## ISO 21400:2018 (E)

# Pulp — Determination of cellulose nanocrystal sulfur and sulfate half-ester content

## Contents

Foreword

### Introduction

- 1 Scope
- 2 Normative references
- 3 Terms and definitions
- 4 Symbols and abbreviated terms
- 5 Total elemental sulfur content ICP-OES method
  - 5.1 Principle
  - 5.2 Reagents and apparatus
  - 5.3 Sample purification by dialysis
  - 5.4 Microwave-assisted sample digestion and sample preparation
  - 5.5 Preparation of calibration solutions and blanks
  - 5.6 Analysis of standards and samples by ICP-OES
  - 5.7 Calculation of dry CNC total elemental sulfur content and CNC surface charge
  - 5.8 Test report
- 6 Sulfate half-ester content Conductometric titration method
  - 6.1 Principle
  - 6.2 Reagents and apparatus
  - 6.3 Sample purification by dialysis
  - 6.4 Sample protonation by ion exchange
  - 6.5 Sample analysis by conductometric titration
  - 6.6 Calculation of dry CNC sulfate half-ester content and CNC surface charge
  - 6.7 Test report
- Annex A (normative) Sample digestion by wet ashing
  - A.1 Reagents and apparatus
  - A.2 Digestion procedure

Annex B (normative) Sample protonation by batch treatment with ion exchange resin

#### Annex C (informative) Precision

- C.1 General
- C.2 Repeatability
- C.3 Reproducibility

Page count: 26