

March 2014

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Spécial Technical Regulations

E D I T O



Following the first oil shock in France in 1974 the first Thermal Regulation (RT) was adopted in order to reduce energy bills. This strategy was urgently created following the brutal rise in price of fuel and has been re-evaluated 4 times since in order to progressively intensify the constraints regarding energy consumption for new buildings. Four decades later, thermal regulation is more than ever central to the challenges and debates in the construction industry and at the heart of the preoccupations of the French people. Among all the economic

sectors of activity, the construction industry is the greatest consumer of energy, (42.5% of total final energy). Even though this sector of activity creates the most CO₂ with 23% greenhouse gas emissions it is also the sector of activity which is making the most obvious efforts to improve. As with prepainted metal, considerable progress has been made. Construction systems have enabled a reduction of close to 50% of CO₂ over 40 years.

New goals have been fixed for the coming decades. On a global level greenhouse gas emissions should be divided by four in industrial countries by 2050 and halved for the rest of the world. On a European level, this goal is threefold and closer, with a 2020 deadline: reduction of energy consumption within the EU of 20%, total reduction of greenhouse gas emissions of at least 20% compared to the level in 1990 and finally a share of at least 20% in the global energy market for renewable energy.

As far as France is concerned, the government has announced a strategy orientated to energy saving and our CO₂ emissions which should result in a 38% drop in our consumption by 2020 and the renovation of 400,000 homes/year and 800,000 social housing for the biggest energy users.

The prepainted metal industry is ready to rise to this new challenge. More than from a retrospective point of view, in this edition we will look to the future and discover the shape of the future for prepainted metal in the construction industry.

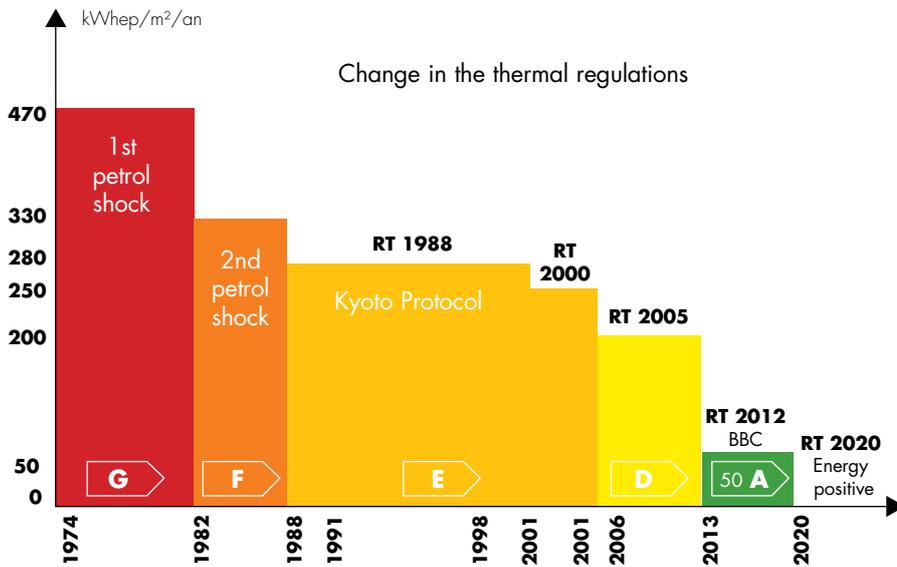
Mario PALERMO
ECCA French Group President



Photograph : Laurent Dequick

RT (Thermal Regulation) 2012: Background and Perspectives

An acceleration of regulations



The first thermal regulations date back to 1974. Effective in 1975 and only applied to new housing. The second thermal regulation RT (thermal regulation) 1988 was applied on a broader scale taking into consideration both residential and non-residential buildings. Since the year 2000, with RT2000, the pressure has risen with the integration of stricter quotas. New residential buildings had to have their maximum consumption reduced by 20%. As for tertiary buildings, their maximum consumption was reduced by 40%.

