ISO 22975-5:2019 (E)

Solar energy — Collector components and materials — Part 5: Insulation material durability and performance

Contents

Foreword

Introduction

1 Scope

2 Normative references

3 Terms and definitions

4 Requirements

4.1 General
4.2 For specific application

5 Test methods

5.1 Rigid polyurethane foam and phenolic foam
5.1.1 Standard atmospheres for conditioning and testing
5.1.2 Apparent density
5.1.3 Apparent volume percentage of open cells
5.1.4 Dimensional stability
5.1.5 Compression properties
5.1.6 Water absorption
5.1.7 Hygroscopic sorption properties
5.1.8 Water vapor transmission properties
5.1.9 Thermal resistance and thermal conductivity
5.1.10 Flammability
5.1.11 Accelerated aged value of thermal resistance
5.2 Mineral wool and mineral fibre
5.2.1 Dimension
5.2.1.1 Sampling
5.2.1.2 Apparatus
5.2.1.3 Procedure
5.2.1.3.1 General
5.2.1.3.2 Expansion of packages and cut roll
5.2.1.3.3 Expansion of full roll
5.2.1.3.4 Measurement of packages and cut roll
5.2.1.3.5 Measurement of full roll
5.2.1.4 Thickness calculation
5.2.2 Bulk density
5.2.2.1 Sampling
5.2.2.2 Apparatus
5.2.2.3 Procedure
5.2.3 Compression behaviour
5.2.4 Water absorption
5.2.4.1 Principle
5.2.4.2 Apparatus
5.2.4.3 Sampling
5.2.4.3.1 Dimensions of test specimens
5.2.4.3.2 Number of test specimens
5.2.4.3.3 Preparation of test specimens
5.2.4.3.4 Conditioning of test specimens
5.2.4.4 Procedure
5.2.4.4.1 Test conditions

5.2.4.4.2 General
5.2.4.4.3 Long term water absorption by partial immersion (Method 1)
5.2.4.4.3.1 Method 1A (drainage)
5.2.4.4.3.2 Method 1B (deduction of initial water uptake)
5.2.4.4.4 Long term water absorption by total immersion (Method 2)
5.2.4.4.4.1 Method 2A (drainage)
5.2.4.4.4.2 Method 2B (deduction of initial water uptake)
5.2.4.4.4.3 Method 2C
5.2.4.5 Calculation and expression of results
5.2.4.5.1 General
5.2.4.5.2 Long-term water absorption by partial immersion
5.2.4.5.3 Long-term water absorption by total immersion
5.2.4.6 Accuracy of measurement
5.2.5 Moisture content
5.2.6 Water vapor transmission properties
5.2.6.1 Principle
5.2.6.2 Apparatus
5.2.6.2.1 Test dishes
5.2.6.2.2 Measuring instruments
5.2.6.2.3 Template
5.2.6.2.4 Analytical balance
5.2.6.2.5 Chamber
5.2.6.2.6 Sealant
5.2.6.3 Sampling
5.2.6.3.1 Dimensions of test specimens
5.2.6.3.2 Number of test specimens
5.2.6.3.3 Conditioning of test specimens
5.2.6.4 Procedure
5.2.6.4.1 Test conditions
5.2.6.4.2 Test procedure
5.2.6.5 Calculation and expression of results
5.2.6.5.1 Change in mass of test assembly
5.2.6.5.2 Water vapour transmission rate
5.2.6.5.3 Water vapour permeance
5.2.6.5.4 Water vapour resistance
5.2.6.5.5 Water vapour permeability
5.2.6.5.6 Water vapour diffusion resistance factor
5.2.6.5.7 Water vapour diffusion equivalent air layer thickness
5.2.7 Thermal resistance and thermal conductivity
5.2.8 The maximum use temperature
5.2.8.1 Principle
5.2.8.2 Apparatus
5.2.8.3 Sampling
5.2.8.4 Procedure
5.2.8.5 Evaluation for maximum use temperature
5.2.9 Non-combustibility
5.3 Outgassing of insulation materials in solar flat-plate collectors
5.3.1 General
5.3.2 Apparatus
5.3.3 Sampling
5.3.4 Procedure
5.3.5 Analysis and criteria

Annex A (normative) Test report for insulation material

A.1 General
A.2 Description of insulation material
A.3 Test results for common and durability property of rigid polyurethane foam or phenolic foam
A.3.1 Common property test
A.3.1.1 Apparent density
A.3.1.2 Apparent volume percentage of open cells
A.3.2 Durability property test
A.3.2.1 Dimensional stability
A.3.2.2 Compression property

A.3.2.3 Water absorption
A.3.2.4 Hygroscopic sorption properties
A.3.2.5 Water vapour transmission properties
A.3.2.6 Flammability
A.3.2.7 Accelerated aged value of thermal resistance
A.4 Test results for common and durability property of mineral wool or mineral fibre
A.4.1 Common property test
A.4.1.1 Dimension
A.4.1.2 Bulk density
A.4.2 Durability property test
A.4.2.1 Compression behaviour
A.4.2.2 Water absorption
A.4.2.3 Moisture content
A.4.2.4 Water vapour transmission properties
A.4.2.5 Maximum use temperature
A.4.2.6 Non-combustibility
A.5 Thermal performance test
A.5.1 Thermal resistance and thermal conductivity
A.6 Outgassing of insulation materials in solar flat-plate collectors

Annex B (informative) Requirements for specific application

B.1 General
B.2 Requirements for rigid polyurethane foam or phenolic foam
B.3 Requirements for mineral wool or mineral fibre

Page count: 42