THE REYNAERS INSTITUTE

REYNAERS
aluminium

TOGETHER
FOR BETTER

INTRODUCTION

Since the company's creation in 1965, Reynaers Aluminium has been playing a leading role in the construction industry. Its profile systems have evolved from aesthetic modules to state-of-the-art building components.

In order to optimally meet the requirements of the international building market, Reynaers Aluminium always teams up innovative ideas with the most current processing methods, resulting in a broad standard system range: windows & doors, sliding systems, curtain walls, sunscreening, conservatories, BIPV (Building Integrated Photovoltaïcs) and complementary systems. For specific projects, our dedicated project department develops tailor-made solutions to perfectly match the desired requirements.

In order to facilitate all of this, the Reynaers Institute was established in 2004. This unique institute with a total surface of 2800m², focusses on sharing the know-how and experience with architects, fabricators, contractors and other building partners. Moreover, the Reynaers Institute provides the following services to its partners:

- Training centre
- Automation centre
- Test centre

The Reynaers Institute is much more than just a building. It is a state of mind and a permanent incentive to implement core values such as partnership and innovation. It is an international communication forum and a source of inspiration for all those involved in the building process.

Our corporate and Reynaers Institute videos can be found on YouTube : www.youtube.com/ReynaersAluminium

TRAINING CENTRE

At Reynaers we endorse the importance of qualitative production and installation for the long-term performance of our aluminium systems. That is why we maintain daily contacts with a strong international network of professional manufacturers and designers and why we advise and train our customers.

We organise numerous training sessions in order to teach our customers the necessary skills and know-how enabling them to provide their own customers with high-quality service. Our practical training is made up of both standard and specialised courses (assembly and installation) as well as software classes.

Reynaers organizes an average of 1800 training days every year (around 1200 practical training courses and 600 software training courses) for its customers and own employees. The trainees come from all over the world (40 different nationalities).

TRAINING OFFER

1. ASSEMBLY TRAINING

A professional trainer guides you through the process of efficiently producing a qualitative Reynaers system: turn-tilt windows, flush doors, sliding or folding doors, curtain walls, or any other Reynaers system. At the same time, you learn to operate specific tooling and dedicated machines for the required operations:

- profile sawing
- profile operations (milling, drilling, punching,...)
- corner connections (crimp or screw connections)
- gasket application
- fitting of the window/door hardware
- glazing beads
- positioning of the glass supports

Our training videos can be found on YouTube: www.youtube.com/ReynaersAluminium

2. INSTALLATION TRAINING

The correct installation on site is very important for the functioning of the finished elements. During this training, the specific building connections and the glazing of the elements are explained, with special attention to airtight building connections with ReynaConnect. Additionally, all possible adjustments to the hardware are demonstrated to fine-tune the elements.

3. SOFTWARE TRAINING

This dedicated training focuses on the use of the ReynaPro software. This Reynaers software solution is created for calculation and manufacturing of windows, doors, sliding systems and curtain walls. In addition to the availability of the complete Reynaers system database, the ReynaPro software provides links to miscellaneous machines to automate the production process.

Modules:

- calculation of the moments of inertia and the U-value
- CAD-section generation, order list and production schedule
- calculation of cost price and sales price
- creation of an attractive and visual presentation
- CNC database, CNC management, clamping positions, tools, operations

For more detailed information about our training offer, visit our Extranet – www.reynaers-extranet.com

AUTOMATION CENTRE

Reynaers Aluminium offers a full range of automation solutions to the customer through dedicated partnerships. Every stage of the production process can be optimized using a fine-tuned combination of the right experience and know-how, state-of-the-art machinery, the most recent technologies and an optimized link with the ReynaPro-software. In this way, the fabricator gets the opportunity to produce in the most efficient way, reduce costs and increase profitability.

In order to realize this, Reynaers selects the best performing and most suitable solution for every type of operation on our profiles.

CONVENTIONAL TOOLING OFFER

- **Multifunctional punch tool:** for all simple operations on profiles
- **Notching saw:** high quality tooling for the notching of curtain wall transoms
- **Copy routers:** specialized copy routers are available for more complex operations to profiles
- **Glazing bead / single head saws**: a range of sawing machines for small profiles

MULTIFUNCTIONAL PUNCH TOOL



NOTCHING SAW


COPY ROUTERS

SAWING GLAZING BEADS


SINGLE HEAD SAW

For more detailed information about our automation services, visit our Extranet – www.reynaers-extranet.com

To allow fully automated production of our systems, there is a direct link between miscellaneous machines and the **ReynaPro software**. This ReynaPro software includes a database of all profiles and accessories, allowing calculation and manufacturing of projects. The technical data and commercial information are continuously updated and supported by our technical service. Today, over 1400 supported ReynaPro-licenses are in use.

