

VELFAC WINDOWS ARE DESIGNED TO LAST

Our core product, the VELFAC 200 window system, has undergone constant product development and evolution in order to satisfy clients' demands as well as the increasing regulatory demands.

We develop and continually test our products to ensure that the quality meets the applicable requirements of the industry and demands of millions of users across Europe. In many cases, we provide higher requirements than current standards require.

Our development department employs 50 dedicated employees, constantly optimising our products so that they offer a 40-60 year design life for every unit.

**Please find our
TEST
RESULTS
on page 10-14**



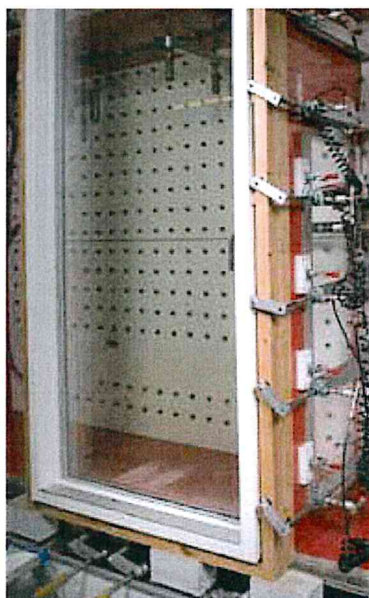
VELFAC R&D Department develops most of our ironmongery, so they are adapted specifically for each window system. The ironmongery are regularly tested both internally and at test institutes. Here are ironmongery exposed to salty Westcoast wind and weather as part of internal test.



Window frames on a windswept hilltop. Our test department compares here the durability of different types of surface treatment.



Window façade exposed to water load test. Water nozzles are located directly in front of the façade and water pumps with a flow rate of at least 3.4 litres/m²/minute.



VELFAC 200 ENERGY casement door ready to open and close 20,000 cycles during an internal test at VELFAC, which is an integral part of the development process.

VELFAC WINDOWS TRIED AND APPROVED

Millions of VELFAC 200 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.

This inherent durability also results in a window which is built to last - VELFAC aluminium / wood windows have been assessed by leading construction industry consultants and a 40-60 year design life is expected.

All VELFAC windows and doors undergo a number of tests at some of Europe's most recognized testing institutions in the UK, Sweden and Denmark, and continually test the products as a natural part of the product development process.

A comprehensive test program

We test our windows and doors in a variety of areas, including:

Forced entry (SBD)

VELFAC windows and doors are Secured by Design certified. SBD certification includes testing of burglary resistance and general performance of the window.



Sound reduction test

We test our windows ability to reduce noise and to document the various window systems performance by different window types. Therefore, we can provide windows that meet the project's specific requirements.

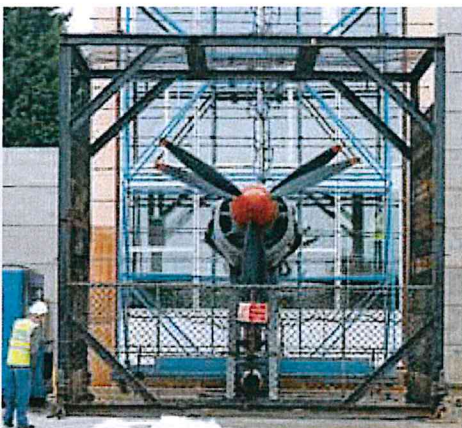
General test (AWW)

VELFAC products are tested for repeated opening and closing, and air, wind and water exposure. Moreover expose our bracket for a Cyclic Corrosion Test (CCT), where VELFAC is testing according to the highest class (CCT evaluation value 10 jf. EN/ISO 10289), which is significantly above the market requirements.

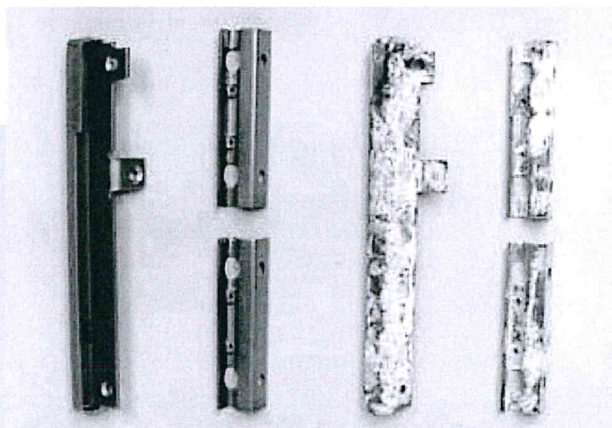
The documentation is in place

You can read more about our extensive testing program and see the results in all test areas on VELFAC.co.uk, where you will also find Declaration of Performance documents (DoP) for all products in our range and our accreditation certificates.

Please call us if you have any questions about the testing, or test evidence of windows for your project on 01223 897100.



CWCT accredited. A 58m² large window screen tested for wind load. Part of the CWCT test includes an aircraft engine simulating very strong wind.



After the CCT test (CCT evaluation value 10 jf. EN/ISO 10289) all VELFAC brackets must still be without a trace of rust. The difference between a VELFAC corrosion protection (left) and corrosion protection for the industry's traditional demands are clear.

