ISO 24578:2021 (E)

Hydrometry — Acoustic Doppler profiler — Method and application for measurement of flow in open channels from a moving boat

Contents

Foreword

Introduction

1 Scope

2 Normative references

3 Terms and definitions

4 Principles of the boat mounted ADCP method

4.1 General
4.2 Doppler principle applied to moving objects
4.3 Acoustic Doppler current profiler techniques
4.3.1 General
4.3.2 Pulse incoherent
4.3.3 Pulse-to-pulse coherent
4.3.4 Broadband (Spread spectrum)
4.4 Measurement of velocity profile
4.4.1 General
4.4.2 Measurement of relative velocity
4.4.3 Measurement of boat velocity
4.4.3.1 Bottom tracking
4.4.3.2 Global Navigation Satellite System (GNSS)
4.4.4 Near boundary data collection
4.5 Speed of sound in water

5 Flow determination

5.1 General method
5.2 Measurement procedure
5.3 Method dealing with moving-bed condition without GNSS system
5.3.1 General
5.3.2 Stationary moving-bed method
5.3.3 Azimuth method
5.3.4 Subsection correction method
5.3.5 Loop method
5.3.6 Mid-section method

6 Site selection

6.1 General
6.2 Site-selection criteria

7 ADCP Deployment procedure

7.1 Deployment techniques
7.1.1 General
7.1.2 Manned boat mounted
7.1.3 Tethered boat
7.1.3.1 General
7.1.3.2 Bank to bank rope deployment
7.1.3.3 Cableway deployment
7.1.3.4 Bridge deployment
7.1.4 Deployment on a remote-control craft
7.1.5 Data retrieval modes

7.2 Operation of boat
7.2.1 Boat path
7.2.2 Boat speed
7.3 Field procedures
7.3.1 Pre-field procedures
7.3.2 Field setup
7.3.3 Reviewing ADCP data during measurement
7.3.4 Post measurement requirements
7.4 Ancillary equipment
7.5 Other consideration
7.5.1 Edge distances
7.5.2 Depth measurements at sites with high sediment concentrations
7.5.3 GNSS compass
7.6 Maintenance and ADCP checks
7.6.1 General
7.6.2 Built-in diagnostic check
7.6.3 Periodic major service in the manufacturer
7.6.4 Periodic ADCP performance check
7.6.5 Physical maintenance
7.6.6 Beam-alignment test
7.7 Training

8 Uncertainty

8.1 General
8.2 Definition of uncertainty
8.3 Uncertainties in ADCP measurements — General considerations
8.4 Sources of uncertainty
8.5 Minimizing uncertainties

Annex A (informative) Velocity distribution theory and the extrapolation of velocity profiles

Annex B (informative) Determination of edge discharges

Annex C (informative) Example of an equipment check list

Annex D (informative) Example of ADCP gauging field sheets

D.1 General
D.2 List of acronyms and abbreviated terms

Annex E (informative) Beam alignment test

E.1 General
E.2 Description of procedure
E.2.1 General
E.2.2 Step-by-step procedure

Annex F (informative) Uncertainty evaluation methods

F.1 General
F.2 Software

Page count: 49