

**Julien Dumas**, "Étude de conception d'un capteur solaire thermique en matériaux polymers".  
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#### Abstract

This study was dedicated to the design and optimization of polymeric collectors. The main objective was to suggest specific designs for solar thermal collectors that would fit the plastic specificities and processes. This kind of collectors had to provide a significant production cost reduction and a ratio performance/cost at least equivalent with metallic solutions with high durability qualities. This reduction of the cost production can be provided by the specificities of the plastic processes as molding, extrusion and thermoforming that allow the gathering of different functions in one part of the collector. One of the main difficulties was to find suitable polymers for each part of the collectors. These polymers had to resist high temperatures, hydrolysis with glycol and UV exposure for very long service time, and at a reasonable price. It appears that PC with UV protection for the glazing, PA12, PPA and PPS for absorbers were suitable polymers for this kind of application. The performance and economic analyses of different concepts have been done in order to improve the design and provide the best ratio cost/performance. Some concepts theoretically reach all these objectives. Prototypes now need to be done in order to validate these results.