

Methods of measurement of

Liquid flow in open channels —

Part 8: Current meters —

Part 8D: Cableway system for stream gauging

[ISO title: Measurement of liquid flow in open channels —
Cableway system for stream gauging]

UDC 532.543:624.55

Cooperating organizations

The Industrial-process Measurement and Control Standards Committee, under whose direction this British Standard was prepared, consists of representatives from the following Government department and scientific and industrial organizations:

- British Gas Corporation
- British Industrial Measuring and Control Apparatus Manufacturers' Association*
- British Steel Corporation
- Control and Automation Manufacturers' Association (BEAMA)
- Council of British Manufacturers of Petroleum Equipment
- Department of Industry (Computers Systems and Electronics)
- Electrical, Electronic, Telecommunications and Plumbing Union
- Electricity Supply Industry in England and Wales
- Electronic Engineering Association
- Engineering Equipment Users' Association
- Institute of Measurement and Control
- Institution of Electrical Engineers
- Institution of Gas Engineers
- Oil Companies Materials Association
- Post Office Engineering Union
- Scientific Instrument Manufacturers' Association*
- Sira Institute

The organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the presentation of this British Standard:

- Association of River Authorities
- Clyde River Purification Board
- Ministry of Development (Government of Northern Ireland)
- National Water Council
- Scottish Development Department
- Thames Water Authority Metropolitan Water Division

This British Standard, having been prepared under the direction of the Industrial-process Management and Control Standards Committee, was published under the authority of the Executive Board and comes into effect on 31 March 1980

© BSI 09-1999

The following BSI references relate to the work on this standard:
Committee reference PCL/3
Draft for comment 77/28072 DC

ISBN 0 580 11243 8

Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

	Page
Cooperating organizations	Inside front cover
National foreword	ii
0 Introduction	1
1 Scope and field of application	1
2 Terminology	1
3 Units of measurement	1
4 General description of cableway with instrument carriage	1
5 General description of cableway with manned carriage	2
6 Functional requirements of cableway components	2
7 Maintenance	4
Figure 1 — Cableway system — Unmanned instrument carriage, with tow cable in endless circuit and separate suspension cable	5
Figure 2 — Cableway system — Unmanned instrument carriage, with tow cable and suspension cable in an endless circuit	6
Figure 3 — Cableway system — Manned carriage	7
Figure 4 — Types of manned carriage	8
Publications referred to	Inside back cover

National foreword

This British Standard is identical with ISO 4375:1979 “*Measurement of liquid flow in open channels — Cableway system for stream gauging*” published by the International Organization for Standardization (ISO).

Terminology and conventions. The text of the International Standard has been approved as suitable for publication, without deviation, as a British Standard. Some terminology and certain conventions are not identical with those used in British Standards; attention is especially drawn to the following:

Wherever the words “International Standard” appear, referring to this standard, they should be read as “British Standard”.

The comma has been used as a decimal marker. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

Cross-references

International Standard	Corresponding British Standard
ISO 772:1978	BS 3680 <i>Methods of measurement of liquid flow in open channels</i> Part 1:1979 <i>Vocabulary and symbols</i> (Technically equivalent)
ISO 1000:1973	BS 5555:1976 <i>SI units and recommendations for the use of their multiples and of certain other units</i> (Identical)

The technical committee has reviewed the provisions of ISO 31, to which reference is made in clause 3, and has decided that they are acceptable for use in conjunction with this standard.

The related British Standard for ISO 31 is BS 1991.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, 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.

0 Introduction

0.1 To obtain the measurements required in the velocity-area method of discharge measurement and in sediment sampling, it is necessary to suspend the measuring or sampling equipment at numerous points along the cross section of the channel. The most practicable way of suspending the equipment is by a cableway spanning the channel. Cableways may be erected at sites where the frequency of gaugings warrants the expense of erection. Suspension from cableways avoids the difficulties which may be experienced in gauging from bridges with piers, or from boats.

0.2 There are two basic types of cableways, namely:

- a) those with an instrument carriage controlled from the river bank (see Figure 1 and Figure 2); and
- b) those with a carriage (trolley) in which the operator travels and makes observations (see Figure 3).

1 Scope and field of application

This International Standard gives a general description, functional requirements, specification and guidelines for the design, and for the operation and maintenance of a cableway system used for stream gauging.

2 Terminology

For the purpose of this International Standard, the terms and definitions used are in accordance with ISO 772 *Liquid flow measurement in open channels — Vocabulary and symbols*.

3 Units of measurement

For the purpose of this International Standard, the units of measurement used are SI units in accordance with ISO 31 and ISO 1000.

4 General description of a cableway with instrument carriage

The cableway system with instrument carriage consists of (see Figure 1 and Figure 2):

- a) towers;
- b) track or main cable;
- c) anchorages;
- d) tow cable;
- e) suspension cable;
- f) instrument carriage;
- g) double drum winch, or two independent winches; and
- h) staylines.

4.1 Towers

The towers are erected one on each bank of the channel. The towers support the main cable at a height which will ensure unimpeded progress of the suspended equipment as it travels along the main cable between the towers. The tower on the operating bank has sheaves for guiding the suspension cable and tow cable and also means for securing the winch(es). The track or main cable must pass freely over the saddle on the top of the tower at the operating bank with negligible bending moment on the tower. The tower on the bank opposite to the operating bank has a saddle at its top for the main or track cable and a sheave for the tow cable. The height of the tower on the opposite bank shall be suitably fixed in accordance with the topography at the site.

4.2 Track or main cable

The track or main cable runs over the saddles on the top of the towers and the two ends are fixed to the anchorages. The instrument carriage travels along the main cable.

4.3 Anchorages

The anchorages are fixtures to which the track cable and staylines are attached.

4.4 Tow cable

The tow cable is attached to one of the drums in the double drum winch (or to a separate winch) and passes over the sheaves fixed to the towers. The two ends of the tow cable are fixed to the carrier making it an endless circuit to move the carriage across the stream. (See Figure 1.) Alternatively the endless circuit may be made by the tow cable (whose one end is fixed to the carrier and the other end is wound on a drum) and the suspension cable. (See Figure 2.)

4.5 Suspension cable

The suspension cable is wound on the second drum in the double drum winch (or on a separate winch) and passes over the sheave on the tower at the operating bank and then passes over the pulley in the carrier. The measuring instruments are attached to the end of the suspension cable. The suspension cable incorporates an insulated inner core which serves as electrical conductor for the instruments.

4.6 Instrument carriage

The instrument carriage is generally triangular in shape with its apex downwards. Two track pulleys are fixed at the top and one suspension pulley at the bottom. The carriage runs along the track cable when pulled from either side. The suspension guide pulley guides the suspension cable. When spans are larger than 125 m, an additional guide pulley may be fixed.