

Description:	<i>Introduction to Task 39 Info Sheets</i>
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Download possible at:	http://task39.iea-shc.org/

Intro

Task 39 "Polymers for Solar Thermal Applications" of the International Energy Agency's Solar Heating and Cooling Programme (IEA SHC) was a joint endeavor by polymer and solar thermal experts from industry and research. It started in 2006 with a variety of studies on polymeric materials' suitability for the application in solar heating components. Investigations on novel designs that allow for alternative materials were elaborated as well as accompanying studies on the cost-reduction potential resulting from the efficient combination of material and product design.

The first phase of Task 39 ended in 2010. Its results were published in Koehl et al. *Polymeric Materials for Solar Thermal Applications*. Weinheim: Wiley-VCH, 2012 (ISBN 978-3-527-33246-5), which is, up to this day, the first publication that synthesizes international expertise in developing a new generation of solar thermal systems based on polymers. The work was continued in a second phase of international collaboration from 2010-2014 during which significant progress was made on collector designs as well as material and component investigations that found their beginnings in Task 39 and were continued throughout its second phase.

The following collection of Task 39 Info Sheets presents the acquired know-how and current state-of-the-art on polymer research for solar thermal applications, adding those results that have not been incorporated in the hardcover publication of 2012. As add-on to the official Task 39 handbook they pinpoint the most recent developments in the field open for download at: <http://task39.iea-shc.org/info-sheets>.

The Info Sheets are sorted according to the Subtask-division of Task 39.

Subtask A Information

General market issues are discussed in the Info Sheets:

A1 - Market and cost effects for polymeric solar thermal collectors

A2 - 100% Renewable Energy Scenarios – Relevance of Plastics for Solar Thermal Technologies

Recycling, life-cycle analysis (LCA) and costs are subject of:

- A3 - Life cycle analysis for polymeric solar thermal collectors
- A4 - Evaluation of thermosiphon systems by adopting a total cost accounting approach
- A7 - Polymeric solar collectors and recycling

Special topics are the impact of presently used standards for testing and the architectural integration, presented in the Info Sheets:

- A5 - Standards, Certification and Regulations
- A6 - Architecturally appealing solar thermal systems - A marketing tool in order to attract new market segments

Subtask B Systems

The main objectives of this Subtask were the design of collectors and systems for the use of polymeric materials including the temperature control for the collectors.

The performance requirements are discussed in following Info Sheets:

- B1 - Performance requirements at reference sites and applications
- B2 - Thermal stress in polymeric solar thermal collectors
- B3 - Pressure stress in polymeric solar thermal collectors
- B9 - Thermal loads at components of state-of-the-art flat-plate collectors

The design of collectors and systems are subject of:

- B7 - Fully Polymeric Thermosiphon System
- B8 - All polymeric thermosiphon system
- B12 - Conceptual solar domestic hot water systems
- B13 - Polymeric solar heating systems building integration and scalability of components

Practical examples for collectors and storage tanks are given in:

- B15 - All polymeric collector Sunlumo
- B16 - AventaSolar collector system
- B17 - UNISOL – universal solar system for pre-heating water
- B14 - Polymeric storage tanks
- B18 - UNISOL – solar combistore evaluation and optimization

Methods for temperature control are shown in:

- B4 - Overheating protection
- B5 - Collector Overheating Protection with Backcooler
- B6 - Thermal limitation of glazed collector for DHW

Subtask C Materials

The objectives were the development and qualification of appropriate durable materials and functional coatings.

Structural materials are described in:

- C1 - Polypropylene absorber materials
- C2 - Polyamide based integrated storage collector
- C5 - Bioplastics for solar collector components
- C7.3 - Polymeric Liner Materials for Hot Water Heat Storages

Functional coatings are presented in:

- C3 - Overheating protection thermotropic layer
- C4 - TISS coating as added value for polymeric solar absorber

Stabilization and durability testing is described in:

- C6 - Tool box for basic characterization of plastics
- C7.1 - Case study: Accelerated UV-Aging
- C7.2 - The Art of Stabilization – Analytical Evaluation of Stabilizer Systems
- C7.4 - Case Study: Twin wall sheet testing

Outlook

Task 39 is happy to receive your feedback with proposals for further improvement or to add additional Info Sheets on future developments contributed by experts.