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Disclaim:

Although this report has been elaborated with every care, we cannot accept any liability in respect of eventually contained false information or of damages that may result from a misinterpretation of the contents.

The objective of this report is to present a list of the existing standardised steel systems as exhaustive as possible. The collect information has been done by different means in order to be complete as possible. However it may append that some fabricators do not appear in this report. We apologise to these companies and invite them to contact us so that we can update this report.

## Research Partners

The present report has been produced in the scope of the VRC Project n°0213 "Standardised Solutions for Steel in Low-rise Buildings" during the period from 2002 up to 2004.

VRC means Virtual Research Center and, for this project, is composed of the following companies:

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# 1. Introduction

## CONTEXT

The scope of the present VRC project is

- To examine the market for standardised construction systems in low rise buildings in Europe.
- To identify the important drivers to be balanced in achieving cost-effective solutions (structural, acoustic, thermal, aesthetic, etc.)
- To demonstrate the cost-effectiveness of a standardised approach by the pre-design of a low rise building.
- To develop a simulation methodology to optimise on-site construction
- To provide detailed technical information and promotional material for design professionals.

The European construction industry is seeking a step change in efficiency including reductions in capital cost, reductions in time on site, increased predictability of final product, reduction of defects, reduction of accidents, increases in productivity and increases in profitability. One way of achieving this step change is the production of prefabricated standardised solutions. Identified markets which are suitable for such systems are the residential sector and the low-rise office sector. Steel is an ideal structural material for prefabricated systems due to its high strength to weight ratio but work needs to be carried out to improve the image of steel in certain areas such as aesthetics, thermal and acoustic performance, etc.

The work programme to achieve the objectives consist of:

- 1) A rigorous market survey of available systems within Europe . Deliverables = present report and questionnaire analyses.
- 2) A demonstrator project concerned with the design of a research facility to be built at CRM. Deliverables = design information and reports.
- 3) The development of a methodology for simulating erection sequences on site to study optimum configuration of modular and frame construction. Deliverables = report.
- 4) A study examining the feasibility of gaining synergy savings by the optimum use of long products and light gauge sections. Deliverables = report.
- 5) The development of design aids to enable professionals to take advantage of the opportunities offered by standardised construction. Deliverables = Computer based design aids.
- 6) The development of promotional material and dissemination to the construction industry on the benefits of standardised construction in steel. Technical sheets and brochures.

## SCOPE

The present report resumes the results of the market survey done by the authors during the years 2001 to 2004. The scope of the survey has been defined thanks to main keywords "low-rise buildings" and "standardised steel solutions". This work identifies, as far as possible, the existing available solutions within the European market.

The definition of low-rise building depends on the building regulations in each country (for example in Germany = 7 m, Belgium = 10 m). However for the survey, low-rise buildings means buildings up to 5 storeys.

Moreover Standardisation means, in a general way, **"the extensive use of processes (The process includes planning, design, manufacture, pre-assembly and installation, products and components), in which there is regularity, repetition and a record of successful practice."** (CIRIA - May 2001)

In order to carry out the survey, the systems or the elements have been characterised as "standardised" if they can be associated to the following concepts

- Different design/buildings resulting from the same list/family of components
- Pre-design components
- One design, many buildings
- Components with standard dimensions
- Solutions with reduced technical input (minimum design, minimum specialised workmanships)
- Pre-fabrication

## CONTENT

In a first step, each partner has provided sheet for systems developed by his company or known in his country. This has lead to 55 system sheets.

In a second step, the number of systems has been increased by a subcontractor specialised in technology watch who has access to technical-economical database or specialised papers, etc...

The present report includes 157 sheets of available standardised systems or elements.

The different systems or elements are classified according their application fields as follows:

- Structural system (3D) including
  - framing systems
  - modular construction
  - car parks
- Structural elements including
  - beams
  - columns
  - floors
  - walls
- Non-structural elements including
  - cladding systems
  - roofing systems
  - ceiling systems
  - partitions systems

The chapter 2 of structural systems (3D) includes provides a broad vision and understanding of the current manufacturing situation with special regard to 3D production. An overview of the different types of standardised solutions together with an understanding of their applications is presented. In total, 36 standardised solutions have been identified. These are framing systems (Chapter 2.2), modular construction (Chapter 2.3) and car parks (Chapter 2.4).

The chapter 3 of structural elements includes the load bearing elements which compose a steel frame. Those elements are beams (Chapter 3.2) and floors (Chapter 3.3) (horizontal components) which are connected to columns (Chapter 3.4) and walls (Chapter 3.5) (vertical components). Several common characteristics of the different structural elements are listed in the introduction (Chapter 3.1).

The chapter 4 of non-structural elements includes the outside components of the building that ensure weathertightness. Those components are divided into :

- building envelope elements as cladding systems (Chapter 4.2) and roofing systems (Chapter 4.3),
- finishing elements as ceiling systems (Chapter 4.4) and partitions systems (Chapter 4.5).

For more information on these non-structural components, see the introduction of the Chapter 4.1.

Inside each chapter, the sheets have been classified according to the alphabetic order of the fabricators name.

On each sheet, the following information are given:

- The system name
- The fabricator address
- The application field
- A product description:
- Some pictures
- Technical comments
- Marketing information (if available)
- Comments

## HOW TO USE

1- Choose the application field of the needed solution.

2- Find according to the product description, the technical comments and the marketing information, the solution which corresponds to you needs.


3- You may contact by phone or visit the internet site for more information.

Structural system (30) - Framing systems

1

2

3

System name: Fusion Building Systems.	Fabricator address: FUSION BUILDING SOLUTIONS New Cork Road Bandon Co. Cork Ireland Tel : +353 (0)23 20660 Fax : +353 (0)23 20661 Email : <a href="mailto:flemingj@flemingconstruction.ie">flemingj@flemingconstruction.ie</a> Web site : <a href="http://www.fusionbuildingsystems.com">www.fusionbuildingsystems.com</a>
Application field : Houses.	
Product description : Complete system for the manufacture and erection of insulated steel frame housing.	
Pictures : 	
Technical comments : Loading resistance : vertical loads are supported by load-bearing, external and internal wall panels. Resistance to horizontal loads (racking) is provided by factory fitted, metal strapping. Thermal performances : Wall U-value : 0.25W/m <sup>2</sup> K Acoustic performances : high acoustic performance by tight construction Interaction with the light work : no interaction : fully equipped house	
Marketing information : Speed construction : Manufacture of a typical 2 storey house is under 4 hours. Erection of an insulated, weatherproofed wall and roof, is as little as 3 days.	
Comments :	





## 2. Structural system (3D)

### 2.1. Introduction

This section provides a broad vision and understanding of the current manufacturing situation with special regard to 3D production. An overview of different types of solutions together with an understanding of their applications is presented.


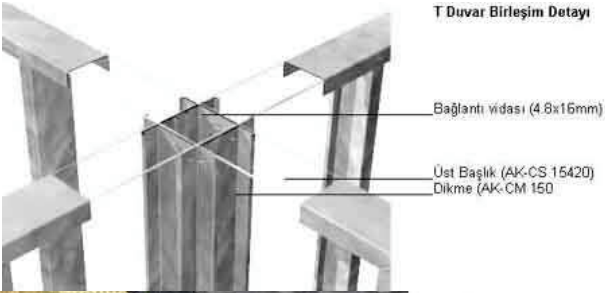

For each of the solution identified, an identity card "ID" has been developed. The "ID" provide the system name, description and field of application as well as technical information. In total, 36 standardised solutions have been identified. These are have been classified under three types of construction, namely:

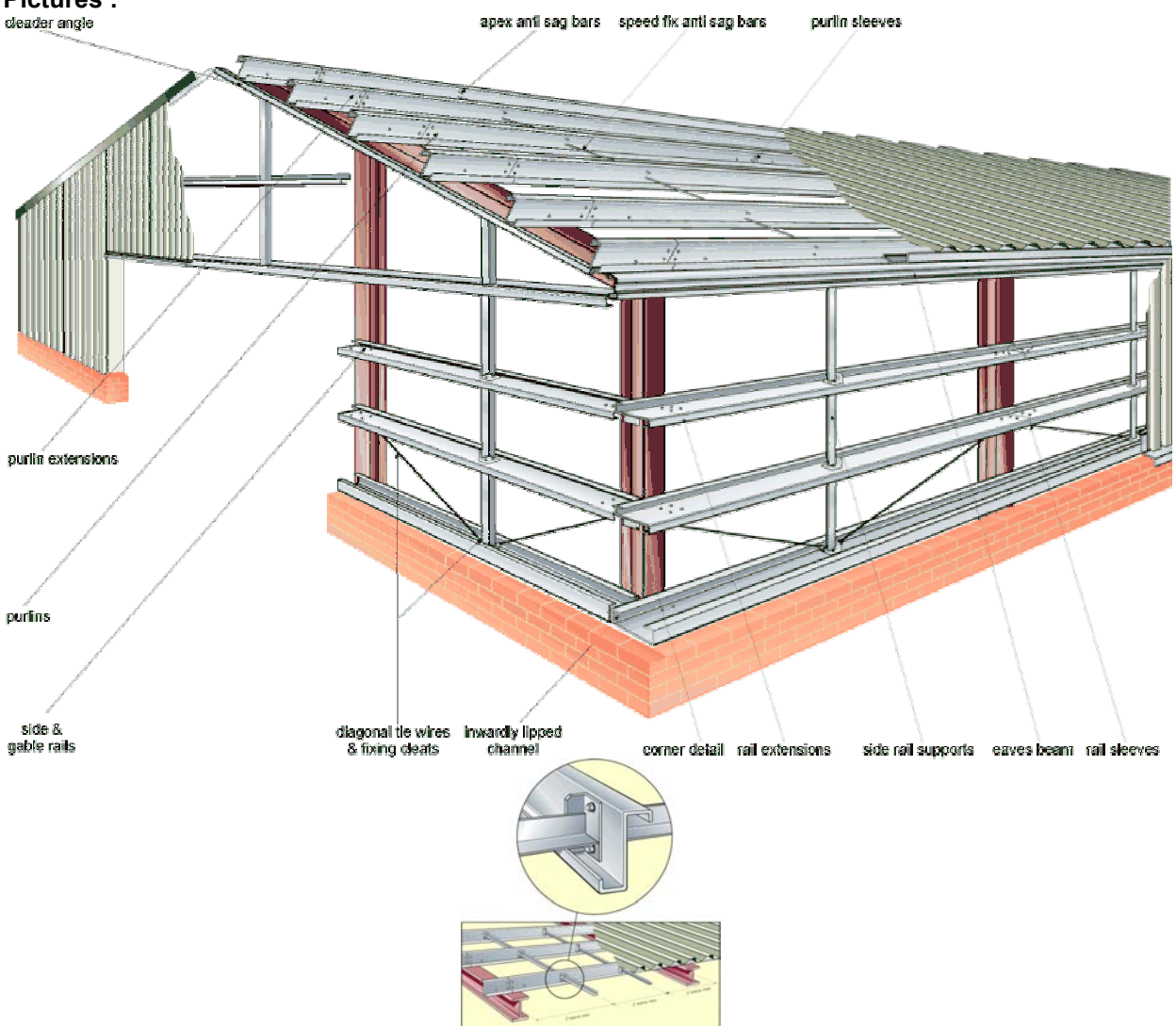
- Framing systems (24 solutions are presented)
- Modular construction (10 solutions are presented)
- Car parks (2 solutions are presented)



3D modular systems are manufactured to precision standards, within a quality-controlled factory environment. The 3D pre-engineered units are delivered to site and assembled as large volumetric components or as substantial elements of a building.

