Test Information

Test information. Millions of VELFAC windows are installed across Europe and thousands of people test them every day. Despite our highly successful track record, we maintain a demanding testing programme to ensure our windows continue to satisfy all necessary regulatory standards.

Testing institutions are looking over our shoulder. VELFAC windows have been tested by Europe's most rigorous standards agencies, which have analysed all aspects of window design and performance.

The VELFAC products have been tested and classified by:

- Chiltern Dynamics and BM Trada, Buckinghamshire, United Kingdom
- Vinci Technology, Bedfordshire, United Kingdom
- CWCT, University of Bath, United Kingdom
- SP Technical Research Institue of Sweden, Boraas, Sweden
- Teknologisk Institut, Aarhus, Denmark (DTI)
- DELTA, Aarhus, Denmark

At VELFAC, our strategy is one of continuous product assessment and improvement, comprising an ongoing review of system components and latest technologies. We know that national standards are also continually reassessed, and we are committed to not only meet but also exceed all the latest requirements. In addition, we fully support the move toward European standards, a global approach which will result in further stringent evaluation of the VELFAC product range.

Standards are constantly developing. As a result, individual VELFAC product specifications may change as products are reviewed and improved, and as standards evolve. Make sure you have the most up to date performance specification by visiting www.VELFAC.co.uk or calling us on 01223 897100.

Note: Individual test results refer to specific types and size of window - please contact VELFAC if you have specific requirements.

Test Information - General test

General test. The Swedish State Test Institute has performed a comprehensive range of tests on the VELFAC 200 window, in order to analyse overall performance and indicate how well the window can cope with everyday use.

The tests performed for VELFAC 200 and VELFAC 200 ENERGY are:
- Air permeability
- Water tightness
- Wind resistance
- The strength and the stability of the construction

The weathering tests detailed are equivalent to BS6375-1.

VELFAC 200 - DGU

Property	Test / Classification standard	Result and classification
Vertical load	prEN 947-1 (EN 14608) / BS EN 13115	Load 400 N - Class 2
Static torsion	prEN 948-1 (EN 14609) / BS EN 13115	250 N - Class 2
Operating forces	EN 12046-1 / BS EN 13115	Mobility 1.5/2.5 Nm opening/closing - Class 1
	BS EN 1191 / prEN 12400	Repeated open/close 10000 cycles - Class 2
Air permeability	BS EN 1026 / BS EN 12207	Air - Class 4 +900 Pa - 600 Pa
Water tightness	BS EN 1027 / BS EN 12208	1500 Pa - Class E1500
Wind resistance	BS EN 12211 / BS EN 12210	Wind - Class C3 ± 1200 Pa Static load ± 600 Pa ×50 Dynamic load ± 1800 Pa Safety load Max. deflection < 1/300H

Test Institute: SP, Boraas
N.B. There may be limitations regarding function, type and size.

VELFAC 200 ENERGY - TGU

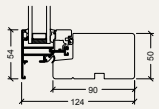
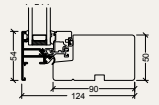
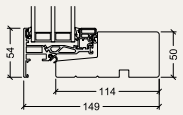
Property	Test / Classification standard	Result and classification
Vertical load	BS EN 14608 / BS EN 13115	- Class 3
Static torsion	BS EN 14609 / BS EN 13115	- Class 3
Operating forces	BS EN 12046-1 / BS EN 13115	- Class 1
	BS EN 1191 / BS EN 12400	Repeated open/close 20000 cycles - Class 3
Air permeability	BS EN 1026 / BS EN 12207	+/- 600 Pa - Class 4
Water tightness	BS EN 1027 / BS EN 12208	1500 Pa - Class E1500
Wind resistance	BS EN 12211 / BS EN 12210	1600 Pa - Class 4C

Test Institute: BM Trada
N.B. There may be limitations regarding function, type and size.

Test Information - Thermal properties

Thermal properties. The insulation capacity of a window is calculated using EN ISO 10077-2 and FEM Therm 5.2. Both are computer generated analyses which simulate a variety of test conditions and predict window performance within a range of thermal parameters.