TEST INFORMATION – GENERAL TEST

OPERATING FORCES AND AWW 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	Class 2
Static torsion	prEN 948-1 (EN 14609) / BS EN 13115	Class 2
Operating forces	EN 12046-1 / BS EN 13115	Class 1
	BS EN 1191 / prEN 12400	Repeated open/close 10000 cycles - Class 2
Air permeability	BS EN 1026 / BS EN 12207	+/-600 Pa - Class 4
Water tightness	BS EN 1027 / BS EN 12208	600 Pa - Class 9A
Wind resistance	BS EN 12211 / BS EN 12210	1600 Pa - Class 4C

Test Institute: Teknologisk Institut, Aarhus, Denmark.

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.

THERMAL PROPERTIES TEST + FIRE WINDOWS TEST

THERMAL PROPERTIES TEST

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

FIRE WINDOWS TEST

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 retardant 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.	Casement door - E30 Windows - E60 Ventilated fire panel - EI60

Test Institute: SP, Boraas

N.B. There may be limitations regarding function, type and size.

SOUND REDUCTION TEST + SAFETY FITTINGS TEST

SOUND REDUCTION TEST

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 and of VELFAC 200 sound reducing windows on page 67.

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

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

SAFETY FITTINGS TEST

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

Child safety. The espagnolette with child-lock has been tested, and has 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

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

CWCT ACCREDITATION TEST

CWCT ACCREDITATION TEST

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

SECURITY + PART Q

SECURED BY DESIGN TEST

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 for 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 types are third party certified to PAS 24 for windows:

VELFAC 200 DGU:

- sidehung window
- fixed casement
- top-guided window

VELFAC 200 ENERGY TGU:

- sidehung window
- fixed casement
- top-guided window

The following types are third party certified to PAS 24 for doors:

VELFAC 231ES ENERGY

- Wood/aluminium Security Casement Door

VELFAC 500:

- Aluminium Security Door

VELFAC Ribo alu door:

- Wood/aluminium Security Door

Secured by Design



Official Police Security Initiative

All our relevant products are registered on the Secured by Design website, www.securedbydesign.com

WINDOW SYSTEMS

Property	Test / Classification standard	Result and classification
Secured by Design	PAS 24:	VELFAC 200 DGU - Passed VELFAC 200 ENERGY TGU - Passed

Test Institute: Chiltern Dynamics and BM Trada

N.B. There may be limitations regarding function, type and size.

DOOR SYSTEMS

Property	Test / Classification standard	Result and classification
Secured by Design	PAS 24:	VELFAC 231ES ENERGY - Passed VELFAC 500 - Passed VELFAC Ribo Alu Door - Passed

Test Institute: Chiltern Dynamics, Buckinghamshire

N.B. There may be limitations regarding function, type and size.

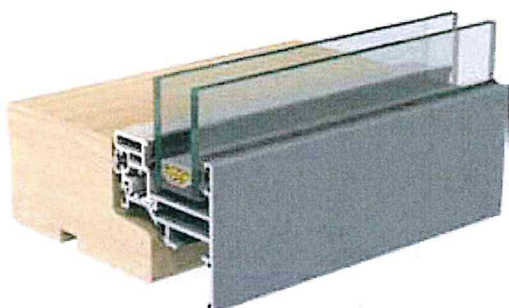
A WINDOW SYSTEM UNDER CONSTANT EVOLUTION

Design and industry expertise. VELFAC windows embody both leading edge design and years of industry expertise. As a window supplier we can proudly present more than 25 years of knowledge with composite windows.

Our core product, the VELFAC 200 window system, has undergone constant product development and evolution in order to satisfy clients' demands as well as the increasing legal demands.

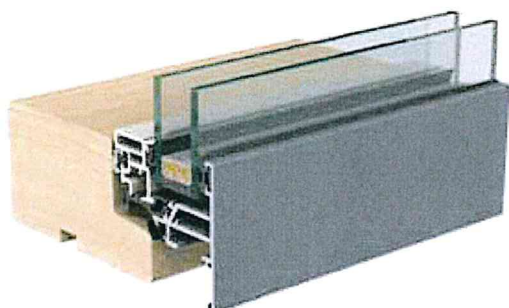
The VELFAC 200 ENERGY system is proven expertise. The new triple layer glazing solution combines unique insulation properties with strength and durability. And the new VELFAC 200 ENERGY profiles will maintain the clean, crisp sightlines that we are renowned for.

Being the third generation of VELFAC 200, the functionality within the new VELFAC 200 ENERGY windows are based on the same proven design as the original VELFAC 200 system launched in 1985. We know it works, we have optimized the design for 25 years, and this knowledge and experience has been used in our new enhanced system.



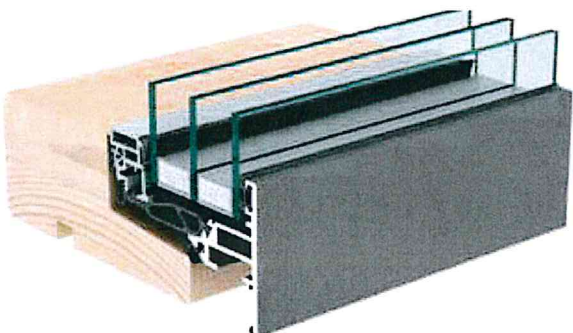
VELFAC 200, 24mm glazing

- Material: aluminium / wood
- U_w -value in 1985: 2.92
- U_w -value in 2011: 1.55
- Double glazed unit
- The optimal choice for most buildings



VELFAC 200i, 24mm glazing

- Material: aluminium with thermal break / wood
- U_w -value: 1.40
- Double glazed unit
- For buildings with low-energy targets



VELFAC 200 ENERGY, 48mm glazing

- Material: aluminium with thermal break / wood
- U_w -value: 0,8
- Triple glazed unit
- For buildings with low-energy targets