RT2005 requires a 15% improvement in thermal performance for new buildings and new extensions. Thus, through successive modified decrees, thermal regulations apply also to renovation.

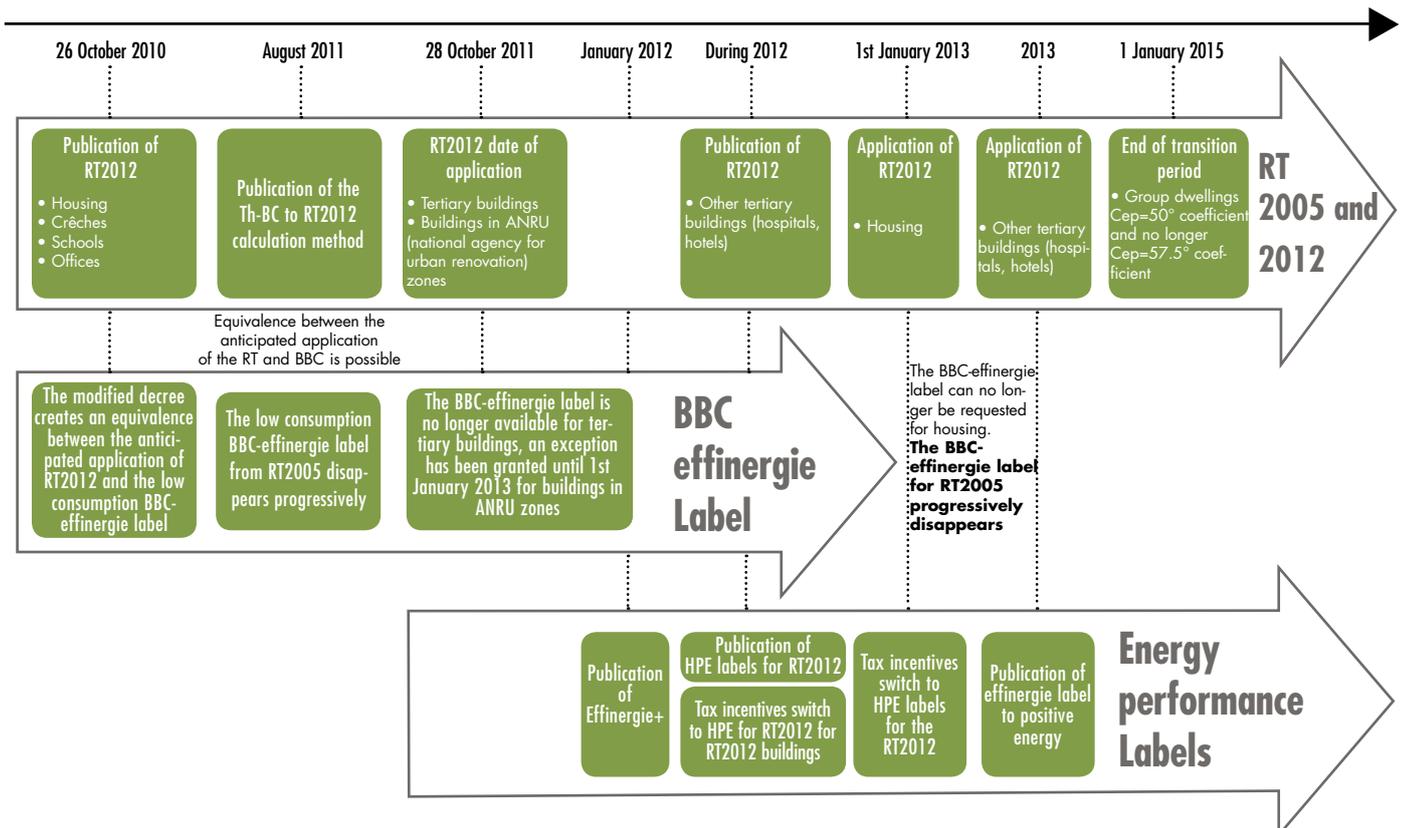
RT2012 has been in force since 28 October 2011 and applies to public buildings such as schools, buildings which receive young children and tertiary buildings and was then broadened on 1st January 2013 to cover residential buildings. New buildings must consume, and prove the consumption of, a

maximum of 50 kWh/m²/year (this is adapted according to geographical location and altitude). This maximum consumption defines a 'low-energy building'