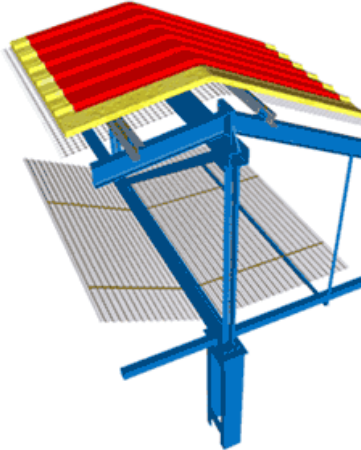
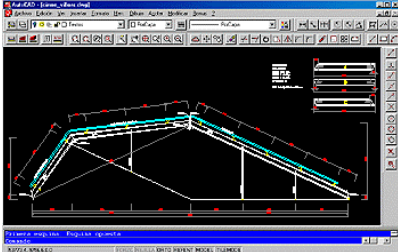



The modular units may form complete rooms, parts of rooms, or separate highly serviced units such as toilets or lifts. Similarly, a simple definition of 3D modular could be "The creation and combination of sub-assemblies and assemblies in an efficient manufacturing environment for installation at the point of use to become a complete integrated building package"

## 2.2. Framing systems

<b>System name:</b> Steel framing systems.	<b>Fabricator address:</b> AKŞAN ETÜD MÜŞAVİRLİK MÜHENDİSLİK İNŞAAT A.Ş. Nazmi Akbaci İş Merkezi No:216 Maslak ISTANBUL Tel : 212-286-0567 (PBX) Fax : 212-286-0571 Email : muge@aksanworks.com Web site : www.aksanworks.com
<b>Application field :</b> Single and two storeys homes.	
<b>Product description :</b> The structural members are hot dipped galvanised steel cold-formed into U,C,Z and sections at the AKSAN FACTORY on roll-form machines. The thickness of the sections are 0,5-2,5 mm. The members are then fastened to each other using self drilling co-polymer or galvanised screws into panels or trusses. These panels are then fastened to each other on site to form the frame of the structure. Sheeting is applied on the panels using OSB 3 , which also contributes to the structure, converting the panels into shear walls capable of bearing vertical and horizontal loads that may be the results of earthquakes and strong winds.	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: flex-start;">    </div> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="width: 30%;"> <p><b>Bodrumlu Temel Detayı</b></p> <ul style="list-style-type: none"> <li>Ankraj profili</li> <li>Dikme (AK-CM 15015)</li> <li>Alt Başlık (AK-CS 15420)</li> <li>OSB(Oriented Strand Board)</li> <li>Bağlantı vidası (4.8x16 mm)</li> <li>Kiriş (AK-CM 25020)</li> <li>Kiriş soketi (AK-CS 25420)</li> <li>Bağlantı profili (AK-CM 15015)</li> <li>Ankraj vidası (6.3x 75 mm)</li> <li>Ankraj plakası</li> </ul> </div> <div style="width: 30%;"> <p><b>T Duvar Birleşim Detayı</b></p> <ul style="list-style-type: none"> <li>Bağlantı vidası (4.8x16mm)</li> <li>Üst Başlık (AK-CS 15420)</li> <li>Dikme (AK-CM 150)</li> </ul> </div> <div style="width: 30%;"> <p><b>Saçak Birleşim Detayı</b></p> <ul style="list-style-type: none"> <li>OSB</li> <li>Isı yalıtımı (Tasyünü)</li> <li>Su yalıtımı</li> <li>Çatı kaplaması (Shingles)</li> <li>Saçak profili</li> <li>Omega (AK-HS 605015)</li> <li>Çatı makası profilleri</li> <li>Bağlantı plakası</li> <li>Üst başlık (AK-CS 15420)</li> <li>Dikme (AK-CM 15015)</li> </ul> </div> </div>	
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> Albion sections	<b>Fabricator address:</b> ALBION SECTIONS LIMITED Albion Road West Bromwich West Midlands B70 8BD England Tel : +44 121 553 1877 Fax : +44 121 553 5507 Email : albionsections@enterprise.net Web site : www.albionsections.co.uk
<b>Application field :</b> Construction and engineering industries.	
<b>Product description :</b> Cold rolled sections.	
<b>Pictures :</b> 	
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b>	

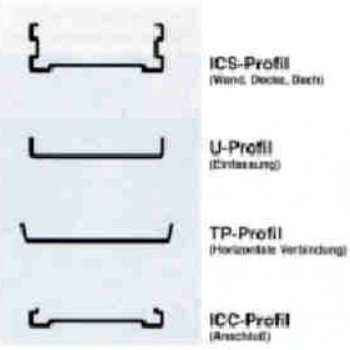

<p><b>System name:</b></p> <p>Portifort</p>	<p><b>Fabricator addresses:</b></p> <p>AÑURI S.A.  Cr. San Sebastián Km. 9 31195 Añezcar (Navarra)  tel: 948 30 21 12  fax: 948 30 21 35  E-mail: info@añuri.es</p>
<p><b>Application field:</b> PORTIFORT is a structural system patented by AÑURI, S.A. specially designed for industrial premises, pavilions, sports centres, supermarkets, etc.</p>	
<p><b>Product description:</b> The design of the frames gives the name to the system. The frames are what support the structure. Each frame consists of a set of profiles –columns and roof beams- assembled with high-resistance screws. These profiles are built-up from steel plates and their sections vary according to length in an attempt at finding the optimum weight/strength relationship. The steel used is always S235 or S275 EN 10025:94 quality and minimum thickness stands at 5 mm.</p>	
<p><b>Pictures:</b></p> <div data-bbox="148 696 903 1196">  </div> <div data-bbox="963 651 1374 1196">  </div>	
<p><b>Technical comments:</b></p> <ul style="list-style-type: none"> <li>• Its optimised design means that Añuri is able to offer competitive systems capable of meeting building requirements, whilst lending an air of “lightness” to the entire structure.</li> <li>• The use of “made-to-measure” profiles readily respond to the need for large spans (up to 80 m. without interior columns) and/or great heights (up to 30 m. without intermediate columns) normally required for sports centres or warehouses.</li> <li>• The 4 welded angles on built-up members avoid the accumulation of humidity and consequent corrosion at the root of welds which is produced when only 2 angles are welded.</li> <li>• The articulated supports used on the frames reduce foundation costs by avoiding the transmission of bending moments to the structural footing.</li> <li>• The versatility of its structural design offers a wide range of solutions to satisfy nearly all requirements: complex distribution, projections, etc.</li> <li>• The corrugated profile on the false ceiling helps distribute the natural light from the skylights uniformly, thereby creating pleasant interior lighting conditions.</li> <li>• The insulation capacity of the roof is enhanced by the heat regulating effect of the air pocket between the roof and the false ceiling.</li> <li>• Assembly efficiency and speed is guaranteed thanks to the use of calibrated, high-resistance bolts on 98% of the joins.</li> <li>• The degree of cleanliness and hygiene achieved by concealing the roof structure with the false ceiling goes a long way towards cutting the cost of upkeep.</li> </ul>	
<p><b>Marketing information:</b></p>	
<p><b>Comments:</b></p>	

<b>System name:</b> Villoar-2-B system	<b>Fabricator addresses:</b> AÑURI S.A. Cr. San Sebastián Km. 9 31195 Añezcar (Navarra) tel: 948 30 21 12 fax: 948 30 21 35 E-mail: info@añuri.es
<b>Application field:</b> VILLOAR 2 BANCO is a structural system patented by AÑURI, S.A. specially designed for industrial premises, pavilions, sports centres, supermarkets, etc.	
<b>Product description:</b> All the principal structure is made with steel profiles. The special geometry of the lattices formed by the beams gives to this system the name "BANCO" (seat).	
<b>Pictures:</b> <div style="display: flex; flex-wrap: wrap;">      </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• The zenith light the system achieves makes for well-lit, pleasant interiors far superior to those offered by other structural systems.</li> <li>• The insulation capacity of the roofing is enhanced by the heat regulating effect of the large air pocket between the roof and the false ceiling.</li> <li>• The versatility of its structural design offers a wide range of solutions to satisfy nearly all requirements, meaning that extensions, uneven floor surfaces, large projections, etc., are no trouble at all.</li> <li>• The large spans which can be achieved (up to 100 m.) solve at a competitive price the problems represented by columns inside buildings. It should be pointed out that, as the distance separating these interior columns on the Villoar 2 Banco system normally ranges from 9 to 12 m, incidence in the layout is low.</li> <li>• Safety during erection is guaranteed by assembling nearly all of the structure at ground level. This same system means that erection is both an efficient and rapid process.</li> <li>• The degree of cleanliness and hygiene achieved by concealing the roof with the false ceiling goes a long way towards cutting the cost of upkeep.</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b>	









<p><b>System name:</b></p> <p>Astronet Standard buildings</p>	<p><b>Fabricator addresses:</b></p> <p>ASTRON NAVES METALICAS  Commercial Intertech S.A.  Oficina de Representación  C. Nicolas Alcorta 2-3i  Planta Comercial  E-48003 Bilbao, España  Tel.: +34 (0)94 444 9931  Telefax : +34 (0)94 421 2155  E-mail: <a href="mailto:info.es@astron-buildings.com">info.es@astron-buildings.com</a></p>
<p><b>Application field:</b> Industrial buildings.</p>	
<p><b>Product description:</b> Astronet standard buildings are pre-engineered industrial buildings.</p>	
<p><b>Pictures:</b></p> 	
<p><b>Technical comments:</b></p> <ul style="list-style-type: none"> <li>• Structure: Spans of 12 m, 15 m, 18 m, 21 m, 24 m, 27 m and 30 m High tensile steels. Galvanised, cold-formed secondary structure. Eaves height 4.4 ; 5.0 ; 6.0 or 7.0 m depending on building type. Bay spacing 7.5 or 6.0 m depending on snow-load. Wing units with a span of 4.5 or 6.0 m. Parapets depending on building type.</li> <li>• Roof system: Classic PR roof ribbed panel, externally fixed. DSR Double skin roof systems.;</li> <li>• Wall system: Classic PR wall, externally fixed with color matched fasteners. Polar SA1 sandwich panel, CFC-free, Polyurethane core Inside Sheeting systems.</li> <li>• Insulation: Astrotherm insulation.</li> <li>• Accessories: Single-skin and insulated roof lights, peak skylights Monovents, circular vents, smoke vents, framed openings, overhead door openings, personnel doors, overhead doors, windows.</li> </ul>	
<p><b>Marketing information:</b></p>	
<p><b>Comments:</b></p> <ul style="list-style-type: none"> <li>• Fast building approvals</li> <li>• Short delivery times - 3 to 4 weeks ex-works</li> <li>• Rapid construction</li> <li>• Possibilities for architectural enhancement</li> <li>• Wide range of accessories</li> </ul>	

<b>System name:</b> Atlas buildings	<b>Fabricator address:</b> ATLAS WARD GMBH GERMANY Schermbecker Landstrasse 22 46569 Hunxe-Drevenack , Germany Tel : +49 2858-9160 Fax : +49 2858-91616 Email : do@atlasward.com  <b>Web site : <a href="http://www.atlas-hallen.de">www.atlas-hallen.de</a></b>
<b>Application field :</b> Industrial and shopping buildings.	
<b>Product description :</b> The design of every building is based on specific requirements. Buildings of any length with clear spans up to 100 meters.	
<b>Pictures :</b> <div data-bbox="295 692 842 1039">  </div> <div data-bbox="863 692 1414 1039">  </div> <div data-bbox="295 1039 842 1303">  </div> <div data-bbox="938 1039 1339 1303">  </div>	
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b>	

