS 7562 contains information and represents good practice at the time it was written and, inevitably, technical developments may render parts of it obsolescent in time. It is the responsibility of engineers concerned with the design and construction of schemes to remain conversant with developments which have taken place since publication.

BS 7562 has been prepared in six Parts as follows:

- *Part 1: Glossary of terms;*
- *Part 2: Guide for acquisition of site data;*
- *Part 3: Irrigation water requirements;*
- *Part 4: Guide to water resources;*
- *Part 5: Guide for irrigation equipment;*
- *Part 6: Guide for feasibility and implementation procedures.*

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 10, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This Part of BS 7562 gives guidance and information on irrigation water requirements.

It covers the subjects of crop water requirements, irrigation water requirements, scheduling and total volumes of water required for the design and operation of irrigation schemes.

2 References

2.1 Normative references

This Part of BS 7562 incorporates, by reference, provisions from specific editions of other publications. These normative references are cited at the appropriate points in the text and the publications are listed on the inside back cover. Subsequent amendment to, or revisions of, any of these publications apply to this Part of BS 7562 only when incorporated in it by updating or revision.

2.2 Informative references

This Part of BS 7562 refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Definitions

For the purposes of this Part of BS 7562 the definitions given in BS 7562-1:1992 apply together with the following.

3.1

soil water deficit

the amount of water required to restore the soil to field capacity

3.2

soil water reservoir

the water storage available in the soil within the effective rooting depth of the crop

NOTE The soil water reservoir is affected by variation of root depth, growth stage of the crop and crop variety.

3.3

easily available soil water

that fraction of the available water holding capacity (AWC) that can be used by the crop without adversely affecting its growth

NOTE This is normally regarded as water available at tensions of 2 bar or less. The value of the fraction depends mainly on the soil type but also on the type of crop and its transpiration rate.

3.4

irrigation cycle

the time between the start of successive irrigation applications on the same field

4 Design considerations

4.1 General

In designing an irrigation system it is essential that the total amount of water to be applied over the growing season is specified as well as how this will vary through the season, particularly as peak demands are likely to be experienced. This Part of BS 7562 shows how this essential information can be assessed. This assessment should be made at the outset of the project. Water availability should be checked with the local National Rivers Authority (NRA)¹⁾ office before any detailed planning is commenced.

Two important issues should be considered: seasonal and peak irrigation requirements.

A seasonal profile of the crop water requirement of each crop should be determined to assess how often, and by how much, it will need to be supplemented with irrigation. This information establishes requirements for licensing and storage purposes. The peak water requirement should also be established as this determines the irrigation system capacity.

Rainfall levels are an important factor in the design of irrigation systems as UK weather conditions are varied. The rainfall data obtained need to be site specific due to for example, rain shadow areas and exposed coastal sites.

Climate data on a location close to the irrigated area, over a recent 20 year period, should be obtained. This should provide a reliable estimate of average weather conditions given the considerable annual variation in weather experienced in the UK. Shorter periods will reduce the accuracy. This weather data can then be used to simulate possible irrigation schedules for design purposes.

NOTE The detailed calculations required in these estimates can be processed with the aid of a suitable computer program²⁾.

4.2 Rainfall

The designer should decide to what extent, if at all, that monthly rainfall figures are taken into account in the irrigation system design. This decision will be based on many factors including the level of risk at which the site owner wishes to operate, the crop value and response to water and economics of the design.

¹⁾ From 1 April 1996 the Environmental Agency will be the appropriate authority to contact.

²⁾ For information on the availability of a suitable computer program, write to Customer Information, BSI, 389 Chiswick High Road, London W4 4AL.