For an optimised production, Reynaers established close partnerships with machine suppliers, to optimally set-up and install different types of machines, but also to ensure full service and support after installation. Over the last 10 years, this collaboration resulted in the installation of over 200 Elumatec machines all over Europe.

The partnership between Reynaers and the machine suppliers results in an optimisation of the start-up times (1 week on average for a CNC-machining centre) and support after sales (specialised teams from Elumatec, Lemuth and Reynaers).

All experience and know-how by Reynaers is also used to assist fabricators in selecting the correct tools and machines, fit for their production, and setting up a perfect work floor lay-out.

A SELECTION OF OUR MACHINE OFFER

Double mitre saw: 2 types of high quality double mitre saws, with special clamping blocks to fully support the entire Reynaers profile range.

elumatec

DG104 DG244

CNC-machining centres: a whole range of state of the art CNC machining centres, with clamping blocks and tooling sets to allow all necessary operations to the Reynaers profiles.

SBZ122 SBZ130 SBZ140 SBZ151

Corner press: dedicated 1 and 4 corner press machines to create high quality corner connections, with special quick-change sets for supports and crimping knives to reduce adjustment time.

EP124 EP424

Transporting units: a combination of tables and transporting units are able to process your elements throughout the workshop with minimal risk of damage.

Gasket insertion machine: a special machine for the continuous mounting of glazing and acoustical gaskets on all sides of the vents and outer frames of Reynaers elements.

LEMUTH

TEST CENTRE

The Reynaers Institute accommodates one of the most advanced testing centres for windows, doors and façades. In the test centre all our systems are meticulously tested to comply with various European standards and to meet the highest standards for quality, durability and reliability, resulting in a 10-year system guarantee.

10 YEAR system guarantee

Yearly, Reynaers performs an average of 150 tests in the Reynaers Institute. Our tests are performed in close collaboration with various European notified bodies such as SKG-IFT-WTCB-TNO-Peutz-Efectis-ITB-WFRG-...

The different tests are centered around these **3 MAJOR TRENDS** in the aluminium industry:

COMFORT	SUSTAINABILITY	SAFETY
1. AIR-, WIND-, WATER TIGHTNESS	1. MECHANICAL PERFORMANCE	1. IMPACT RESISTANCE
2. ACOUSTIC INSULATION	2. SOLAR RADIATION	2. BURGLAR RESISTANCE
	3. OTHER TEST FACILITIES	3. BULLETPROOF
	4. ENERGY PERFORMANCE	4. FIRE RESISTANCE
		5. SMOKE RESISTANCE
		6. SMOKE & HEAT EVACUATION

Depending on **your project specifications**, the Reynaers Institute is at your disposal and supports you in organising tailored and extensive testing on various systems in divergent situations and conditions.

For more detailed information about our test centre, visit our Extranet - www.reynaers-extranet.com

COMFORT

1. AIR-, WIND-, WATER TIGHTNESS (AWW)

All window-, door- and curtain wall systems are tested according to the relevant standards for air permeability, wind load resistance and water tightness.

Test facility:

3 calibrated testing walls with a total capacity for 7 different test positions

- max. dimensions element: 5m (W) x 6m (H)
- max. test pressure : 4000Pa, with possibility to test up to 6000Pa by using an external ventilator

Official test reports can be provided by SKG (notified body)

2. ACOUSTIC INSULATION

The sound insulation properties of finished building elements are tested in a specially designed, fully equipped and calibrated acoustical lab.

Test facility:

The flexible separation wall between the sending and receiving chamber of the acoustical lab enables a broad range of test openings:

- 1.25m (W) x 1.5m (H) (windows)
- 1m (W) x 2.3m (H) (single door)
- 1.3m (W) x 2.3m (H) (double door)
- 2.7m (W) x 2.3m (H) (sliding door)
- 4m (W) x 2.3m (H) (curtain wall/sliding door)

Official test reports can be provided by SKG (notified body)

SUSTAINABILITY

1. MECHANICAL PERFORMANCE

The durability of systems is tested to guarantee the long-lasting performance in the building.
Different types of tests are all performed on the dedicated island.

Test facility:

- max. dimensions element: 5.6 m (W) x 4m (H)
- 6 tests simultaneously

Official test reports can be provided by SKG (notified body)

1.1. Repeated opening and closing

All opening types can be tested on their durability: turn-tilt windows, door, swing doors, folding doors, sliding elements, ...

- average for windows: 20.000 cycles
- average for doors: 200.000 cycles, up to 1.000.000 cycles

Official test reports can be provided by SKG (notified body)

1.2. Operating forces

Operating forces for all opening types are measured and classified according to the relevant standards.

- opening/closing
- locking/unlocking

1.3. Racking & torsion

The racking and torsion test is performed, according to the relevant standards, to simulate the effects of the wrong use of windows and doors.