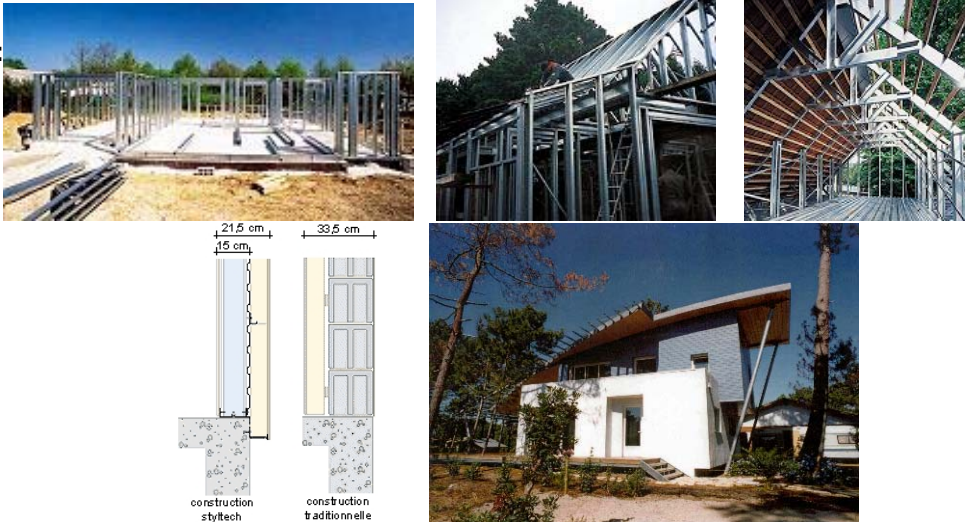
<b>System name:</b> Atmosfair Systemhaus	<b>Fabricator address:</b> Atmosfair-Bauhaus GmbH (ThyssenKrupp Steel company) Essener Straße 59 D-46047 Oberhausen Tel. +49-208-8204-00 Fax +49-208-8204-325 www.atmosfair.de
<b>Application field:</b> Prefabricated floors, walls and roofs	
<b>Product description:</b> Frame of cold formed steel profiles spot-welded, then encased in lightweight concrete <ul style="list-style-type: none"> <li>• Steel profiles: made of galvanised steel sheet, thickness between 1 and 2 mm, zinc weight 275g/m<sup>2</sup></li> <li>• Concrete: lightweight concrete with polystyrene</li> <li>• Concrete mixture can be varied to achieve optimum load-bearing capacity, noise insulation, thermal insulation</li> </ul>	
<b>Pictures:</b> <div style="display: flex; align-items: center;"> <div style="flex: 1;">  </div> <div style="flex: 2;">  </div> </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Main sector: residential structures and offices</li> <li>• 5 standard houses were developed, but individual construction is possible</li> <li>• System is similar to prefabricated concrete slabs, but reinforcement is replaced by steel frame</li> <li>• Very slender steel profiles are stabilised by concrete</li> <li>• Atmosfair speaks of a composite system, but no means of connection between steel and concrete are used (self-drilling screws were tested)</li> <li>• Smallest wall profile is 10 cm wide. Together with 2.5 cm concrete cover on both sides this makes a minimum wall thickness of 15 cm. Compared to masonry, this is no real advantage</li> <li>• System provides diaphragm effect</li> <li>• Mainly for buildings up to 3 – 5 storeys</li> <li>• Additional thermal insulation is necessary to satisfy German regulations =&gt; on-site works</li> <li>• F 90 is possible.</li> </ul>	
<b>Marketing information:</b> The annual production capacity of Atmosfair is an equivalent of 100 single-family houses. They have contracts with other companies to be able to produce 1200 houses per year. Due to the bad situation of the German residential construction market 100 houses seem to be more realistic. In the sales brochure a cost advantage of 30% compared to normal structures is mentioned, but this does not seem to be true. Two important projects in Germany are running, both are ordered from other ThyssenKrupp companies.	
<b>Comments:</b> No significant advantage compared to reinforced lightweight concrete.	



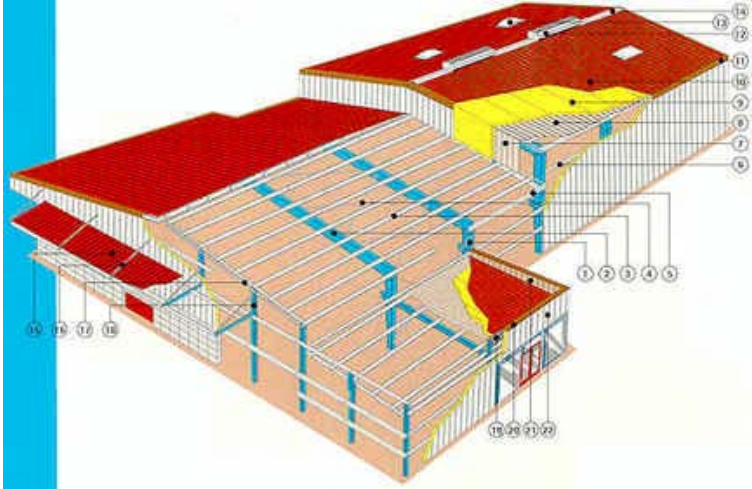
<b>System name:</b> Ayrshire Steel Framing	<b>Fabricator address:</b> AYRSHIRE 17 Church Street Irvine Ayrshire KA12 8PH Tel: +44 (0)1294 274171 Fax: +44 (0)1294 275447 Email: Ayrshireuk@aol.com  SYSTEM BAU ELEMENTE OFFENBACHSTRASSE 1 81241 MUNCHEN Germany Tel: + 49 (0) 89 896 0840 Fax: + 49 (0) 89 834 1431 Email: hallo@sbe-zeta.de Web site : www.ayrshire.co.uk
<b>Application field :</b> light industrial buildings, domestic housing, apartment buildings up to 6 storey, over-roofing of existing buildings, mezzanine floors, etc.	
<b>Product description :</b> light steel frames	
<b>Pictures :</b> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;">        </div> </div>	
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b>	



<p><b>System name:</b></p> <p>Surebuild</p>	<p><b>Fabricator addresses:</b></p> <p>Corus Framing Whitehead Works, Mendalgief Road, Newport S Wales, NP20 2NF Tel: 0044 (0)1633244000</p>
<p><b>Application field:</b></p> <p>Surebuild is a light weight steel framing system used for domestic housing, flats and other similar structures and is manufactured by Corus Framing in South Wales.</p>	
<p><b>Product description:</b></p> <p>All the principal structure is made with steel profiles. The system is based upon a 'warm frame' concept meaning that the frame is warm and dry at all times; to achieve this, insulation panels are added to the outside of the frame to provide a weather tight exterior</p>	
<p><b>Pictures:</b></p> 	
<p><b>Technical comments:</b></p> <ul style="list-style-type: none"> <li>• The party wall has passed the 60 minute fire test for stability, integrity and insulation and the standard floor system has passed the 30 minute test.</li> <li>• In addition, the accelerated salt spray and sulphur dioxide tests proved the corrosion resistance of the tough zinc coating protecting the frame.</li> <li>• Corus Framing has achieved BBA and ISO 9001 accreditation and has received Lantac, NHBC and Zurich approval for the Surebuild system.</li> <li>• Safety during erection is guaranteed by assembling nearly all of the structure at ground level. This same system means that erection is both an efficient and rapid process.</li> <li>• A Surebuild wall can retain over 30% more heat than building regulations require. So the house will be much more comfortable, and cost a lot less to run.</li> <li>• Surebuild homes can be built in as little as 7 - 10 weeks - so once you've made your reservation you may be able to move sooner than you think</li> <li>• Extensive testing by Corus on houses "in the field", has conclusively proved that the sound reduction between adjoining homes is significantly better than with conventionally built homes</li> </ul>	
<p><b>Marketing information:</b></p>	
<p><b>Comments:</b></p>	

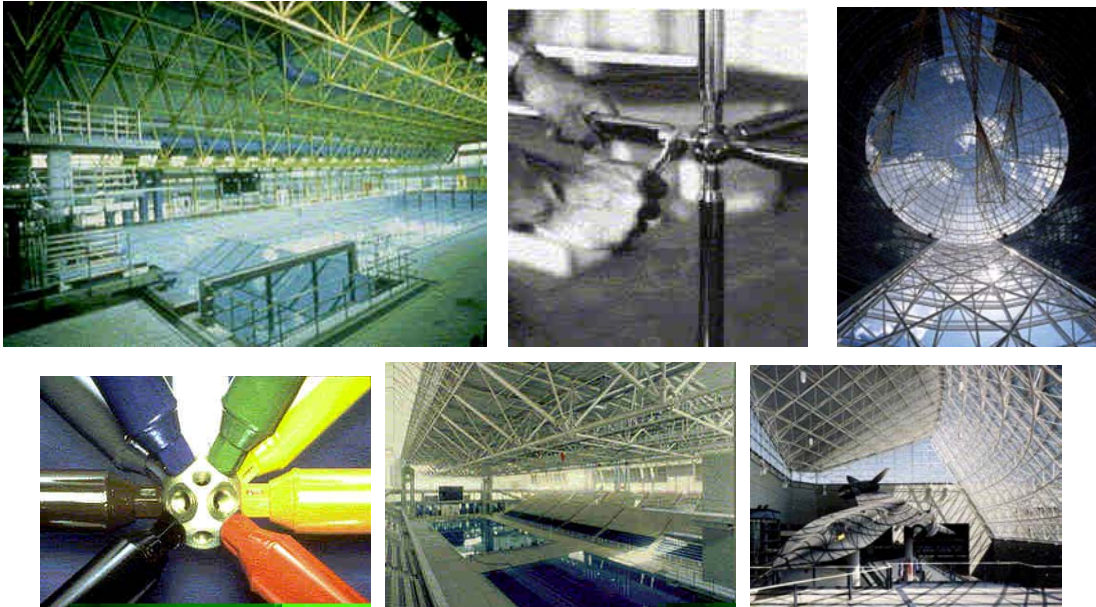
<b>System name:</b> Fusion Building Systems.	<b>Fabricator address:</b> FUSION BUILDING SOLUTIONS New Cork Road Bandon Co. Cork Ireland Tel : +353 (0)23 20660 Fax : +353 (0)23 20661 Email : <a href="mailto:flemingj@flemingconstruction.ie">flemingj@flemingconstruction.ie</a> Web site : <a href="http://www.fusionbuildingsystems.com">www.fusionbuildingsystems.com</a>
<b>Application field :</b> Houses.	
<b>Product description :</b> Complete system for the manufacture and erection of insulated steel frame housing.	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Loading resistance : vertical loads are supported by load-bearing, external and internal wall panels. Resistance to horizontal loads (racking) is provided by factory fitted, metal x-bracing.</li> <li>• Thermal performances : Wall u-value : 0.25W/m²K</li> <li>• Acoustic performances : high acoustic performance by 'tight' construction</li> <li>• Interaction with the light work : no interaction : fully equipped house</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Speed construction : Manufacture of a typical 2 storey house in under 4 hours. Erection of an insulated, weatherproof shell and roof, in as little as 3 days.</li> </ul>	
<b>Comments :</b>	




<b>System name:</b> STYLTECH	<b>Fabricator address:</b> GEIE PAB (Arcelor Group) Immeuble Le Pacific 11-13 Cours Valmy F-92070 La Défense Cedex Tel : 00 33 (1) 41 25 97 77 Fax : 00 33 (1) 41 25 97 01 www.pab.tm.fr
<b>Application field:</b> Steel framing system ; residential, offices, schools, ... buildings	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Steel framing : cold-formed steel profiles (galvanised steel) ; screwed (self-drilling screw)</li> <li>• External walls on the outer side : either galvanised steel deck (ribbed) + outside insulation system (rendering on insulation or clothing), or sandwich panels cladding</li> <li>• External walls on the inner side : gypsum panels screwed on the framing.                         <ul style="list-style-type: none"> <li>– The floors are either composite floors, or wood panels screwed on steel beams</li> <li>– This system can also be used to extend or set-up some constructions (steel, concrete or masonry buildings)</li> <li>– Some licensed undertaking set up the building system</li> <li>– Foundation : reinforced concrete.</li> </ul> </li> </ul>	
<b>Pictures:</b> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• The inner gypsum panels allow all internal finish and traditional equipment</li> <li>• The roof can be traditional roofing on steel small girder and steel or wood roof batten, composite panels, ...</li> <li>• The fire-proof is according to the constructive device and the fire stability (first depending on the framing) is 1/4h, 1/2h, 1 hour, 1.5 hour or 2 hours</li> <li>• The ducting can be set into the steel framing (holes on the cold-formed profiles)</li> <li>• Thermal insulation is better (4.2% to 39.3%) than the regulation rate (according to the geographical area considered, the components of the walls, ...)</li> <li>• Sound insulation : transmission loss <math>R_w = 45</math> to 65dB (according to the components of the walls)</li> <li>• CSTB technical assessment 2/00-812</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b> the project is studied by PAB or an accredited engineering design	



