

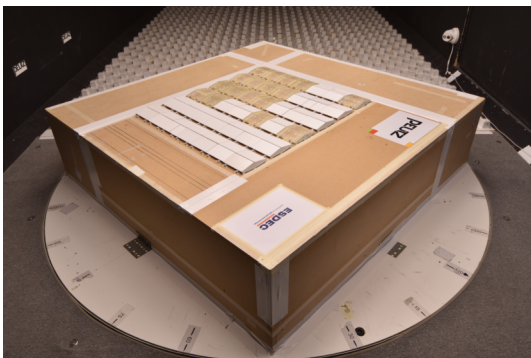
Certificate

subject: Enstall - PanelClaw Calculator for Wave Series (flat roof)
date: November 12th, 2024
reference: MvU/MvU/W 15389-24E-NO-003
from: ir. G.M. van Uffelen
to: PanelClaw - an Enstall company

On request of the Enstall Group, the original Peutz certificate W 15389-24E-NO-002 has been updated and renamed as per November 2024. Originally, the Wave Series product was developed and marketed by Esdec. As a result of the further development and internationalization of Esdec, the name change to Enstall was implemented. And within this Enstall Group, the marketing of Wave Series in the C&I (Commercial & Industrial) segment is included in the PanelClaw brand. However, the Wave series products are unchanged. So, this updated certificate concerns an evaluation of the PanelClaw Calculator for ballast calculations for the Wave Single and Dual Series, 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 PanelClaw Wave Series mounting system for flat roofs. The dedicated wind tunnel studies, specifically for these systems, were carried out by us in July 2020 and November 2021. The lower left photograph shows a typical scale model in our wind tunnel.



Based on mechanical lift tests carried out by Enstall (Esdec) in 2020 and 2021, see right photograph on the previous page, the 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 Enstall. A screen dump has been depicted down here.

The screenshot displays the PanelClaw software interface for a 'Wave Single and Dual' project. The central area shows a 2D layout of solar panels on a roof, with various tools and settings visible. On the right, a 'SUMMARY' table provides key project data:

SUMMARY	
WIND PRESSURE	749.34 N/m ²
REGULAR SNOW LOAD	480.06 N/m ²
REGULAR BUILDING SAFETY FACTOR	1.00
PANEL COEFF.	98
TOTAL POWER	43,000 Wp
AVERAGE ROOF LOAD OVER SYSTEM AREA	23.82 kg/m ²
TOTAL WEIGHT	5,363.06 kg

Below the summary, the 'YOUR CONFIGURATION' section shows settings for PRODUCT (WAVE), DISTANCE BETWEEN UNITS (95), LIGHTNING PROTECTION LEVEL (NONE), and BALL BEAM CHECK (2P ONLY). The 'YOUR ORDERLIST' table lists various components and their quantities:

NUMBER	PRODUCT NAME	QTY
100011	Wave Ballast Tray	17
100012	Wave Ballast Bracket	40
100015	Wave Ballast Perimeter	2
100019	Wave Ballast Tray	2
100033	Wave Wind Deflector Clamps	12
100037	Wave Dual Unit 2P 1070-1150	60
100038	Wave Wind Deflector Set 1070-1150	12
100040	Wave Single Unit 2P 1070-1150	16
100061	Wave Single Unit 1P 1070-1150	28
100070	Wave Single Wave Deflector Clip	76

The total price is €8,684.15, with a net cost per module of €88.61 and a net cost per Wp of €0.3772.

We hereby declare, after studying and testing the calculator, that PanelClaw does indeed use the wind tunnel measurements of the Wave Series, 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 PanelClaw calculator. The approach and method used by Enstall – PanelClaw when applying this calculator have been tested and approved by us in several reference projects. The wind tunnel data are valid for roof tilt angles between -5 ° and +5° .

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

Mook,

This certificate contains 2 pages