Official test reports can be provided by SKG (notified body)

2. SOLAR RADIATION

Dedicated test equipment simulates the solar radiation on systems using infrared lights. By exposing the element to the infrared light, the surface temperature of the profile increases depending on the colour of the coating. The temperature and behaviour of the element can be evaluated.

Test facility:

- max. dimensions element: 1.2m (W) x 2.7m (H)

3. OTHER TEST FACILITIES

3.1. Ageing test

- QUV test:
  The QUV test equipment generates an accelerated reproduction of the damage caused by sunlight, rain and dew that normally occurs over months and years of outdoor exposure. This test on profiles is done according to Qualicoat guidelines.

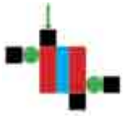
- Climate chamber:
  This climate chamber simulates the influence of extreme changes in temperature and humidity on profile systems or specific components.
  - thermal cycle (-10°C / +70°C): a test of 1.000.000 cycles takes about 42 days
  - mechanical load can be applied

- Oven:
  Profile systems are tested in a universal oven for precise, absolutely reliable and safe temperature control (temperatures up to +200°C).

3.2. Strength & shear tests

Dedicated tensile-strength test equipment is used to measure the strength of assembled profiles (CTQ-values), connections between components, pull-out forces on screw connections, ... Both the deformation values and the rupture value are accurately logged.

Transverse tensile strength



Shear strength

QUV testing chamber

climate chamber

4. ENERGY-PERFORMANCE

The R-cube is specially designed and built to provide state-of-the-art analyses of curtain walls, sun shading systems, windows and doors allowing the product designers to develop more energy-efficient and comfortable building solutions. This unique 360° rotatable testlab can be considered as a passive house, with an overall U-value of 0.12 W/m²K.

The testlab has 2 identical chambers, with controlled humidity and temperature, allowing to simulate the effect of different climates and seasons on a system. Both chambers can be used to simultaneously test and compare the energy performance of 2 different systems, under identical circumstances with a specific orientation of the R-Cube.

Some of the tests which can be performed:

- condensation tests on (ventilated) façades or window systems
- behaviour of systems during wintertime/summertime
- tests and demonstrations on building connections

Test facility:
Dedicated measuring equipment is available:

- equipment for blowerdoor test to measure the air tightness
- infrared camera to evaluate the thermal performance and air tightness
- full automated logging system for the registration of indoor and outdoor conditions (temperature, wind speed, solar radiation, relative humidity)

OUTDOOR MEASUREMENTS

- **Temperature** - 20°C up to +70°C (infrared camera)
- **Relative humidity** 30% up to 90%
- **Solar radiation** W/m²K according orientation
- **Wind speed** and wind direction

INDOOR MEASUREMENTS

- **Surface temperatures** - 20°C up to +70°C (infrared camera)
- **Relative humidity** 30% up to 90%
- **Illuminance level** (lux)
- **Air tightness** +50 or -50 Pa during blower door test
- **Energy consumption** of cooling and heating (HVAC) installation

SAFETY

INTERNAL SAFETY TESTING

1. IMPACT RESISTANCE

In order to guarantee full safety of systems, the effect of soft and heavy body impact on the element is meticulously tested, according to relevant standards.

Test facility:

- max. dimensions element: 6m (W) x 3.5 m (H)
- a mobile and free level adjustable pendulum test unit with impactor (double tyre, sandbag, ...)
- the drop height of the impactor determines the classification

Official test reports can be provided by SKG (notified body)

2. BURGLAR RESISTANCE

The systems are tested for intrusion safety.
The elements can be tested for the **burglar resistance classes RC 2, RC 3 and RC 4.**

Test facility:

- max. dimensions element: 6m (W) x 3.5 m (H): this allows you to mount the element for pretesting and the official test element at the same time
- fully equipped for static or dynamic testing and for manual burglar testing
- different tool sets depending on the classification are available to test according to the specific classification

Official test reports can be provided by SKG and WTCB (notified bodies)

EXTERNAL SAFETY TESTING

Apart from the internal testing facilities, the Reynaers Institute provides full support for testing at external testlabs. Extensive advice and support, manufacturing of test elements, installation on location, ... are all part of Reynaers' expertise. For external testing, and in coordination with the Reynaers representative, a person from Reynaers can witness and support the tests on location. This enables us to exchange our know-how and expertise.

3. BULLETPROOF

Tests on the bullet impact on profile systems, according to the most severe European standards, are performed in notified testlabs such as TNO and the Royal Military School.

4. FIREPROOF

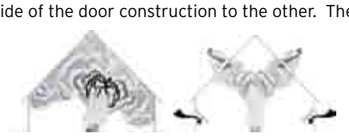
The resistance of systems against fire breakthrough for a period of at least 30 minutes and up to 60 minutes, are performed in close cooperation with various accredited European labs such as WFR, IFT, Efectis Group, ITB, ...