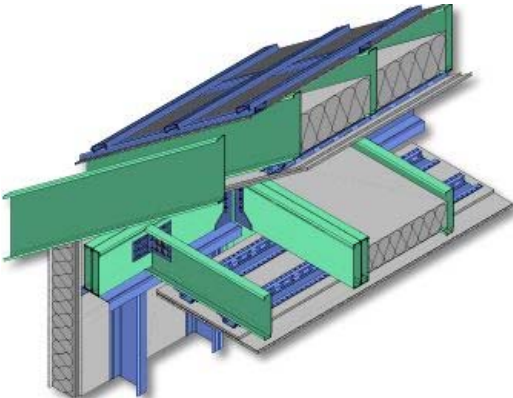
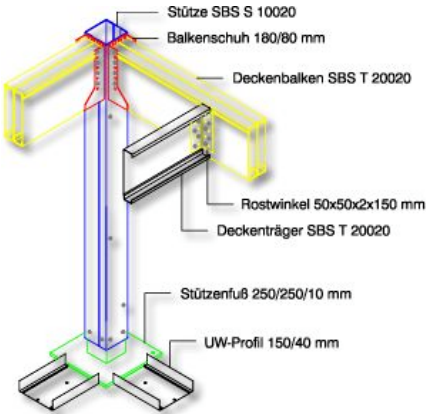
<b>System name:</b> Janspan	<b>Fabricator address:</b> JANSA METAL, S.A. Zona Industrial, Cami del Mig, 20 ES-08349 Cabrera de Mar Tel: 00.34.93.759.61.69 Fax: 00.34.93.759.03.96 email: <a href="mailto:info@jansa.com">info@jansa.com</a>
<b>Application field:</b> Pre-engineered buildings	
<b>Product description:</b> The Janspan system means that the building is completely designed, prefabricated, and planned beforehand, thereby removing the need to make risky decisions during the building work - decisions which cost time and money.	
<b>Pictures:</b> 	
<b>Technical comments:</b> <p>Roofing systems are made of high-resistance galvanised steel using the Senzdmir and Galvalange processes. They are then phosphated, painted with primer and finished using silicone polyester or polyvinyl fluorine (PVF). The insulation used is always CFC free. Insulation depends on the option chosen. All the systems are based on 1m wide panels or plates which overlap lengthways. They are joined together by steel bolts with EPDM joint sealing washers. Neither fillers nor silicone are used, as they can vary with climatic conditions. (When exposed bolts are required, the heads are non-metallic.)</p> <p>With Janspan we can produce structures with a usable span of 70 m., using a third of the columns and a modulation of up to 16 m.</p>	
<b>Marketing information:</b> The pre-engineered buildings have been used several times in industrial buildings.	
<b>Comments:</b> Is easily assembled.	



<b>System name:</b> LLENTABHALLEN	<b>Fabricator address:</b> LLENTAB AB Box 104 S-456 23 KUNGSHAMN Tel : 0523-79 000 Fax : 0523-31 120 Email : info@lilentab.se Web site : www.lilentab.com
<b>Application field :</b> From small non-insulated storage halls to two storey office buildings.	
<b>Product description :</b>	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b> LLENTAB halls can be designed with pitched-roof or mono-pitch roof (single slope) and with a roof slope of 4°, 7°, 14° or 21°. The width can, without centre pillar support, vary between 5,6 and 50 m. Wider halls are supplied with centre pillar supports. <ul style="list-style-type: none"> <li>• <b>FRAMEWORK :</b> The roof truss is, together with the pillars and framework, delivered in the form of U &amp; Z profiles that are bolted together onsite. All holes are pre-punched profiles galvanised.</li> <li>• <b>ROOF / WALLS :</b> These are galvanised and painted corrugated steel plates, with profile height of 45 mm. Standard thickness of roofing 0,6 mm and walls 0,5 mm. All screw holes for mounting onto framework are pre-punched. The material for the gable wall panels are angle cut at the factory. The side overlapping of the roof panels are extra wide covering 1 crest and 1 trough. Insulation are available in a number of designs from just condensation protection to mineral wool with lacquered-sheet-material on the interior</li> <li>• <b>TRIMMINGS :</b> Trimmings for ridgetile, base of roof, footing, windfacing boards and corners are produced in galvanised painted steel plates.</li> <li>• <b>FIXING :</b> For assembly of the framework, galvanised screws, nuts and washers are induced. For assembly of the corrugated plating, standard pressed threaded stainless steel screws and sealing washers are included. For trimmings, zinc plated painted overlapping screws are included. For mounting of pillars onto cement base, galvanised zinc plated expanding bolts are included.</li> </ul>	

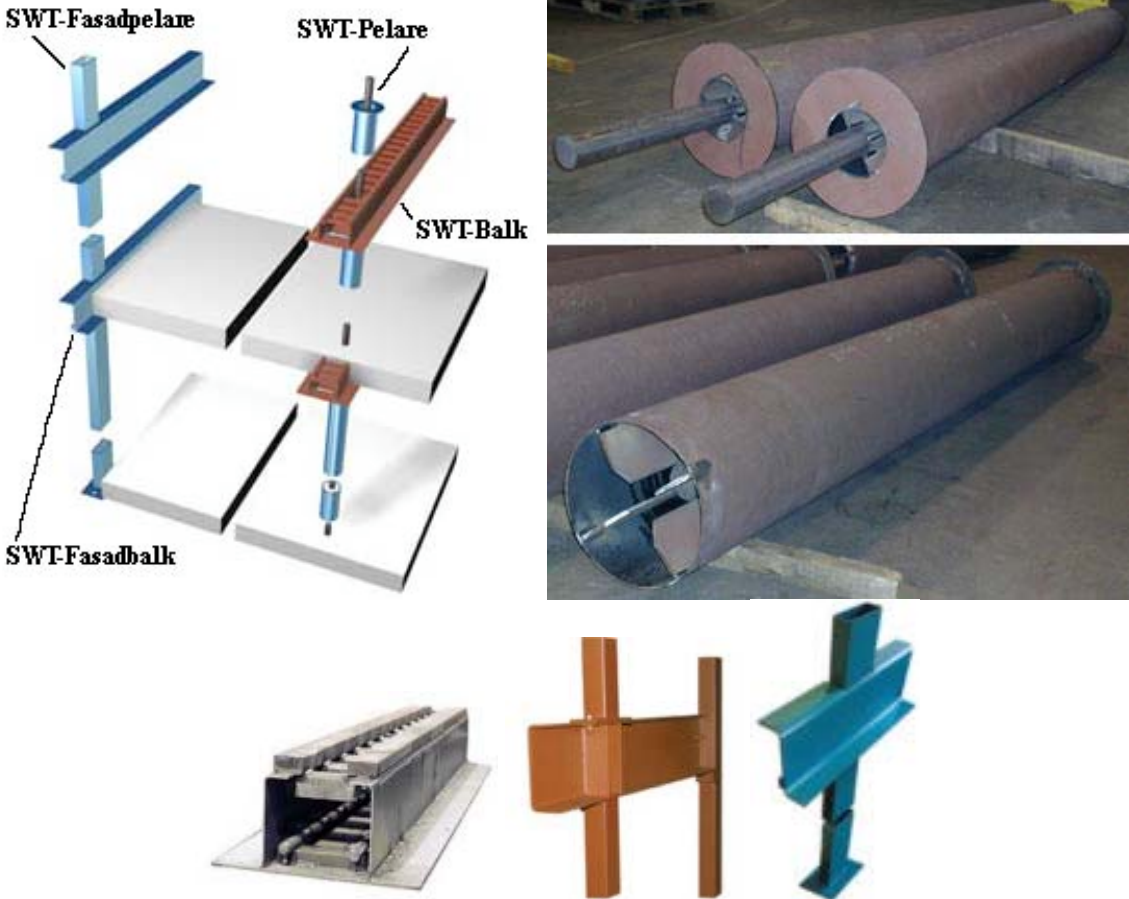
<b>System name:</b> Mero spaceframes	<b>Fabricator addresses:</b> MERO (UK) Plc Unit 5 Ancells Court Rye Close, Ancells Business Park Fleet, Hants GU13 8UY - Great Britain Tel.: +44/1252/815335 Fax: +44/1252/815336 e-mail: <a href="mailto:enquiries@merouk.co.uk">enquiries@merouk.co.uk</a>
<b>Application field:</b> Structural steel roofing system. Mero are fabricators of three-dimensional structural systems	
<b>Product description:</b> The traditional MERO system, the first prefabricated space frame system, is supremely adapted to a wide range of applications. It consists of only two basic elements, ball nodes and members made of hollow round sections. In combination with a series of different members arranged according to the principle of a geometric progression, it can be made to fit a great variety of shapes.	
	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• World famous for commercial development and supply of three-dimensional structural systems, MERO has continually built on this success and now is a leader in the supply of complete high technology envelopes.</li> <li>• Innovative solutions for various kinds of structures, atria</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b>	


<p><b>System name:</b></p> <p><b>CIBBAP</b></p>	<p><b>Fabricator address:</b>  PAB Est (Arcelor Group)  10, Rue du bassin de l'industrie - BP25  F-67017 STRASBOURG  Tel : 00 33 (3) 88 41 48 75  Fax : 00 33 (3) 88 41 48 04  www.pab.tm.fr</p>
<p><b>Application field:</b>  Steel framing system ; residential, offices, schools, ... buildings (constructions 1 to 4 storeys)</p>	
<p><b>Product description:</b></p> <ul style="list-style-type: none"> <li>• Modular load-bearing wall.</li> <li>• The walls, floors and roofs are designed and pre-assembled</li> <li>• Galvanised or stainless steel</li> <li>• The floors are either composite or dry (max. span 10m)</li> <li>• Foundation : reinforced concrete.</li> </ul>	
<p><b>Pictures:</b></p> <div data-bbox="161 949 432 1182">  </div> <div data-bbox="451 862 847 1182">  </div> <div data-bbox="868 862 1358 1182">  </div>	
<p><b>Technical comments:</b></p> <ul style="list-style-type: none"> <li>• This system can be used in seismic zones and tropical zones (with cyclone seasons)</li> <li>• Cibbap can also realise some modular units (prefabricated and then installed on site)</li> <li>• This system can have all type of roof (traditional, steel, ...)</li> <li>• Thermal insulation is better (&gt; 20%) than the regulation rate (insulation with mineral wool – fire-resistant)</li> <li>• Sound insulation : the CIBAPP system accommodate the new acoustic regulation (good transmission loss)</li> </ul>	
<p><b>Marketing information:</b></p>	
<p><b>Comments:</b></p> <ul style="list-style-type: none"> <li>• good flexibility (the inner space isn't partitioned with load-bearing walls and can then change)</li> <li>• rapidity of manufacturing</li> </ul>	




<b>System name:</b> RISY-SBS (Richter System Steel Building System)	<b>Fabricator address:</b> Richter System Flughafenstr. 10 D-64347 Griesheim Tel. +49-6155-8760 Fax +49-6155-876281 E-mail: <a href="mailto:info@richtersystem.com">info@richtersystem.com</a>
<b>Application field:</b> Walls, roofs, floors for industrial, office and residential buildings, car parks	
<b>Product description:</b> Load-bearing elements: cold-formed steel profiles, cladding: gypsum panels, plasterboard, <ul style="list-style-type: none"> <li>• Steel profiles: made of galvanised steel sheet, max. thickness 2 mm</li> <li>• Thermal insulation: mineral wool</li> </ul>	
<b>Pictures:</b> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Connection wall-floor-roof</p> </div> <div style="text-align: center;">  <p>column</p> </div> </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Main sector: industrial structures and offices</li> <li>• Max span: 6m</li> <li>• No diaphragm effect, diagonal elements necessary</li> <li>• No load-bearing walls, main beams take the loads to columns =&gt; very flexible interior walls</li> <li>• Lightweight system, very useful for additional storeys on existing buildings</li> <li>• Much building-site work (Erection of the columns, installations of main beams and floor beams, installation of secondary elements, cladding)</li> <li>• Up to 5 storeys</li> <li>• All relevant fire safety requirements for these buildings can be fulfilled</li> <li>• Additional thermal insulation necessary for office or residential use</li> </ul>	
<b>Marketing information:</b> Widely used, (market leader for lightweight steel structures in Germany ?)	
<b>Comments:</b> Very good system for modification of existing buildings	