The VELFAC 200 System achieves the results in the table below:

	1-leaf VELFAC 200 window - W x H: 1230 x 1480mm	U_w-value EN673
	double-glazed window - 4-16-4 with 1 low-e and argon*	1.55
	double-glazed window - 4-16-4 with 2 low-e and argon	1.47
	double-glazed window - 4-16-4 with 1 low-e and argon*	1.40
	double-glazed window - 4-16-4 with 2 low-e and argon	1.36
	triple-glazed window - 4-18-4-18-4 with 2 low-e and argon*	0.82
	triple-glazed window - 4-18-4-18-4 with 2 low-e and argon	0.79

* VELFAC standard glazing

Test Information - Fire windows

Fire windows. As with fire doors, fire windows must be able to contain a fire so that exits or escape routes remain accessible for as long as possible. The fire test examines the window's resistance to fire. The test is stopped once the fire has breached the window for more than ten seconds.

VELFAC fire windows are flame retardent on the internal side for either 30 minutes or 60 minutes depending on the sash function (Integrity E). The ventilated panel has been tested for integrity and insulation (EI).

VELFAC fire windows are made to look exactly the same as the 200 System, ensuring that the sightlines remain identical.

Please notice, that fire windows and doors are only available as double glazed windows.

Property	Test / Classification standard	Result and classification
Fire resistance	BS EN 1363-1, BS EN 1363-2, BS EN 1364-1 and BS EN 1634-1 Boverket's General Advice 1993:2, edition 2. Guidelines for fire technical approvals.	Patio door - E30 Windows - E60 Ventilated fire panel - EI60

Test Institute: SP, Boraas
N.B. There may be limitations regarding function, type and size.

Test Information - Sound reduction

Sound reduction. This test measures a window's capacity to reduce the levels of unwanted noise e.g. from heavy traffic. The noise level within most rooms of a family house should not exceed 30dB. If for example loud traffic noise amounts to 65-70dB, the building envelope must be able to reduce the noise level by 35-40dB.

VELFAC offers a variety of noise reduction solutions. Glazed units can be fitted with different types and thicknesses of glass. Please find examples of our glazing assortment for acoustic window solutions on page 70 and of VELFAC 200 and VELFAC 100 sound reducing windows on page 71.

Property	Test / Classification standard	Result and classification
Sound measurement	BS EN ISO 140-3 / BS EN ISO 717-1	VELFAC 200 DGU: R_w = 32 - 48dB VELFAC 200 ENERGY TGU: R_w = 33 - 43dB VELFAC 100 DGU: R_w = 33 - 38dB

Test Institute: DELTA, Aarhus and BM Trada, Buckinghamshire
N.B. There may be limitations regarding function, type and size.

Test Information - Safety fittings

CE-marking requires test of load bearing capacity of safety devices. All VELFAC window and door systems are CE-marked.

Child safety. The espagnolette with child-lock and the standard restrictor have been tested separately. Both have passed the Scandinavian child safety test, which consists of two parts:

- In Stage 1, a group of at least 30 children are asked, individually, to attempt to open a window locked with a child-lock. They are given five minutes to complete the task. If a child fails, he/she is then shown how the lock is operated and asked to try again. 43 children took part in the VELFAC test, and less than the maximum percentage, 15%, of the children were able to open the VELFAC window.
- Stage 2 tests durability under stress: the lock and safety mechanism is required to maintain performance despite receiving repeated blows from a hammer.

Property	Test / Classification standard	Result and classification
VELFAC 200 DGU, Safety devices, CE marking[1]	BS EN 14351-1 (equivalent to BS6375-2)	Load 350N, 1 minute - Passed
VELFAC 200 ENERGY TGU, Safety devices, CE marking[2]	BS 6375-3	- Passed
Espagnolette with child-lock [3]	NT CONS 018, SS 3587	As described above - Passed
Standard restrictor[2]	NT CONS 018, SS 3587	As described above - Passed

Test Institute: [1]Teknologisk Institut, Aarhus, [2] BM Trada and [3]SP, Boraas
N.B. There may be limitations regarding function, type and size.

