

# EXASUN BDA Test Kiwa BLACK ROOF™

The Exasun Black Roof system has undergone testing as a roofing system to quantify its ability to withstand the wind uplift, water penetration and exposure to fire. Laboratory tests were performed in September 2018. The Black Roof system was found to:

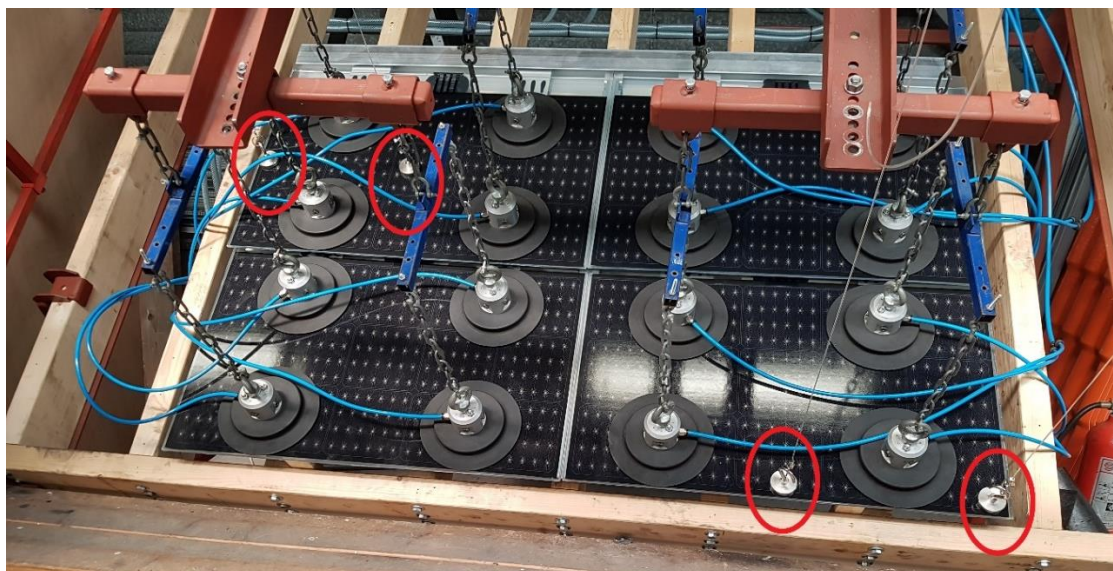
- >3x STRONGER THAN ROOF TILES FOR WIND UPLIFT
- ALMOST COMPLETELY WATERTIGHT FOR ALL ROOFS IN THE NETHERLANDS
- NO SPREAD OF FIRE, FLAME PENETRATION OR MECHANICAL COMPROMISE

For a more detailed report, or the official report itself, contact us on [info@exasun.com](mailto:info@exasun.com).

## WIND UPLIFT RESISTANCE

- SYSTEM STRENGTH = 7280 N = 185 kg/module
- >3x STRONGER THAN ROOF TILES
- NO SHATTERED GLASS
- ALMOST NO PERMANENT DEFORMATION (MOST COMMON FAILURE MODE)

A hydraulic cylinder connected to suction cups applies a pulling force on four Black Roof modules, while paying attention to the deformation and/or breaking of the system.



The system was tested to its extreme three times. At which, the screws are being pulled from the mounting battens or the aluminium profile itself. This occurred at a pulling force of **250°kg** per Black Roof module! The characteristic system strength is calculated using statistics and safety margins and is therefore, slightly lower at 7280°N, which corresponds to 185°kg per Black Roof module.

## WATERTIGHTNESS / RESISTANCE TO WIND DRIVEN RAIN

- COMPLETELY WATERTIGHT FOR HEAVY RAINFALL WITHOUT WIND AT INCLINATIONS OF  $\geq 20^\circ$
- SEMI-WATERTIGHT FOR NEARLY THE ENTIRE NETHERLANDS FOR ROOFS OF  $\geq 20^\circ$

The Black Roof system is installed on the test setup at an inclination of **20°**. The test consists of two subtests: The first consists of large quantities of rain, while the second decreases the water volume, but introduces strong winds and a negative pressure under the system to simulate even stronger winds.

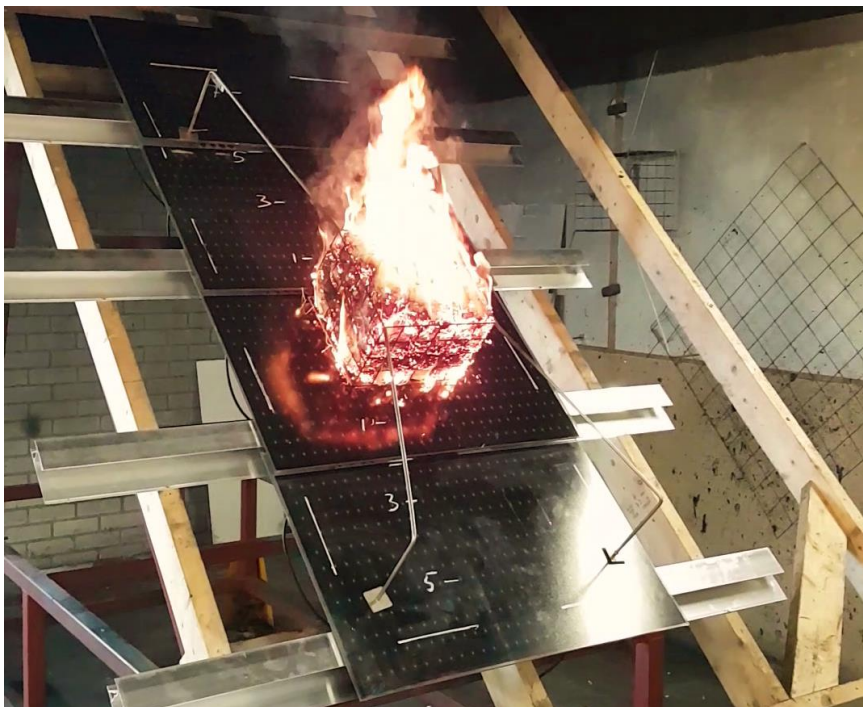
No water penetration was measured during two minutes of simulated heavy rainfall without wind. shows the experimental set-up during this subtest.

The Black Roof system was found to be completely watertight for the first part of the second subtest. When further increasing the windspeeds, very small amounts of water droplets penetrate the system through the many ventilation possibilities.



## EXTERNAL FIRE EXPOSURE TO ROOFS

- NO SPREAD OF FIRE
- NO FLAME PENETRATION
- FIRE SELF-EXTINGUISHED AFTER ON AVERAGE 6 MINUTES
- NO STRUCTURAL DAMAGE TO SYSTEM



Resistance to fire and flame penetration was determined for five different positions on the modules and connection with other modules or fitting panels.

No spread or penetration of flames was observed in any of the tests. In two cases the glass of the modules did break but did not lose their structural integrity. Broken modules were still easy to dismount and replace.