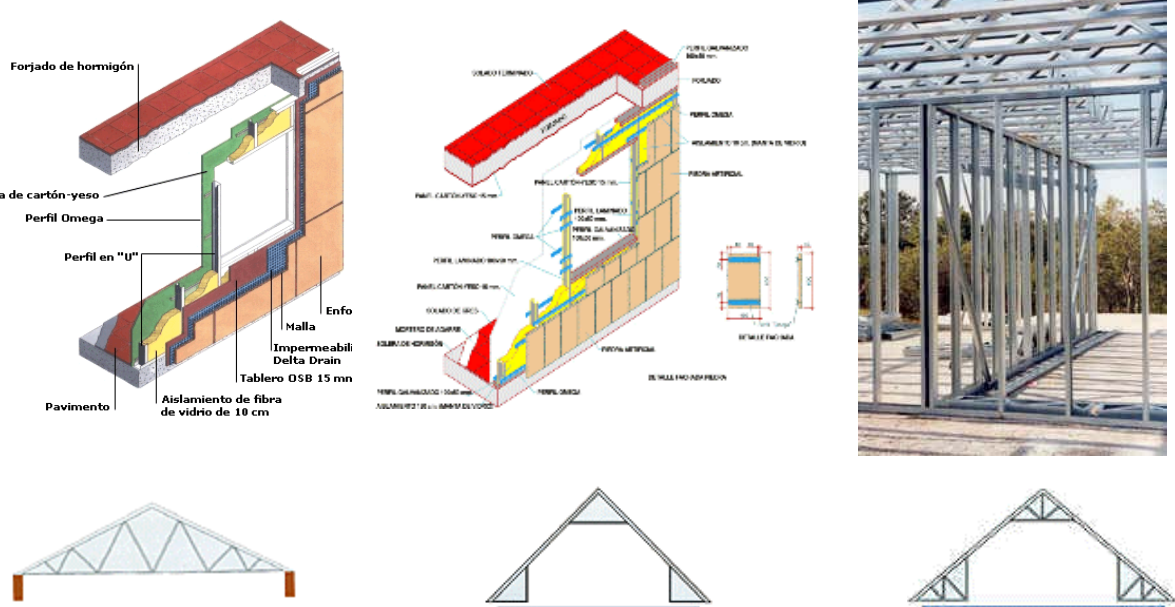
<b>System name:</b> Säbu	<b>Fabricator address:</b> Säbu Morsbach GmbH Krottorfer Straße D-51597 Morsbach <a href="http://www.saebu.de">www.saebu.de</a>
<b>Application field:</b> Office buildings	
<b>Product description:</b> 3D elements with steel profiles composed of hot-rolled sections.	
<b>Pictures:</b> <div style="display: flex; justify-content: space-around;">   </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Main sector: offices</li> <li>• Also hospitals, petrol stations</li> <li>• Up to 3 storeys are possible</li> <li>• Exterior walls: according to customer demands (glass facades, aluminium, steel, ...)</li> <li>• Interior walls: cold-formed steel profiles, mineral wool insulation, gypsum panels</li> </ul>	
<b>Marketing information:</b> Company is more than 75 years old, was founded as a sawmill. Today production of standardised steel buildings (3D elements) and timber buildings (2D elements). 30% cheaper than massive structures (according to the producer)	
<b>Comments:</b> Very good system for modification of existing buildings	


<b>System name:</b> SWT-system	<b>Fabricator address:</b> SCANDINAVIAN WELDTECH AB Box 853 781 29 BORLANGE Email : info@swt.se Web site : www.swt.se
<b>Application field :</b> Framing	
<b>Product description :</b> columns with hollow sections and welded box beams	
<b>Pictures :</b>  <p>The 'Pictures' section contains several images illustrating the SWT system components and their assembly:</p> <ul style="list-style-type: none"> <li><b>Technical drawings:</b> <ul style="list-style-type: none"> <li><b>SWT-Fasadpelare:</b> A vertical blue profile with a flange.</li> <li><b>SWT-Pelare:</b> A vertical blue profile with a central hole.</li> <li><b>SWT-Balk:</b> A horizontal red profile with a central hole.</li> <li><b>SWT-Fasadbalk:</b> A horizontal blue profile with a flange.</li> </ul> </li> <li><b>Photographs:</b> <ul style="list-style-type: none"> <li>Two large, dark, cylindrical hollow sections (columns) with horizontal rods passing through them.</li> <li>A close-up of a horizontal rod passing through a hollow section.</li> <li>A perspective view of a horizontal rod passing through a hollow section.</li> <li>A perspective view of a horizontal rod passing through a hollow section.</li> <li>A perspective view of a horizontal rod passing through a hollow section.</li> <li>A perspective view of a horizontal rod passing through a hollow section.</li> </ul> </li> </ul>	
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b>	


<b>System name:</b> SMII/Puzzle	<b>Fabricator address:</b> SMII Diffusion Tour Ariane (33 <sup>ème</sup> étage) 5 Place de la Pyramide F-92088 Paris La Défense Tel : 00 33 (1) 55 68 12 68 Fax : 00 33 (1) 55 68 10 00
<b>Application field:</b> Steel construction system ; residential, offices, schools, ... buildings	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Steel framing : galvanised steel columns and purlins</li> <li>• The floors are either composite or wood panels</li> <li>• Roof : roof boarding is generally wood insulating panels or steel ; with complementary mineral wool insulation</li> <li>• Wall insulation : polystyrene glued and screwed on a galvanized steel framing</li> <li>• Foundation : reinforced concrete.</li> </ul>	
<b>Pictures:</b> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• This system can be used in seismic zones</li> <li>• This system can have all type of traditional finish</li> <li>• Thermal and sound insulations are better than the regulation rates</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b> <ul style="list-style-type: none"> <li>• good flexibility (the inner space can be easily partitioned)</li> <li>• rapidity of manufacturing</li> </ul>	

<b>System name:</b> Steadmans Zed Section Roofing Purlins & Cladding Side Rails	<b>Fabricator address:</b> STEADMANS Ltd Warnell, Welton, Carlisle, Cumbria CA5 7HH UK Tel : +44 16974 78277 Fax : +44 16974 78530 Email : info@steadmans.co.uk Web site : www.steadmans.co.uk
<b>Application field :</b> Halls	
<b>Product description :</b> Cladding rail, 3D structure elements	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Manufactured to length as specified.</li> <li>• Loading resistance : All Steadmans Zed sections are manufactured by cold rolling and pre-punching structural, hot dipped galvanised steel coil to BS 2989: 1982, grade Z35 - G275 with a minimum yield strength of <math>280\text{N/mm}^2</math>. the load/span characteristics have been produced analytically in accordance with BS 5950: Part 5: 1987</li> <li>• Durability (corrosion) : Hot dipped galvanised steel</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	



<p><b>System name:</b></p> <p>Steel built</p>	<p><b>Fabricator address:</b></p> <p>Steel built Quintana, 20 - 4º A E-28008 Madrid Tel. +34 915 591 032 Fax. +34 915 591 032 E-mail: <a href="mailto:info@steelbuilt.es">info@steelbuilt.es</a></p>
<p><b>Application field:</b></p> <p>Residential buildings; based in a galvanized steel structure over an economic and light foundation</p>	
<p><b>Product description:</b></p> <ul style="list-style-type: none"> <li>• The concrete slab is between 180 and 400 kg/m<sup>2</sup></li> <li>• Galvanized steel profiles: light gauge steel cool conformed by Steel built</li> <li>• Light covers formed by galvanized steel of 1,2 mm thickness, joined by bolts and covered by oriented strain boards (OSB)</li> <li>• Closing system Panelex, formed by OSB panels and Delta drain panels for the waterproofing.</li> </ul>	
<p><b>Pictures:</b></p> 	
<p><b>Technical comments:</b></p> <ul style="list-style-type: none"> <li>• The soundproofing and thermal isolation can be four times higher than the obtained in the traditional construction.</li> <li>• The time erection of this system is very lower than the traditional system.</li> <li>• Allows a flexible design.</li> </ul>	
<p><b>Marketing information:</b> Is a growing system in Spain.</p>	
<p><b>Comments:</b> Steel built is the official distributor of stone panels in Spain.</p>	

<b>System name:</b> <ul style="list-style-type: none"> <li>○ Steel framed homes</li> <li>○ Pyramid Homes</li> </ul>	<b>Fabricator address:</b> STEEL FRAMED HOMES 12 Gisburn Drive Bury Lancashire BL8 3DH UK Tel : +44 161 7633577 Fax : +44 161 7633577 Email : sales@steelframedhomes.org.uk Web site : www.steelframedhomes.org.uk
<b>Application field :</b> Housing	
<b>Product description :</b>	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions :           <ul style="list-style-type: none"> <li>– Steel framed homes : 764 – 4068 m<sup>2</sup></li> <li>– Pyramid Homes : 1496 – 4104 m<sup>2</sup></li> </ul> </li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price :           <ul style="list-style-type: none"> <li>– Steel framed homes : £ 5,333 to £ 27,757 (ex shipping/duty)</li> <li>– Pyramid Homes : £17,530 to £35,510 (ex shipping/duty)</li> </ul> </li> <li>• Speed construction : the unique framing system can be erected in a very short time using 3 - 5 men or (ladies). On some multi-level designs lifting equipment is recommended</li> </ul>	
<b>Comments :</b> Lifetime Homes standard package includes: <ul style="list-style-type: none"> <li>• Heavy Gauge Bolt-Together Steel Columns and Rafters</li> <li>• Metal Roof Purlins</li> <li>• 8" Steel Stud System for Exterior Walls</li> <li>• Metal Framing Components for All Dormers, Roof and Porch Saddles</li> <li>• Metal Sub-Faschia Material for Roof Overhangs</li> <li>• 3 5/8" Metal Studs and Track for All Interior Walls</li> <li>• Metal Furring Channels for All Ceiling Surfaces</li> <li>• 8" Metal Second Floor Joists for All Two Story Areas</li> <li>• All Bolts and Fasteners for: Structural Columns, Rafters, Joists and Purlins, Metal Studs and Furring, Metal Sub-Faschia Framing.</li> <li>• Five Complete Sets of Working Drawings Including Anchor Bolt Layout and Erection Instructions</li> <li>• A list of all items to complete the home.</li> </ul>	

<b>System name:</b> Steel framed homes	<b>Fabricator address:</b> STEEL FRAMED HOMES 12 Gisburn Drive Bury Lancashire BL8 3DH UK Tel : +44 (0) 161 7633577 Fax : +44 (0) 161 7633577 Email : sales@steelframedhomes.org.uk Web site : www.steelframedhomes.org.uk
<b>Application field :</b> Commercial and metal buildings.	
<b>Product description :</b>	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : Building sizes range from : 30' wide 40' length 12' eave to 60' wide 150/170' length 16' eave.</li> <li>• Loading resistance : Standard specification is UBC 1994, 20psf roof load, Exposure B Seismic 2A. All columns tapered and bay spacing is 20'. Roof pitch is 1:12, 26ga. galvalume "R" panel roof, 26ga.colour "R" panel wall. Plus all necessary fasteners to assemble the frame and attach roof and sheeting with X- Bracing on some Bays.</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price : Standard list prices (ex shipping/duty) range from £6000 to £25000</li> </ul>	
<b>Comments :</b> All buildings can be constructed using any type of interior/exterior finish material making them pleasing to work in and easy to blend in with the local environment.	