It also necessitates means, such as:

- The breathability of a building must be below 0.6 m³/h/m². This defines the impermeability of a building. Any loss must be below 0.6 m³ per 1 hour for 1 m² of surface loss ((not counting the ground level floor)
- Window area must be equal to at least 1/6 of outside walls to favour natural light
- Reduction of thermal bridges
- A detached house must have renewable energy for hot water or heating
- Measure or estimation of energy consumption per use.

With RT2020, new buildings must be energy-plus buildings. This means they produce more energy than they consume.



Spécial Thermal Regulations

the RT2012 : A leap forward in energy for new buildings

The aim of the 2012 thermal regulations is to fix an upper limit for energy consumption in new buildings in the five following areas: heating, cooling, hot water production, auxiliaries and lighting.



Looking to the RT2020: energy-plus and passive buildings

The conference on environmental issues defined an objective for 2020, for energy-plus new buildings (BEPOS) this means that they produce more energy than they consume. Standardisation work needs to be carried out to define the corresponding concepts (energy-plus buildings, passive buildings).

Passive buildings are buildings which allow a comfortable indoor temperature without conventional heating in the winter and cooling in the summer. The house heats up and cools down passively.

Conventional heating systems are not necessary; the impermeable envelope of the building reduces heat loss which is almost totally compensated by passive heat.

Annual heating needs do not exceed 15 kWh/m²/year.

This low energy need can be met, for example with a heated ventilation system for incoming air.

The Passive House is a German building standard (Label PassivHaus) which must meet the following criteria:

A – heating and cooling energy needs

<math>< 15\text{ kWh/m}^2</math> (per year).

B – total energy consumption for the house <math>< 120\text{ kWh/m}^2</math> (per year) in primary energy (the 5 regulatory points of the RT 2012 + white goods and electronics).

C – air tight: blower door n50 <math>< 0.6\text{ h}^{-1}</math>.

D – comfort in the summer: overheat frequency > 25°C should be below 5% of the time

THE DESIGN OF A PASSIVE BUILDING IS BASED ON THE FOLLOWING PRINCIPLES

Drop in thermal loss by improving the basic elements:

- Strengthened thermal envelope of building, high performance windows (triple glazing with insulated frames).
- Suppression of all thermal bridges (obligatory insulation from the outside)
- Excellent air-tightness.
- Double flow ventilation (recuperation of heat from outgoing air).
- Use of low energy consumption white goods.

Optimisation of direct sunlight

- Use of bio-air-conditioning (south facing living areas, natural shade). Secondary rooms or corridors (north facing) to catch as much of the sun's energy as possible
- Compact building

Severe controls in sight

The new standardisation of buildings set out in the RT2012 will have big consequences on the use of buildings in that the non respect of technical standards could result in a Court finding the building improper as a low consumption building.

Prepainted metal and Thermal Regulation Solutions

Prepainted metal is a great solution for improved thermal insulation:

Metal framed construction usually requires prepainted industrial systems for the envelope, associated with complex insulation resulting in a high level of thermal performance. These systems are sometimes used with other materials (glass, slate, wood, breeze blocks, bricks, prefab concrete, synthetic materials etc.). moreover this system provides excellent air-tightness.

