

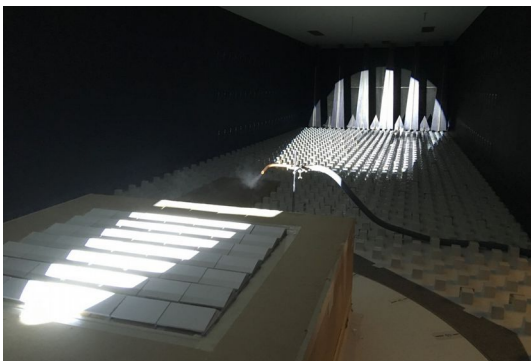
Certificate

subject: ESDEC Calculator FlatFix Fusion 2021
date: February 7th, 2022
reference: MvU/MvU/W 15389-26-NO-001
from: ir. G.M. van Uffelen
to: Esdec B.V.

This certificate concerns an evaluation of the ESDEC Calculator for ballast calculations for the FlatFix Fusion system, that is depicted in the photographs down here.



This is based on the specific wind tunnel research conducted by Peutz bv into the wind load on the Esdec FlatFix Fusion mounting system for flat roofs. This dedicated wind tunnel study, specifically for this system, was carried out by us in 2018. The lower left photograph shows the scale model in our wind tunnel.



Based on mechanical lift tests carried out by Esdec with improved system connections in the summer of 2021, see right photograph up here, the actual degree of interconnection of the systems was determined and processed by us into the wind tunnel data. These have been

incorporated in the aforementioned calculator of Esdec. A screendump has been depicted down here.

The screenshot shows the Esdec FlatFix Fusion software interface. The main window displays a grid of roof panels with dimensions of 46m by 25m. The interface includes a top navigation bar with options like Project, Dashboard, Entities, Administration, Language, and Account. On the left, there are panels for Location (The Netherlands, Wind Zone II, Terrain Category II), Roof (Flat, Bitumen Insulated), Height (10m), Angle (0°), Parapet Height (200mm), Roof Orientation (From North), and Panels (Jinko Cheetah Mono Silver Frame). On the right, there is a Summary panel with the following data:

Parameter	Value
WIND PRESSURE	731.99 N/m ²
PANEL COUNT	360
TOTAL POWER	122.40 kWp
AVERAGE ROOF LOAD OVER SYSTEM AREA	16.17 kg/m ²
TOTAL WEIGHT	12.926.73 kg

Below the Summary panel is the 'YOUR CONFIGURATION' section, which includes a dropdown for 'PRODUCT' set to 'FLATFIX FUSION', a checkbox for 'ARTICLES IN BLACK (WHEN AVAILABLE)', and a dropdown for 'GROUNDING AND/OR BONDING' set to 'NO ADDITIONAL GROUNDING/BONDING'. At the bottom right, there is a 'YOUR ORDERLIST' table:

NUMBER	PRODUCT NAME	QTY
1000612	Mounting screw M6 x 12mm	780
1000655	Mounting screw M6 x 55mm	780
1003022	Universal mid clamp with bonding	660
1004335	FlatFix end clamp 35mm	120
1007011	FlatFix Fusion base	26

The bottom of the order list shows a subtotal of €19,810.12, a discount of 0%, and a total price of €19,810.12.

We hereby declare, after studying and testing the calculator, that Esdec does indeed use the wind tunnel measurements of FlatFix Fusion, which have been combined with the mechanical lift tests into the wind tunnel data, and that the results have been correctly and safely processed in the Esdec calculator. The approach and method used by Esdec when applying this calculator have been tested and approved by us in several reference projects.

Conformity: CUR Recommendation 103: 2005
NEN 7250: 2021
NEN-EN 1990: 2011
NEN-EN 1991-1-4: 2019

Mook,

This certificate contains 2 pages