<b>System name:</b> Trent Pre-fab Concrete	<b>Fabricator addresses:</b> Trent Concrete Limited Colwick, Nottingham NG4 2BG Phone: 0115 987 9747 Fax: 0115 987 9948 E-mail: <a href="mailto:quality@trentconcrete.co.uk">quality@trentconcrete.co.uk</a>
<b>Application field:</b> Precast concrete frames involve an entire structure being fabricated off-site for faster programme times, Improving buildability by fabricated off-site for rapid erection on-site and to produce a high standard of workmanship in factory conditions.	
<b>Product description:</b> Precast concrete frames are designed as structural elements having heavier reinforcement than is required for non-structural cladding. Elegant connections are required between columns and beams to transfer considerable forces without adversely affecting the visual appearance of the frame.	
<b>Pictures:</b> <div style="display: flex; flex-wrap: wrap;">     </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• primary floor-support beams, each typically 16m long. The connections to in situ columns are made via 'keyhole' nodes with a fairly high degree of accuracy in the placement of reinforcement.</li> <li>• Dimensional accuracy is critical in order to meet setting-out tolerances as tight as <math>\pm 3</math> mm. With up to 16 reinforcing bars of 32 mm diameter used to make the column-to-beam connections, accurate placement of reinforcement was critical in avoiding clashes and in helping to ensure adequate compaction.</li> <li>• A rubbed finish to the soffits and exposed sides of the beams revealed the silica in the mica-rich mix to give a sparkle effect to the surfaces.</li> <li>• exceptionally large grids of 12 x 12 m and 15,6 x 12 m maximise the unobstructed floor space.</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b>	






### 2.3. Modular construction

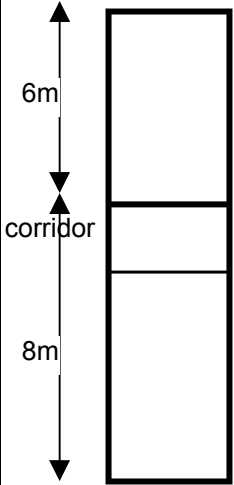


<b>System name:</b> ALHO Modulbau	<b>Fabricator address:</b> ALHO Systembau GmbH Hammer 1 D-51597 Morsbach/Hammersteg Tel. +49-2294-696139 Fax +49-2294-696180
<b>Application field:</b> 3-dimensional modules for offices, residential houses and hospitals	
<b>Product description:</b> Load-bearing elements: <ul style="list-style-type: none"> <li>• Steel frames, made of hot-rolled profiles</li> <li>• 5 different modules for office buildings</li> <li>• 90% prefabrication</li> <li>• Corrosion protection.</li> </ul>	
<b>Pictures:</b> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Prefabrication</p> </div> <div style="text-align: center;">  <p>Transport</p> </div> <div style="text-align: center;">  <p>Floor plan example</p> </div> </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Max 5 storeys</li> <li>• Exterior walls: light steel profiles with mineral wool insulation and gypsum panels on both sides (2x12,5mm); thermal insulation <math>k = 0,23 \text{ W/(m}^2\text{K)}</math>; airborne sound insulation <math>R'w=55 \text{ dB}</math>; fire resistance F30 or F90; cladding: sandwich panels or thermal insulation with plaster or corrugated aluminium sheet</li> <li>• Inner walls: light steel profiles with mineral wool insulation and gypsum panels on both sides (2x12,5mm); airborne sound insulation <math>R'w=49\text{dB}</math>; fire resistance F90</li> <li>• Floor slabs: two parts (ceiling of lower storey, floor of upper storey); steel frame with concrete slab, polystyrene insulation and creed material; thermal insulation <math>k=0,23\text{W}/(\text{m}^2\text{K})</math>; fire resistance: F90; total thickness: 350mm</li> <li>• Module sizes: <ul style="list-style-type: none"> <li>– width 2,625 m, 3,25 m, 3,875 m</li> <li>– length 7,5 m, 10,26 m, 11,5 m, 12,15 m, 14,00 m, 15,25 m</li> </ul> </li> <li>• 12,75 x 3,875 m standard size for offices</li> <li>• Modules completely equipped with heating.</li> </ul>	
<b>Marketing information:</b> Market leader for modular buildings in Germany  Also production of containers for temporary offices and prefabricated wooden elements	
<b>Comments:</b>	

<b>System name:</b> <ul style="list-style-type: none"> <li>○ Unigalow</li> <li>○ Export</li> </ul>	<b>Fabricator address:</b> ATEMCO Avenue du Général de Gaulle F-24400 MUSSIDAN Tel: 05 53 80 81 82 Fax : 05 53 82 08 93 Email : sce-commercial@atemco.fr Web site : www.atemco.fr
<b>Application field :</b> Modular construction	
<b>Product description :</b> Hotels, office buildings, schools, lodges.	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: flex-start;">   </div> <p style="text-align: center;">Unigalow</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;">   </div> <p style="text-align: center;">Export</p>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions:                             <ul style="list-style-type: none"> <li>– Unigalow: length from 2955 to 11915 mm; width from 2475 to 2975 mm; height from 2270 mm to 3000</li> </ul> </li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b> <ul style="list-style-type: none"> <li>• Unigalow have a ten years guarantee as well as traditional construction</li> <li>• Export is delivered piled up and equipped modules: electric component, floor covering and insulation are already installed and conditioned. The first phase of assembly consists in reconstituting the standard parallelepiped of the modules. The assembly then corresponds to a traditional service with its constraints of chock, alignment and assembly.</li> </ul>	

<b>System name:</b> <ul style="list-style-type: none"> <li>○ Conport Panel</li> <li>○ Conport Steel</li> </ul>	<b>Fabricator address:</b> CONPORT STRUCTURES 27a Sloane Square London SW1W 8AB United Kingdom Tel : +44 (0)20 7730 9105 Fax : +44 (0)20 7730 5031 Email : sales@conport.com Web site : www.conport.com
<b>Application field :</b> 3D structures	
<b>Product description :</b> The Conport Panel building has been used in over 40 countries since 1965 and is designed to be economical, relocatable and easy to transport and erect. Various options are available which can upgrade the basic package where the budget permits.	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around;">   </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : span : 3,6 m or 6,0 m or 7,2 m. Module : 1,2 m. Eaves height : 2,4 m or 2,7 m or 3 m.</li> <li>• Transport : 300m<sup>2</sup> floor area in one 40' container</li> <li>• Certificates and standards : designed in accordance with "European recommendations for the stressed skin design of steel buildings"</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Speed construction : 5 man hours by m<sup>2</sup></li> </ul>	
<b>Comments :</b>	






<b>System name:</b> Haller Modulbauweise	<b>Fabricator address:</b> Haller Industriebau GmbH Steinkichring 1 D-78056 VS-Schwenningen Tel. +49-7720-69180 Fax +49-7720-691845
<b>Application field:</b> 3-dimensional modules for offices and residential buildings	
<b>Product description:</b> Load-bearing elements: <ul style="list-style-type: none"> <li>• Steel frames, made of hot-rolled profiles (HEA, HEB, HEM, U, hollow sections)</li> <li>• Floor: concrete slab (connected to the steel frame with bolts), 50mm Polystyrene, 50mm screed material</li> <li>• Exterior walls: lightweight concrete with aerated clay, thermal insulation, plaster</li> <li>• Interior walls: cold-formed steel profiles with mineral wool insulation and double gypsum panels</li> <li>• Floor slab acts as diaphragm</li> <li>• Bracing: walls can be reinforced</li> <li>• 90% prefabrication</li> </ul>	
<b>Pictures:</b> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Transport</p> </div> <div style="text-align: center;">  <p>Module</p> </div> <div style="text-align: center;">  <p>Small office building</p> </div> </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Max module size: length 12 m, width 3.0 m, height 3.3 m.</li> <li>• Smaller sizes are possible in 10 cm steps</li> <li>• Max span 6 m.</li> <li>• Modules are completely equipped with heating, electric equipment, thermal insulation.</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b>	



<b>System name:</b> IPL System Rohbau Module	<b>Fabricator address:</b> IPL Generalbau Am Siek 24 - 26 D-59557 Lippstadt Tel.+49-2941-97650 Fax:+49-2941-9765111 Email: info@ipl.de
<b>Application field:</b> Office buildings	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Prefabricated 3D-elements (welded steel frame of hot-rolled sections)</li> <li>• Secondary elements: timber</li> </ul>	
<b>Pictures:</b>  <p>Standard modules</p>	 <p>Production site</p>  <p>Office building</p>
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Roof: 2 shells of profiled galvanized steel sheet with thermal insulation in between, the inner shell is welded onto the steel frame</li> <li>• Floors: 22 mm cement board on both sides, screwed onto the frame</li> <li>• Poor sound insulation due to very simple floor construction, can be improved with floor screed</li> <li>• load-bearing capacity 3.5 kN/m<sup>2</sup> for offices, 5kN/m<sup>2</sup> for the corridors</li> <li>• Outside walls: cement boards for inner and outer shell, thermal insulation in between, inner shell can directly be wallpapered, no plaster needed; additional outside cladding is not necessary, but corrugated steel or aluminium sheet is often used for reasons of aesthetics</li> <li>• Thermal insulation: mineral wool; roof: 160 mm, walls 200 mm, floors 120 mm</li> <li>• Electric equipment is completely pre-installed</li> <li>• Fire resistance: F30 for all elements</li> <li>• Standard window size: 2.50 x 1.40 m</li> <li>• Module size: width 3m, length 6 or 8 m, max inside height 2.85 m (suspended ceiling possible); special module sizes for staircases, end modules, ...</li> <li>• 2 modules are combined: one with 6m length and the other with 8 m length; the standard width of a building is 14 m. The 8m modules are divided in 6m office and 2m corridor (see picture).</li> <li>• 3 to 4 storeys are possible</li> </ul>	
<b>Marketing information:</b> Price order: from 400€/m <sup>2</sup> for office structures (very competitive)	
<b>Comments:</b> IPL also delivers furniture, kitchens, ...	

<b>System name:</b> MARTIN	<b>Fabricator address:</b> MARTIN-CALAIS R.D. 32 BP 13 F-76133 EPOUVILLE Tel : 02 35 30 26 35 Fax : 02 35 20 39 01 Email : martincalais@wanadoo.fr Web site : www.martin-calais.fr
<b>Application field :</b> Modular construction	
<b>Product description :</b> Offices, dormitories, medical buildings.	
<b>Pictures :</b> <div data-bbox="247 647 753 969">  </div> <div data-bbox="798 640 1303 969">  </div> <div data-bbox="277 976 722 1229">  </div> <div data-bbox="879 969 1222 1229">  </div>	
<b>Technical comments :</b> The frame is made with galvanised steel sections.	
<b>Marketing information :</b>	
<b>Comments :</b>	




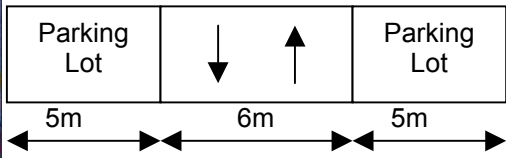
<b>System name:</b> OCEBLOC	<b>Fabricator address:</b> OCEBLOC 19 rue Saint Exupery F-63800 COURNON Tel : 04 73 69 31 80 Fax : 04 73 69 81 42 Email : m.delanoy@ocebloc.com Web site : www.ocebloc.com
<b>Application field :</b> Offices, commercial buildings, existing building extension.	
<b>Product description :</b> Built with rigid modular structures. They are juxtaposable and superposable up to 3 levels and dismountable.	
<b>Pictures :</b> <div style="display: flex; flex-direction: column; align-items: center;">    </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions: length from 2 to 12 m ; width from 2,5 to 3,6 m ; height : 2,8 m</li> <li>• Fire resistance : ERP 5<sup>th</sup> category</li> <li>• Acoustic and thermal performances: rock wool isolated panels used in the modular construction</li> <li>• Interaction with the light work : all modular constructions are fully equipped by Ocebloc.</li> <li>• Durability (corrosion) : specific treatment : painting and different other chemical treatments</li> <li>• Certificates and standards: no certificate or standard for the moment</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Produced quantity: 250 modular constructions a year</li> <li>• Price order: 335 to 535 euros/m2 (all construction costs comprised)</li> <li>• Maintenance costs : no particular maintenance costs</li> <li>• Speed construction: short delivery times : 4-6 weeks for all modular constructions</li> </ul>	
<b>Comments :</b>	

