

**Techniques of Water-Resources Investigations**

**Book 9**

**Handbooks for Water-Resources Investigations**

**National Field Manual  
for the Collection of  
Water-Quality Data**



**Chapter A6.  
FIELD  
MEASUREMENTS**

*Edited by*  
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## Foreword

The mission of the Water Resources Discipline of the U.S. Geological Survey (USGS) is to provide the information and understanding needed for wise management of the Nation's water resources. Inherent in this mission is the responsibility to collect data that accurately describe the physical, chemical, and biological attributes of water systems. These data are used for environmental and resource assessments by the USGS, other government agencies and scientific organizations, and the general public. Reliable and quality-assured data are essential to the credibility and impartiality of the water-resources appraisals carried out by the USGS.

The development and use of a *National Field Manual* is necessary to achieve consistency in the scientific methods and procedures used, to document those methods and procedures, and to maintain technical expertise. USGS field personnel use this manual to ensure that data collected are of the quality required to fulfill our mission.

(signed)

Robert M. Hirsch  
Associate Director for Water

# **Techniques of Water-Resources Investigations**

## **Book 9**

### **Handbooks for Water-Resources Investigations**

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**Note: Contents current as of September 2005.**



# FIELD MEASUREMENTS

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Contents current as of September 2005.

The citation for this version of chapter A6 of the *National Field Manual* is as follows:

Wilde, F.D., ed., variously dated, *Field Measurements: U.S. Geological Survey Techniques of Water-Resources Investigations*, book 9, chap. A6, accessed from <http://pubs.water.usgs.gov/twri9A/> on \_\_\_\_\_. (After "on" insert the date on which you last accessed "Field Measurements.")



# Chapter A6.

## FIELD MEASUREMENTS

*Edited by F.D. Wilde*

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### ABSTRACT

The *National Field Manual for the Collection of Water-Quality Data (National Field Manual)* provides guidelines and standard procedures for U.S. Geological Survey (USGS) personnel who collect data used to assess the quality of the Nation's surface-water and ground-water resources. Chapter A6 presents procedures and guidelines for the collection of data on air and water temperature, and on dissolved-oxygen concentrations, specific electrical conductance, pH, reduction-oxidation potential, alkalinity, and turbidity in water.

Each chapter of the *National Field Manual* is published separately and revised periodically. Newly published and revised chapters are posted on the World Wide Web on the USGS page "National Field Manual for the Collection of Water-Quality Data." The URL for this page is <http://pubs.water.usgs.gov/twri9A> (accessed August 6, 2005).

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### INTRODUCTION

As part of its mission, the U.S. Geological Survey (USGS) collects data needed to assess the quality of our Nation's water resources. A high degree of reliability and standardization of these data are paramount to fulfilling this mission. Documentation of nationally accepted methods used by USGS personnel serves to maintain consistency and technical quality in data-collection activities. The USGS "Techniques and Methods" and "Techniques of Water-Resources Investigations" (TWRI) report series document scientific methods used by USGS personnel.

TWRIs are grouped under major subject headings called books. The Book 9 series, Handbooks for Water-Resources Investigations, is designed for field use and was developed to summarize, from other TWRIs and references, techniques for planning and conducting specialized work in water-resources investigations. The *National Field Manual for the Collection of Water-Quality Data* (*National Field Manual*) is Section A of Book 9. The *National Field Manual* is comprised of individually published chapters. Chapter numbers are preceded by an "A" to indicate that the report is part of the *National Field Manual*.

TWRI Book 9, Chapter A6 on field measurements includes procedures, techniques, and guidelines for planning and conducting specialized work in water-resources investigations. Sections and other chapters of the *National Field Manual* are referred to in this report by the abbreviation "NFM" and the chapter and (or) section number. For example, general information on temperature measurements is covered in section 6.1 of Chapter A6 "Field Measurements" and is cited here as NFM 6.1.

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## PURPOSE AND SCOPE

The *National Field Manual* provides guidelines and standard procedures to be used by USGS personnel for field activities related to water-quality data collection and analysis. This manual is targeted specifically toward data collectors in order to (1) establish and communicate scientifically sound methods and procedures, (2) encourage consistent use of field methods for the purpose of producing nationally comparable data, and (3) provide methods that minimize biasing the data and, when properly applied, that result in data that are reproducible within defined limits of variability.