Suppression of thermal bridges

Two main methods are coming to light to get rid of thermal bridges: one is with indoor thermal insulation using bridge ruptures which must be put in place during the building phase but which become much more difficult to use during renovation. The second is using exterior thermal insulation (ITE), which is where coil coating proves some of its advantages. It is part of the composition of the wall covering as the most outer coat and can even be doubled with another coat of purely thermal covering. This can be done as ventilated cladding, which involves fixing modular elements on a main load bearing structure and creating a slit of air between the breeze block and outer wall or covering: the first case is an association of metal prepainted with an insulant which is then placed, without a slit of air, on the load bearing wall. The second example uses metal without insulation. Not all thermal bridges can be dealt with using this method, but the flexibility in terms of geometry, the range of prepainted metal shades on offer, provide architects with the flexibility that they are looking for during the design phase.

Labels currently in effect

High Energy Performance (HPE in French) is a range of official French labels which take into account energy, sanitary and environmental performance of a building on a design/concept and maintenance level.



Effinergie or Collectif Effinergie is a French non-government association whose role is to promote construction and renovation of low energy consumption buildings. The first label was launched in 2007, and had a strong simu-

lative effect on the development of thermal regulations in France. The consumption objective of 50 kWh/m²/year was used as the regulatory base for RT2012. The association continued their work and created the (Effinergie+) label in anticipation of RT2020 and to facilitate the implementation of BEPOS as a building standard.

VERT ÉBÈNE

44 low income housing with the "PassivHaus" label, in the heart of a dense green landscape

CAUCHETEUX BELLO Agency

- Founded in 1997 in Villeneuve d'Ascq (France)
- Winners of the Prix National Grand Public de l'Architecture in 2005. Other regional awards from the Order des Architectes (Beffroi d'Or in 1995 and 1996).
- The Agency has chosen to work on programmes for 'sensitive populations' : Hospitals, children, low income housing.

Photograph : Laurent Dequick

“ The unprecedented ambition here; to raise the current energy challenge.

ECCA: How would you define your job as an architect?

Sophie BELLO: We are explorers of complexity and we try, I hope, to be poets. Our daily challenge is to successfully bring together ideas and features which are normally opposed and very different. We are here to serve man in his role of social animator (living happily together), needs and buildings in the city. Like the human body and the numerous internal networks, you can't see the technical aspects which should be within the poetry and conviviality.

Our work starts as it would for an investigator. We analyse a site, a city, the flow, the cost of a project, the planning, the identity, the surrounding urban area... in order to decide the constraints and what the end users of the building need. The project form is only decided once all these parameters have been identified and linked to serve each other.

ECCA: Can you explain the origin of the Vert Ebène/ Green Ebony project?

SB: The city of Lille and the low cost housing landlord Partenord work hard on 'living well'. Accommodation is at the heart of the social and urban project. Building passive housing was our premise. The council's expectations regarding energy were extremely high and we have pushed the boundaries. This project was an opportunity for us to show that it was possible, as our European neighbours have already done. The social housing landlord has a social and political role and rose to this challenge.

Not only is it an experimental breakthrough, it is above all a guarantee of savings for the landlord. The cost of energy isn't an issue for high to medium income families; it is though however for low income families, those in low income housing.

We therefore mustn't create tomorrow's insecurity by continuing to build housing, plagued by energy costs that the 'disadvantaged' won't be able to cover as prices rise.

The goal of Vert Ebène is to be the architectural tool of a concept called «Inhabited Woods » set up by Dusapin-Leclerc. Our project aims to favour the idea of returning to the city centre for families who are generally won over by the outskirts of the city, by valuing the image and use of city housing (by removing the pitfalls of urban density), and by offering the same quality of life as can be found in the country.

Vert Ebène has set several goals in order to meet these ambitions:

- Managing privacy and being overlooked in the heart of a densely populated area
- Managing sunlight in each home
- Generous private outside space for each tenant
- Affirming the presence of vegetation, following the building's colour scheme, both in the communal garden and on terraces and balconies.
- A variety of typology.