<b>System name:</b> <ul style="list-style-type: none"> <li>o ULTIMA</li> <li>o DUPLEX</li> <li>o PULLMAN</li> <li>o WARDSPACE</li> </ul>	<b>Fabricator address:</b> PORTAKABIN ZI de Templemars 8 rue de l'Epinoy - BP20 F-59175 TEMPLEMARS Tel : 03.20.16.50.00 Fax : 03.20.16.50.25 Email : construction@portakabin.fr Web site : www.portakabin.com
<b>Application field :</b> Modular construction	
<b>Product description :</b> Offices, commercial buildings. All Portakabin products are built to meet permanent building standards, to provide accommodation of the highest standards	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: flex-end;">     </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <span>ULTIMA</span> <span>DUPLEX</span> <span>PULLMAN</span> <span>WARDSPACE</span> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions:                         <ul style="list-style-type: none"> <li>– Ultima : length 8 to 13 m ; width : 3,3 to 3,8 m ; height : 3,28 m ; floor area : 23 to 40 m2</li> <li>– Duplex : length 7,6 to 12,8 m ; width : approximately 3 m ; height : 3,23 m ; floor area : 21 to 25 m2</li> <li>– Pullman : length 9,9 to 18,3 m ; width : 4,25; height : 3,04 m ; floor area : 36 to 68 m2</li> </ul> </li> <li>• Thermal performances : up to 40% more thermally efficient for reduced energy costs (constructor data), by use of polymer foam.</li> <li>• Interaction with the light work : all modular constructions are fully equipped by Portakabin.</li> <li>• Certificates and standards: ISO 9001</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order: on quotation only 335 to 535 euros/m2 (all construction costs comprised)</li> <li>• Maintenance costs : no particular maintenance costs</li> </ul>	
<b>Comments :</b> <ul style="list-style-type: none"> <li>• Ultima buildings from Portakabin are designed around three vital elements: quality, comfort and flexibility.</li> <li>• The Duplex modular building system can create buildings of up to four-storeys and unlimited floor areas</li> <li>• Pullman buildings combine spacious accommodation with all the benefits of self-contained buildings</li> <li>• WardSpace buildings, for hospital applications, offer purpose designed, acute care ward accommodation to maintain in-patient levels during modernisation, or to rapidly increase your hospital's bed capacity.</li> </ul>	


<b>System name:</b> Theo Pongrac Bau-Systeme	<b>Fabricator address:</b> Theo Pongrac Bau-Systeme Ahornstr.4 D-59379 Selm Tel. +49-2592-4693 Fax +49-2592-240321 E-Mail: info@bauservice-pongrac.de
<b>Application field:</b> Pre-fabricated 3D-elements for office and residential buildings, schools	
<b>Product description:</b> Load-bearing elements: cold-formed steel profiles, cladding: gypsum panels, plasterboard, <ul style="list-style-type: none"> <li>• Load-bearing elements: steel frame, batch-galvanized</li> <li>• Steel frame is encased in lightweight concrete</li> <li>• 80% Pre-fabrication</li> </ul>	
<b>Pictures:</b> Erection of a building, residential building <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Exterior walls: thickness 15cm, lightweight concrete with polystyrene as aggregate (650kg/m³); only the encased steel frame bears the loads</li> <li>• Floors: 12.5cm lightweight concrete with steel frame, 19mm OSB</li> <li>• Interior walls: light-gauge steel framing with 60mm mineral wool insulation, 12.5mm gypsum panels on both sides</li> <li>• Roof: trapezoidal steel sheeting</li> <li>• Fire resistance: F90</li> <li>• Module size 10m x 3m; weight 14.0t</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b> <ul style="list-style-type: none"> <li>• System is not flexible (max room size = module size)</li> <li>• Very high transport and crane requirements due to size and weight</li> </ul>	

<b>System name:</b> COUGNAUD	<b>Fabricator address:</b> YVES COUGNAUD parc activités Beaupuy 2, route de Nantes F-85000 MOUILLERON LE CAPTIF Tel : 02 51 34 12 76 Email : christophe.cougnaud@yves-cougnaud.fr Web site : www.yves-cougnaud.fr
<b>Application field :</b> Modular construction	
<b>Product description :</b> Offices, commercial buildings, existing building extension. Modular build-to-suit designed construction available into 8 to 12 weeks.	
<b>Pictures :</b> <div style="display: flex; flex-wrap: wrap;">     </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions: length 6 to 12 m ; width : 2,5 to 3 m</li> <li>• Thermal performances : depend on insulation material used in sandwich panel : coef. K from 0.54 to 0.22.</li> <li>• Acoustic performances : depend on insulation material used in sandwich panel : RW from 29 to 44 db.</li> <li>• Durability (corrosion) : galvanised steel used.</li> <li>• Interaction with the light work : all modular constructions are fully equipped by Yves Cougnaud.</li> <li>• Certificates and standards: all products used have CSTB agreement</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order :               <ul style="list-style-type: none"> <li>– from 275 to 340 €/m<sup>2</sup> for “economic” solutions</li> <li>– from 350 to 460 €/m<sup>2</sup> for “comfort” solutions</li> </ul> </li> <li>• Produced quantity : thousands of m<sup>2</sup> a year</li> <li>• Market survey : high evolution sector</li> <li>• Customer perception : 1) aesthetics and 2) durability.</li> </ul>	
<b>Comments :</b>	

## 2.4. Car parks

<b>System name:</b> GOBACAR	<b>Fabricator address:</b> Goldbeck GmbH Ummelner Str. 4-6 33649 Bielefeld Tel. +49-521-94880 Fax +49-521-9488411 www.goldbeckbau.de
<b>Application field:</b> Car parks	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Steel frame of hot-rolled sections</li> <li>• Floor slabs: prefabricated reinforced concrete</li> </ul>	
<b>Pictures:</b> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 10px;"> <div data-bbox="240 763 774 1133" style="text-align: center;">  <p>car park</p> </div> <div data-bbox="774 853 1281 1010" style="text-align: center;">  <p>basic element</p> </div> </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Main sector: multi-storey car parks</li> <li>• Element: frame with 16m span with 1 column in each corner (5m per parking lot and 6m to drive through)</li> <li>• Width 2.40 or 2.50 m (according to customer needs)</li> <li>• Height (2.70m per storey), beam and slab together are 0.60m high</li> <li>• Composite action of beams and precast floor slab with bolts and concrete</li> <li>• Special microsilica concrete is used, so no asphalt cover on the concrete is needed</li> <li>• Special elements for ramps and staircases</li> </ul>	
<b>Marketing information:</b> Total use: approx. 2 000 000 m <sup>2</sup> floor space until 2001	
<b>Comments:</b> Special solution "GOBACAR mobil" available for temporary use	



<b>System name:</b> Multi-Storey Car Parks	<b>Fabricator address:</b> JOHN REID AND SONS LTD Strucsteel House 6-106 Reid Street Christchurch Dorset BH23 2BT England Tel : +44 1202 483333 Fax : +44 1202 470103 Email : sales@reidsteel.co.uk Web site : <a href="http://www.reidsteel.com">www.reidsteel.com</a> / <a href="http://www.buildingssteel.com">www.buildingssteel.com</a>
<b>Application field :</b> car parks	
<b>Product description :</b>	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"><li>Multi-Storey Car Parks: steel framed car parks span over a car, the roadway and another car giving 15.5m clear spans. The steel building allows the big span. the big bay and the minimum construction depth, the crash barriers and hand rails are integrated into the main steel structures. There are no columns in the parking or turning areas.</li></ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

### 3. Structural elements

#### 3.1. Introduction

Structural elements means as a general definition, load-bearing components of the building frame, which can sustain the vertical (dead, wind and variables loads) and horizontal (wind loads) loads and transmit them to the ground via the foundations. Structural elements are **beams** and **floors** (horizontal elements) which are connected to **columns** or **walls** (vertical elements). Even if **cladding** and also **roofing** elements may transmit the load (wind and snow) to the frame, they will be dealt within the next chapter Non-structural elements.

For steel structures, those structural elements are mainly made by hot rolled (H, I, channel, angle,...) and cold formed process (C, U, Z,  $\Sigma$  and corrugated steel sheets).

The following remarks may characterise the different systems:

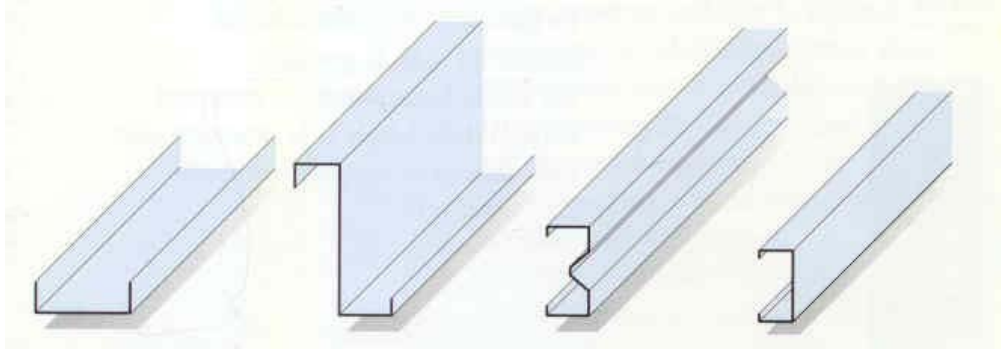
- The elements are standardised here by their cross-sections (width, height and thickness). The length is variable.
- In order to choose the needed cross-section:
  - calculation of bearing resistance and deformations have to be performed according National or European rules. Sometimes fire resistance, acoustical and thermal performance have to be assessed. For this, numerous design guides already exist.
  - a quick answer may be found thanks to user-friendly software or design tables which are mainly provided by the fabricators.
- Some products may be used directly "alone" and some others have to be combined with others products or materials in order to form a systems. For example:
  - a composite slab consists in a profiled steel deck which supports the self-weight of the wet concrete and acts as reinforcement to the slab during in-service conditions.
  - dry flooring system consists in a structure composed of profiled steel deck or cold formed profiles which support plasterboard panels, wood panels, ceiling, insulation materials and/or finishing layer.
- These structural elements, especially for floors and walls, may have in addition to the bearing resistance a function of thermal and acoustical insulation as well as the compartmentation.
- Some products may advantageously integrate the services like water ducts, ventilation distribution, electrical wires, etc..
- Some systems are developed in order to reduce or avoid the beam soffit in floors and therefore increase the available space in the rooms.
- Some systems facilitate and reduce the time of the construction phase:
  - thanks to special connections with the other elements of the building.
  - by avoiding the propping.


The present chapter includes 30 sheets from which

- 6 beams, see chapter 3.2,
- 20 floors, see chapter 3.3,
- 3 columns, see chapter 3.4,
- 2 walls, see chapter 3.5.

