Example name: Integra IDMK Flat Plate Integrated Collector

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For installations

BISTS *Location: Ireland, 51N, 8W*
Climate Type: *Cfb*
Building Use: *residential*

Level of BISTS integration
Rush level 3 / Reijenga level 3

- ~~O~~ New Build
- O Refurbishment
- O Other: ……

Type of BISTS:

Active/~~Passive/Hybrid~~

Function(s):
- O Air heating
- ~~O~~ Water heating
- O Combi-system
- O Cooling/ventilation/shading
- O PV/T
- O linked to another system (e.g., heat pump)
- O Other: ……

	Integra IDMK 2.5	Integra IDMK 1.25
Dimensions	2063 x 1228 x 107 mm	1015 x 1228 x 107 mm
Gross Area	2.53 m²	1.25 m²
Aperture Area	2.32 m²	1.1 m²
Absorber Area	2.29 m²	1.08 m²
Height	107 mm	107 mm
Total Weight	54 kg	27 kg
Liquid Volume	1.6 litres	0.67 litres
Nominal Flow	120 l/hr	80 l/hr
Collector Connection	2 x 1" swivel nut	2 x 1" swivel nut
Absorber Type	Harp absorber	Harp absorber
Absorber Coating	Highly selective	Highly selective
Absorption	95%	95%
Emission	5%	5%
Covering	Low iron, structured, solar safety glass	Low iror, structured, solar safety glass
Heat Insulation	50mm mineral wool	50mm nineral wool
Collector Case	Timber (sides & back)	Timber isides & back)
Efficiency η_0 (aperture)	78.10%	78.10%
Heat Coefficient k1	3.79 W/m²K	3.79 W/m²K
Heat Coefficient k2	0.013 W/m²K	0.013 W/m²K
Max Stagnation Temperature	210°C	210°C
Max Operating Pressure	10 bar	10 bar
Hydraulic Connection	Series connection	Series connection

Product Specifications

Building element:

- O Facade
- ~~O~~ Roof
- O Other: ……..

BISTS characteristics:

The Integra Flat Plate Integrated Collector is typical is construction and appearance to other flat plate collector units. There are two standard collector sizes: 2.5m^2 or 1.25m^2 gross areas. The Integra IDMK Flat Plate Integrated Collector consists of a double header/manifold absorber construction. The riser pipes are ultrasonically bonded to the absorber plates which are brazed to the top and bottom manifolds. Product specifications are detailed in the table above.

Stage of Development:		Responsible:
O	Idea/Patent	……..
O	Prototype	……..
O	Demonstration	……..
⊖	Integral building element	GREENoneTEC Solarindustrie GmbH, Austria
⊖	Commercially available	Clean Energy Ireland, Rathard, Aherla,Co. Cork.

BISTS description and context

The exposed collector components are resistant to UV, moisture, freezing and salty environments. The collector must be fixed to a roof that meets the requirements of I.S. ICP 2:2002 (Irish) Code of practice for slating and tiling. The collectors are mechanically fixed to the roof trusses with aluminium L-brackets, 70mm coach screws and stainless steel screws. Four bracket sets per collector should be directly fixed into the rafters (preferred) or to additional, structurally designed and adequately supported timber bearers (not standard roof battens). Four separate flashing kits are available; Irish Slate (Anthracite), Flat Tile (Anthracite), Curved Tile with Lead Skirting (Anthracite), Irregular Tile with Lead Skirting (Dark Brown), for Irish dwellings.

System viability

Nothing available

Modelling and simulation tools developed/used

The SEAI Dwellings Energy Assessment Procedure (DEAP) software was used to calculate and assess the potential energy performance of the solar water heating system mounted on an Irish domestic dwelling.

Performance (W)		Global solar radiation (W/m²)		
		400	700	1000
$T_m - T_a$[1] (K)	10	633	1176	1719
	30	433	976	1519
	50	210	753	1296

[1] T_m is the mean temperature of system fluid; T_a is the ambient temperature

BISTS Performance data

Based on:
O Estimation
Θ Detailed simulation
Θ Measurement/testing
O Long-term monitoring

Performance parameters

For integrated systems:
key performance indicators -

For separate collectors:
performance rating coefficients -

EN 12975-2:2006
η_0 = 0.782
k_1 = 3.796 W/m^{2}K
k_2 = 0.013 W/m^{2}K

Other:

The η_0 and a_0 values for the Integra units where obtained when tested to EN 12975-2:2006.

Model	Aperture area	η_0	a_0
IDMK 25	2.32 m^2	0.781	3.796
IDMK 15	1.1 m^2	0.781	3.796

Zero-Loss Collector Efficiency and Heat Loss Coefficient Values

The Integra IDMK Collector was tested for impact resistance in accordance with EN 12975-2:2006, and met the pass criteria for impact resistance.

BS 476-3:2004 Fire tests on building materials and structures – Classification and method of test for external fire exposure to roofs, the Integra Collector achieved an EXT.S.AA rating.

The Integra IDMK Collector was tested to 3000 Pa positive pressure (i.e. downward pressure) without failure occurring. Using the safety factor of 1.5 for positive pressure (Section 5.9.1 of EN 12975-2:2006), the systems can withstand a positive pressure of up to 2000 Pa. The Integra IDMK Collector was also tested to 2000 Pa negative pressure (i.e. upward pressure/uplift) without failure occurring.

Additional information:

Sources and references:

NSAI Agrément , NSAI, 1 Swift Square, Northwood, Santry, Dublin 9, Ireland.