
International Standard



7393/1

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**Water quality — Determination of free chlorine and total chlorine —
Part 1: Titrimetric method using
N,N-diethyl-1,4-phenylenediamine**

Qualité de l'eau — Dosage du chlore libre et du chlore total — Partie 1: Méthode titrimétrique à la N,N-diéthylphénylène-1,4 diamine

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7393/1 was prepared by Technical Committee ISO/TC 147, *Water quality*.

Water quality — Determination of free chlorine and total chlorine —

Part 1: Titrimetric method using *N,N*-diethyl-1,4-phenylenediamine

0 Introduction

ISO 7393 consists of the following parts:

Part 1: Titrimetric method using *N,N*-diethyl-1,4-phenylenediamine.

Part 2: Colorimetric method using *N,N*-diethyl-1,4-phenylenediamine, for routine control purposes.

Part 3: Iodometric titration method for the determination of total chlorine.¹⁾

1 Scope and field of application

This part of ISO 7393 specifies a titrimetric method for the determination of free chlorine and total chlorine in water.

Sea water and waters containing bromides and iodides comprise a group for which special procedures are required.^[2]

The method is applicable to concentrations, in terms of chlorine (Cl₂), from 0,000 4 to 0,07 mmol/l (0,03 to 5 mg/l) total chlorine and at higher concentrations by dilution of samples. For concentrations above 0,07 mmol/l, ISO 7393/3 can also be used.

In annex A a procedure is presented for the differentiation of combined chlorine of the monochloramine type, combined chlorine of the dichloramine type and combined chlorine in the form of nitrogen trichloride.

Several compounds influence the determination specified in this part of ISO 7393. Interferences are noted in clauses 7 and 9.

2 Definitions (see table 1)

For the purpose of this part of ISO 7393, the following definitions apply.

2.1 free chlorine: Chlorine present in the form of hypochlorous acid, hypochlorite ion or dissolved elemental chlorine.

2.2 combined chlorine: The fraction of total chlorine present in the form of chloramines and organic chloramines.

2.3 total chlorine: Chlorine present in the form of "free chlorine" or "combined chlorine" or both.

2.4 chloramines: Derivatives of ammonia by substitution of one, two or three hydrogen atoms with chlorine atoms (monochloramine NH₂Cl, dichloramine NHCl₂, nitrogen trichloride NCl₃) and all chlorinated derivatives of organic nitrogen compounds as determined by the method specified in this part of ISO 7393.

3 Principle

3.1 Determination of free chlorine

Direct reaction with the *N,N*-diethyl-1,4-phenylenediamine (DPD) and formation of a red compound at pH 6,2 to 6,5. Titration by means of a standard solution of ammonium iron(II) sulfate to the disappearance of the red colour.

3.2 Determination of total chlorine

Reaction with DPD in the presence of an excess of potassium iodide then titration as in 3.1.

Table 1 — Terms and synonyms in relation to actual compounds in the solution

Term	Synonym		Compounds
Free chlorine	Free chlorine	Active free chlorine	Elemental chlorine, hypochlorous acid
		Potential free chlorine	Hypochlorite
Total chlorine	Total residual chlorine		Elemental chlorine, hypochlorous acid, hypochlorite, chloramines

1) At present at the stage of draft.