

## Built environment

### CSIR heliostat mirror panel withstands hailstone tests

A heliostat mirror panel used by the CSIR in solar power research passed hailstone tests by Agrément South Africa recently with flying colours.

"A heliostat is a mirror array that tracks the sun, focusing the reflected sunlight to a stationary focal point. The heat is then used to generate electricity or perform high temperature thermochemistry," explains Thomas Roos, a CSIR research engineer working in the field of gas turbines and concentrating solar thermal technology.

The hail impact tests were performed with a pneumatic hail gun designed by Agrément SA. The gun is used for testing elements for the construction industry.

The panel, being mirror, has to survive storm winds as well as Gauteng hail. Previous tests were successfully conducted on a 4 mm mirror panel by Agrément, and were described in the energy edition of the CSIR's [ScienceScope publication](#), p 19.

This hail gun test series was on a lightweight 3 mm mirror panel. The hailstone sizes used were ice spheres of 38 mm and 45 mm diameter. The test setup ensured that the test hailstones would impact perpendicularly to the mirror surface, in accordance with the agency's criteria. All shots were fired at close range to maximise the impact and accuracy of projectile speed readings and to cause an impact of 10 and 20 J.

A range of hailstone sizes and velocities was tested on the mirror panel. The final test used a 45 mm diameter hailstone at 90 m/s. The mirror panel withstood the 162 J impact without any damage to the surface, as it had survived all the previous hailstones.

"We are obviously very excited about the outcome of these tests - the results allow us to proceed with the development of a lightweight heliostat, saving support steel and energy to drive the heliostat actuators," comments Roos. The heliostat technology will be incorporated in a 90-heliostat 800 kW field being built at the CSIR as part of an integrated research infrastructure platform.

Agrément SA is a certification agency managed by CSIR Built Environment. The agency is an internationally acknowledged, independent centre that tests non-standardised or unconventional building products for fitness-for-purpose, and then provides technical approval of successful products.

- Hilda van Rooyen



Nic Arnold, senior technical assessor at Agrément SA, conducting the hailstone testing



The hail gun releasing hail stones, targeted to hit the heliostat mirror panel

[Copyright](#) © CSIR. All Rights Reserved. Page last revised on 15/9/2009

Tel: + 27 12 841 2911, technical enquiries: + 27 12 841 2000, fax: +27 12 349 1153, web site feedback: [web team](#)