5. SMOKE RESISTANCE

Tests on the smoke tightness of the profile systems for a minimal diffusion of smoke throughout the building, are performed in notified testlabs such as ITB, IFT and MPA Braunschweig.

6. SE (SMOKE & HEAT EVACUATION)

Door constructions are being submitted to a smoke leakage test to determine the leakage of cold and warm smoke from one side of the door construction to the other. These tests are performed by MPA Braunschweig.



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RELEVANT TEST STANDARDS: WINDOWS & DOORS

TESTS ACCORDING TO PRODUCT STANDARD EN 14351-1:2006	Test method	Classification
Air-, wind-, water tightness		
Air permeability	EN 1026	EN 12207
Water tightness	EN 1027	EN 12208
Resistance to wind load	EN 12211	EN 12210
Acoustic insulation		
Measurement and sound insulation in buildings & building elements	EN ISO 10140-2	-
Rating of sound insulation in buildings & building elements	EN ISO 717-1	-
Mechanical performance		
Repeated opening & closing	EN 1191	EN 12400
Mechanical strength, racking and torsion windows	EN 14608 - racking	EN 13115
	EN 14609 - static torsion	EN 13115
Mechanical strength, racking and torsion doors	EN 947 - resistance to vertical load	EN 1192
	EN 948 - resistance to static torsion	EN 1192
	EN 949 - soft and heavy body impact	EN 1192
	EN 950 - hard body impact	EN 1192
Operating forces windows	EN 12046-1	EN 13115
Operating forces doors	EN 12046-2	EN 12217
Doors - behaviour between two different climates	EN 1121	
Solar radiation		
Infrared measurements	EN 13187	
Energy performance tests in R-Cube		
Air tightness of buildings (Blowerdoor)	EN 13829	
Thermal transmittance	EN 10077-1 & EN 10077-2	
Impact resistance	**EN 13049**	**EN 13049**
Burglar resistance	**EN 1628 - EN 1630**	**EN 1627**
Bulletproof	**EN 1523**	**EN 1522**

TESTS ACCORDING TO PRODUCT STANDARD AS 2047:1999-2011 (Australian standard)	Test method
Air-, wind-, water tightness	
Resistance to wind load	AS 4420.2
Air permeability	AS 4420.4
Water tightness	AS 4420.5
Ultimate strength	AS 4420.6
Mechanical performance	
Operating forces	ES 4420.3
Energy performance	
Thermal transmittance	NFRC100-2010

RELEVANT TEST STANDARDS: CURTAIN WALLS

TESTS ACCORDING TO PRODUCT STANDARD EN 13830:2003	Test method	Classification
Air-, wind-, water tightness		
Air permeability	EN 12153	EN 12152
Water tightness	EN 12155	EN 12154
Resistance to wind load	EN 12179	EN 13116
Mechanical performance		
Resistance to dead load	EN 1991-1-1	-
Impact resistance	**EN 12600**	**EN 14019**
Accoustic insulation	**EN ISO 10140-2**	**EN ISO 717-1**
Burglar resistance	**EN 1628 - EN 1630**	**EN 1627**
Bulletproof	**EN 1523**	**EN 1522**
Fire resistance	**EN 13501-2**	**-**
Thermal transmittance	**EN 13947**	**-**

TESTS ACCORDING TO PRODUCT STANDARD AS 4284:2008 (Australian standard)	Test method
Air-, wind-, water tightness	
Preliminary:Static Pressure SLS	AS 4284
Preliminary:Static Water	AS 4284
Structural Test at Servicibility Limit State	AS 4284
Air Infiltration	AS 4284
Water Resistance	AS 4284
Structural Test at Ultimate Limit State	AS 4284

ABOUT REYNAERS ALUMINIUM

Reynaers Aluminium is a leading European specialist in the development and marketing of innovative and sustainable aluminium solutions for windows, doors, curtain walling, sliding systems, sunscreening and conservatories. Besides offering an extensive range of standard solutions, the company also develops solutions that are tailored to the individual customer or project. Research, product development and testing are conducted at the Reynaers Institute, the sector's largest private innovation and testing centre, located in Duffel (Belgium). In addition, the company also provides extensive technical support and advice to fabricators, contractors and architects.

Reynaers Aluminium is the market leader in Belgium and has acquired a strong market position in the 30 countries where it has its own sites. The company's success is due in part to the close partnership between Reynaers and 5,000 partner fabricators, architects and project developers worldwide.

In 2011 the Reynaers group achieved a turnover of 300 million euros (26 000 tons) and has 1,200 employees throughout the world. The company exports to more than 60 countries on 5 continents.

For more information: www.reynaers.com

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