

# ISO 21160:2018 (E)

## Cigarettes — Determination of selected carbonyls in the mainstream smoke of cigarettes — Method using high performance liquid chromatography

---

### Contents

	Foreword
	Introduction
1	Scope
2	Normative references
3	Terms and definitions
4	Principle
5	Apparatus
6	Reagents
7	Preparation
7.1	Preparation of glassware
7.2	Preparation of solutions
7.3	Preparation of standards
7.3.1	HPLC calibration standards and working solutions
7.3.1.1	Primary carbonyl standards
7.3.1.2	Secondary carbonyl standards
7.3.2	Carbonyl working standards
8	Sampling
9	Tobacco product preparation
10	Sample generation — Smoking of cigarettes
10.1	General
10.2	Smoking machine setup
10.3	Smoking
10.3.1	General
10.3.2	Linear smoking
10.3.3	Rotary smoking
11	Sample analysis
11.1	Preparation of mainstream smoke extract solution
11.2	Reversed phase high performance liquid chromatography
11.2.1	Chromatographic conditions
11.2.2	Mobile phase reagents
11.2.3	HPLC separation conditions
11.3	Calculation
11.3.1	Calibration curve
11.3.2	Sample quantification
12	Repeatability and reproducibility
12.1	General
12.2	Results from the 2012 collaborative study
13	Test report

**Annex A (informative) Recrystallization of 2,4-dinitrophenylhydrazine**

**Annex B (normative) Example of calibration standards preparation**

**Annex C (informative) HPLC chromatogram of a typical combined carbonyl calibration standard**

**Annex D (informative) HPLC chromatogram of carbonyls in DNPH extract of mainstream cigarette smoke**

**Page count: 17**