Test Information - CWCT accreditation

VELFAC 200 Plus has been designed to perform exceptionally in large areas of window walling, tall buildings - up to 20 storeys, and in the most exposed locations - coastal sites, or high above sea level. Stunning façades can be created where opening and fixed lights have identical sightlines, and where the window wall maintains the visual appearance of all the other glazing in the project, providing a coherent aesthetic for the whole development.

VELFAC 200 Plus meets the challenge. Based on the established 200 System, VELFAC 200 Plus composite aluminium and wood windows feature new enhancements and installation details which take performance to the next level - these include:

- Additional sealing for frame corners, mullion and transom joints
- Additional sash retainers for opening lights, and sash fixings for fixed units
- Secondary weather seals
- Additional weather screen gaskets

These enhancements also contribute to the system's excellent U-values - far better than usually achieved by a conventional aluminium curtain wall system.

A real achievement. VELFAC and CWCT worked together to develop a test rig and testing sequence to ensure the system would perform. The test procedure was undertaken by Taylor Woodrow and overseen by CWCT and having worked so closely with CWCT, VELFAC 200 Plus achieved CWCT system certification on successful completion. This provides official CWCT accreditation of VELFAC 200 Plus, a greater achievement than simply gaining a successful test report from a testing house, thus ensuring specifiers an increased level of confidence in the performance of VELFAC 200 Plus within their own projects.

Please notice, that fire windows and doors are only available as double glazed windows.

Property	Test / Classification standard	Result and classification
Air permeability	BS EN 12152 / BS EN 12207	+600 Pa - Class A4
Water tightness	BS EN 12154 / BS EN 12154 Dynamic water test to ENV 13050 Hose test (AAMA 501.2)	Static water tightness: 600Pa - Class R7 Dynamic water tightness - Passed Hose test - Passed
Wind resistance	BS EN 12179 / BS EN 13116	Serviceability to ± 2000 Pa - Passed Safety to ± 3000 Pa - Passed
Impact	BS 8200	Passed

Test Institute: Chiltern Dynamics, Buckinghamshire

Test Information - Resistance to forced entry (SBD)

Secured by Design certification includes testing of burglary resistance and general performance of the window.

The testing of capabilities concerning burglary is aimed at replicating how a thief would work and includes:

- A 'burglar's tool kit' is used by a professional expert to try and force entry. One set of tools can be used 3 minutes. The overall time limit is 15 minutes.
- An attempt is made to remove the glass pane externally - as VELFAC 200 windows are internally glazed, with an integral glazing bead, external removal is impossible.
- A mechanical loading test is made using parallel and perpendicular loads to gain entry. The test should simulate attempted forced entry by using crowbars. Before the mechanical loading is performed an identical window is attempted forced open with 2 crowbars to see if further weak points should be tested.

The following window types have passed the PAS 24 annex 3 (BS7959) tests and are third party certified for Secured by Design:

VELFAC 200 DGU:

- sidehung opening light
- patio door (single leaf)
- fixed light
- tophung projecting light

VELFAC 200 ENERGY TGU:

- sidehung opening light
- patio door (single leaf)
- fixed light
- tophung projecting light

Secured by Design

SBD

Official Police Security Initiative

The following doors have passed the PAS 23-1 and PAS 24-1 tests and are third party certified for Secured by Design:

VELFAC 500:

- Aluminium Security Door

VELFAC 600:

- Wood/aluminium Security Door

Property	Test / Classification standard	Result and classification
Secured by Design[1]	PAS 24, BS6375-1, 6375-2, 6375-3	VELFAC 200 DGU - Passed
Secured by Design[2]	PAS 24, BS6375-1, 6375-2, 6375-3	VELFAC 200 ENERGY TGU - Passed

Test Institute: [1]Chiltern Dynamics and [2]BM Trada
N.B. There may be limitations regarding function, type and size.

Property	Test / Classification standard	Result and classification
Secured by Design	PAS 23-1: 1999 and PAS 24-1: 2007 + 2009	VELFAC 500 - Passed VELFAC 600 - Passed

Test Institute: Chiltern Dynamics, Buckinghamshire
N.B. There may be limitations regarding function, type and size.