Accompanying the environmental approach Bois Habité /Inhabited Wood involves these objectives; the unprecedented ambition of this project is to rise to the current energy challenge.

The 44 homes have been designed to not consume energy for heating: a PASSIVE building.

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ECCA: Why did you choose prepainted metal for this building?

SB: Our ambition was to make the tenants and visitors feel like they are in woodland. The colours, black and white, on the first storey of the building, reflect tree trunks, the higher level the conifer green multiplies the effect of vegetation.

Green and white should reflect light. The white we have chosen is high gloss so that the trees around reflect onto it, giving an impression of movement on the facade. We could only achieve this with prepainted metal. There is a very wide range of greens and whites with over 60% gloss.

Our strict requirement was to create a perfectly insulated envelope, with no thermal bridges, including between the framework and the cladding. Prepainted metal was the obvious choice for its aesthetics, its cost, its large format possibilities to limit calpinage, its slimline form for space saving and to compensate for insulation (36cm thickness on walls).

ECCA: What is Vert Ebène's energy performance?

SB: The results speak for themselves:

- Heating energy consumption < 15 kWh/m² (per year).
- Air-tightness: blower door n₅₀ < 0.6 h⁻¹.
- Total energy consumption for the home < 120 kWh/m² (per year) for primary energy.

ECCA: Were your backers reticent about using prepainted metal?

SB: We have put metal cladding on areas of the facade which are not accessible to the public to avoid any potential scratching or scraping. The contracting authority wanted to test the materials before validating the choice. We notably tested the colourfastness on powder coated Mirawall aluminium: White (RAL 9010 satin, 30% gloss) and green (RAL 6025 gloss, 85% gloss). The self-cleaning aspect was also decisive to avoid dirt and moss in the woodland environment.



The Vert Ebène Project

- Developer : SEM Euralille. Site Le Bois Habité
- Urbanists: Dusapin- Leclerc
- Architects: Caucheteux-Bello Architectes
- Contracting authority: Partenord Habitat
- Programme: 44 passive homes (39 apartments and 5 detached houses)
- Surface area: 3,890 m² SHON. 20 m² SHAB



DAL'ALU

“ In our industry the principal use of coatings is for protection and decoration.

Simon CRÉMIEU-ALCAN: Can you please tell us about Group ARAMIS

Armelle Baraudou: Aramis is an industrial group specialised in aluminium products for the construction industry.

The two main activities are:

Gutters, developed notably under the brand DAL'ALU, and through a franchise network. The special feature of our system being that the customer can contour the gutter in a continuous stretch on the construction sites.

Insulating panels, with multiple uses: conservatory roofs, facades, front doors, shutters. The main subsidiary for this sector of activity is on 11 lines with 5 different technologies, on 4 sites. For gutters, the expertise revolves around working with aluminium coils: Slitting, cutting, profiling, bending and punching.

SCA: Your Group has national and international expertise in metallic construction. What's your secret?

AB: : We have 8 production and/or distribution sites in France, each with their own specialist know-how. This allows us to be flexible and reactive to our customers' demands. For example,

for insulating panels we manufacture on 11 lines with 5 different technologies, on 4 sites. For gutters, the expertise revolves around working with aluminium coils: Slitting, cutting, profiling, bending and punching.



DAL'ALU

Spécial Thermal Regulations

SCA: What do you need from steel or aluminium coatings?

AB: In our industry, the main purposes of coatings are protection and decoration. Protection, because our products are for the envelope of buildings, or recuperating rain water and therefore face major climatic and environmental challenges; decoration, because it is the essence of our products which are referenced by colour, texture. For example, over the last 30 years aluminium gutters have gained nearly a quarter of the French market notably thanks to the range of over 20 colours which cannot be matched with the competing zinc or PVC products.

SCA: What do you need from the prepainters?

AB: The prepainters need to be both excellent suppliers and real partners. As a supplier particularly, through the quality of their products, reliability in delivery times, reactivity in the case of a problem. The partnership is necessary to create long term partnerships. Prepainted aluminium is our main raw material, it is essential to create great trust in the work we do with the prepainters to ensure that, for example, new and exclusive products can't be found with our competitors the next day. In our relationship with suppliers, not only do we expect reactivity, but their help in our continual effort for innovation, coatings in particular and products in general. We also pay very close attention to the ecological aspect of products and processes, which is becoming more and more important.

SCA: Are the contracting parties at all reticent about using pre-painted metal, and if so, which ones? What is your argument against such reticence?

AB: We often find conservative attitudes in the building industry in France or other countries, such as Germany. It's the main brake to the development of our products. These reticences are not with the contracting parties so much as the tradesmen or building companies. For example, insulating panels for industrial buildings enable high thermal performance with a contemporary and original design but oppose tradition cladding companies' habits and they need to organise their work differently to install this type of product. The more the products are known and marketed the easier it will be to overcome such reticence

SCA: Can you tell us about a prepainted metal construction that you are currently working on, or have just delivered?

AB: Through a DAL'ALU franchise we have just completed two EPHAD (nursing homes for the elderly) in Gironde (western France). These buildings have been equipped with aluminium roofing and cladding, standing seam profiles. The aesthetics of our products convinced the architect, who was initially going to work with zinc, to switch to prepainted aluminium for the two buildings.

SCA: Thank you very much.



ARCELORMITTAL CONSTRUCTION, FRANCE

" ArcelorMittal Construction is always looking for new and lasting coating systems and has developed ZM® Evolution, a new generation coil coated steel from a unique alloy composed of zinc, aluminium and magnesium. The product is made in France in Contrisson/Haironville in the Meuse county."

This new metallic coating has notably improved anti-corrosion protection. ZM® Evolution has been developed in order to preserve natural resources and reduce the carbon footprint. Colorissime® coil coated steel on ZM Evolution has higher anti-corrosion resistance than standard galvanised steel and therefore a longer life span.



ECCA AT BATIMAT 2013

ECCA (European Coil Coating Association) brought together European coil coaters and their suppliers at Batimat 2013 on 5th - 7th November 2013 on MIRAL, an Association Member's stand.



BECKERS

Beckers specify their range of coil coating systems for roller blinds and garage doors.

The very high abrasion resistance of Beckry®Roll coil coating systems make it suitable for use on roller blinds and garage doors. The Beckry®Roll range allows customers to design their own coating systems to meet adherence, flexibility, UV hold and abrasion resistance criteria. Performance can be improved by adjusting the quality of coats applied on the substrate. The Beckry®Roll systems also offer a range of shades and pattern themes/ to meet ever growing market aesthetic criteria.

Beckry®Roll
Beckry®Roll Plus
Beckry®Roll Premium
Beckry®Roll Premium Plus

Each of these system is available in Beckry®Therm and Beckry®Low versions for increased thermal comfort and energy cost savings. Roller blinds coated with Beckry®Roll contribute to sustainable development and thermal comfort by reducing energy loss and limiting heat accumulation over the summer



ECCA SPRING CONGRESS

The European Coil Coating Association (ECCA) will hold its 48th Annual Spring Conference in Bologna (Italy) 19th and 20th May 2014. The conferences and presentations will be on Trends in Colours and Aesthetics for Prepainted Metal. A visit of the ECCA member, Italian company MARCEGAGLIA's coil coating line has also be planned.

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www.toiture-innovante.fr

For more information

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AKZO NOBEL - ALCOA - ARCELORMITTAL - ARKEMA
BECKERS - CHEMETALL - HENKEL - MIRALU - MYRIAD - NLMK
Strasbourg - NOVACEL - PPG Industrials Coatings - VALSPAR

> Or contact ECCA



ECCA Groupe Français
17, rue Hamelin
75783 PARIS CEDEX 16
contacts@ecca.asso.fr



www.ecca.asso.fr