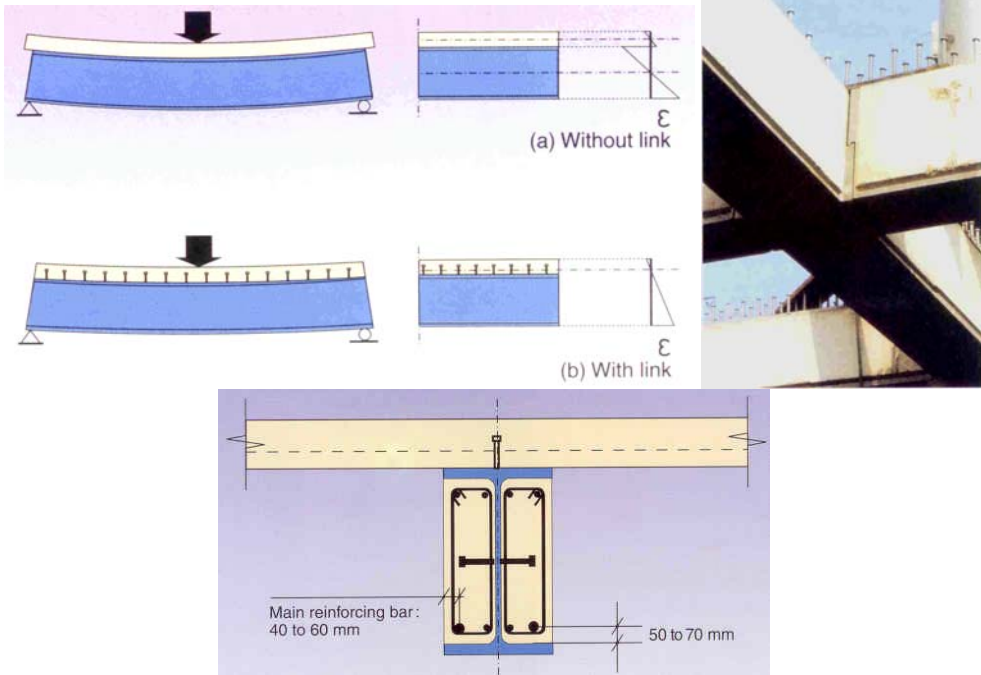



### 3.2. Beams

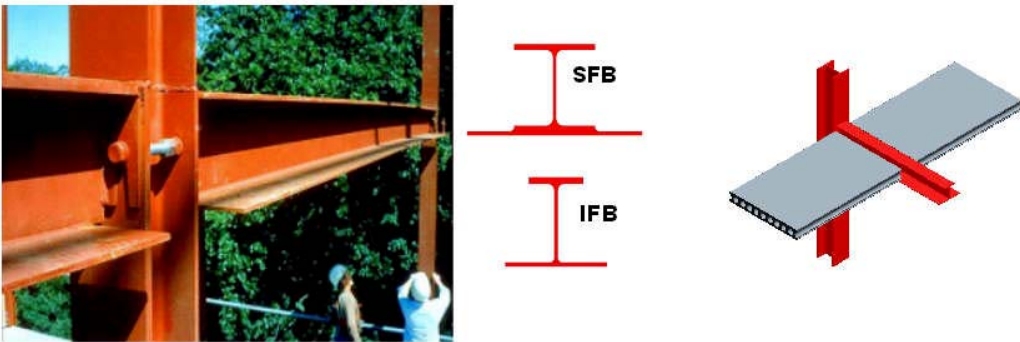
<b>System name:</b> <ul style="list-style-type: none"> <li>○ U section</li> <li>○ Z section</li> <li>○ <math>\Sigma</math> section</li> <li>○ C section</li> </ul>	<b>Fabricator address:</b>
<b>Application field:</b> Light steel structure	
<b>Product description:</b> cold formed steel profiles.	
<b>Pictures:</b> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>•</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b>	

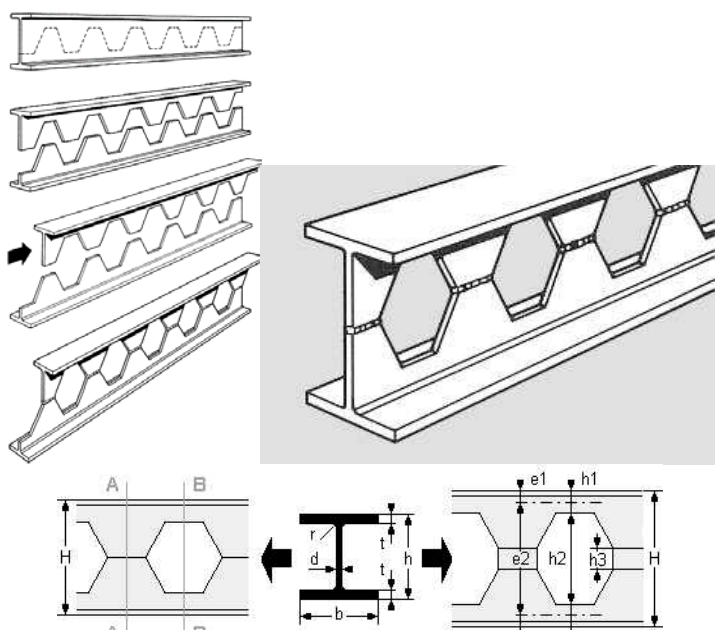
<b>System name:</b> <ul style="list-style-type: none"> <li>○ H-Sections: IPE, HE, UB</li> <li>○ Channel: UAP, PCF</li> <li>○ Angle: L</li> </ul>	<b>Fabricator address:</b>
<b>Application field:</b> steel buildings	
<b>Product description:</b> Hot rolled steel profiles.	
<b>Pictures:</b> <div data-bbox="151 526 726 1400"> <p><u>European standard section ranges</u></p> </div> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Very wide range of cross-sections. The cross-sections are characterised by an important second moment of area (inertia) which plays a role in the deflection and bending resistance of the elements.</li> <li>• 5 different steel grades : S235, S275, S355, S420 and S460</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b> A pre-design free software PSL is available on internet site <a href="http://www.profilarbed.lu">www.profilarbed.lu</a>	



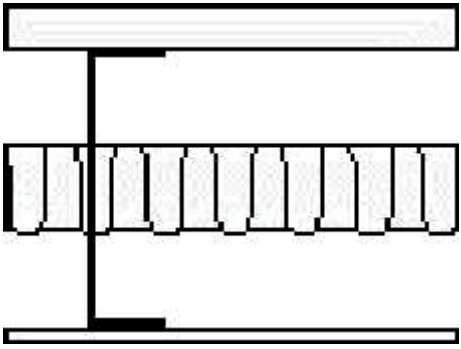
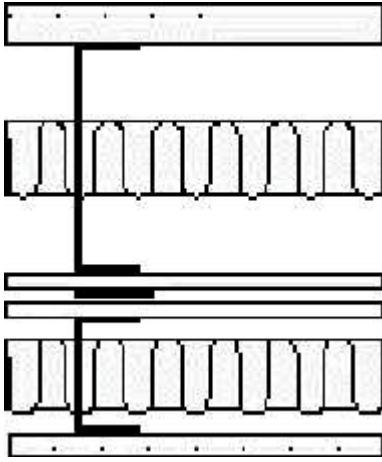
<b>System name:</b> Steel-Concrete composite beams	<b>Fabricator address:</b>
<b>Application field:</b> multi-storey building and bridges	
<b>Product description:</b> Composite beams The rolled steel section is connected to the concrete slab using mechanical shear connectors. Combining the two materials makes conventional structures lighter in weight, while making optimum use of the space involved.	
<b>Pictures:</b> <div style="text-align: center;">  </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Max span : generally used for spans between 6 and 16 m, but can be used to span over 20 m</li> <li>• The slab is generally cast in-situ using profiled, galvanised metal decking as permanent formwork, or sometimes using thin concrete precast slabs as the formwork.</li> <li>• The most common form of connection comprises welded headed shear studs.</li> <li>• Partially encased beam. The fire resistance of a traditional composite beam can be improved considerably by infilling the areas between the steel flanges with reinforced concrete.</li> <li>• Shear connectors and transverse reinforcement placed in the slab above the beam transfer the longitudinal shear force between the steel and concrete. Any adhesion between the steel and concrete is not taken into consideration</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b> A pre-design free software, PSL, is available on internet site <a href="http://www.profilarbed.lu">www.profilarbed.lu</a> No account is taken of the concrete within the depth of the decking profile, or within the depth of the dry joint when precast concrete slab are used as permanent form work.	

<b>System name:</b> <b>ARCELOR Cellular Beams</b>	<b>Fabricator address:</b> ARCELOR LONG COMMERCIAL S.A. 66, rue de Luxembourg L-4221 Esch/Alzette Tel: +(352)-53 13-1 <a href="http://www.profilarbed.lu">www.profilarbed.lu</a>
<b>Application field:</b> Long span structural beams and service integration	
<b>Product description:</b> ACB are rolled reconstituted beams with circular periodic web openings. The circular openings allow the accommodation of the service ducts through the profiles web. There an infinity of possibilities for the height of the profiles, the openings diameters and the web post width. The curving of the beams allows architectural design	
<b>Pictures:</b> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• These beams are produced by oxycutting to times the web (a continuous horizontal and half circle line) and shifting the two half parts. The webs between two openings are then welded together.</li> <li>• The integration of services is easily achieved thanks to the openings in the web.</li> <li>• An increasing of the section depth about 50% can be achieved.</li> <li>• Composite section: The composite action by means of stud connectors between the concrete slab and the upper flange of the beam increase advantageously the span (up to 18 m).</li> <li>• Hybrid section: a different grade or section between the two half parts allows an optimisation of the material consumption.</li> <li>• Pre-cambering is possible in order to get long span (up to 30 m).</li> <li>• The final height of the profile could varies in order to enhance the inertia to meet the requirements of loads or deflections.</li> <li>• Vibration test have been made with very good results</li> <li>• Fire tests are under performance.</li> </ul>	
<b>Marketing information:</b> To be more and more used in the future.	
<b>Comments:</b> A pre-design free software ACB is available on internet site of PROFILARBED.	

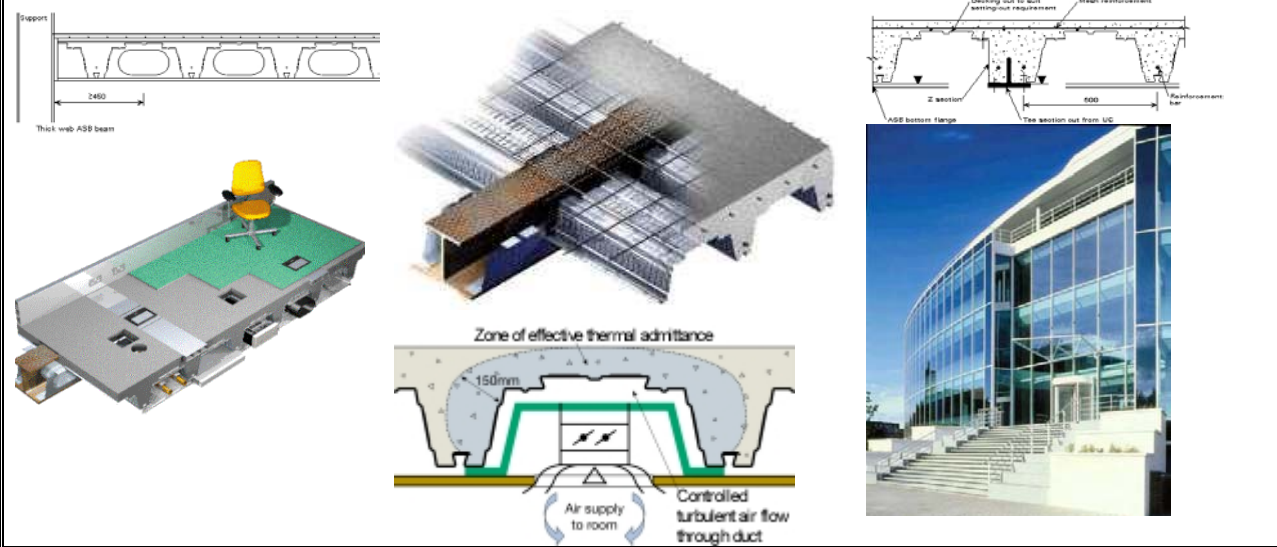
<b>System name:</b> <ul style="list-style-type: none"> <li>○ Integrated Floor Beams (IFB)</li> <li>○ Slim Floor Beams (SFB)</li> </ul>	<b>Fabricator address:</b> ARCELOR LONG COMMERCIAL S.A. 66, rue de Luxembourg L-4221 Esch/Alzette Tel: +(352)-53 13-1 Web site: <a href="http://www.profilarbed.lu">www.profilarbed.lu</a>
<b>Application field:</b> Slim floors.	
<b>Product description:</b> The steel beams are designed with an asymmetric cross-section where floor elements, pre-stressed concrete hollow core slabs, sit on top of the bottom flange. Alternatively corrugated steel sheets or filigran slabs can be used. A structural or non-structural screed is poured over the elements. This screed can be used to get a diaphragm effect of the slab. For IFB, the beams are welded together from half of a rolled section and a 400-500 mm wide steel plate as the bottom flange or a 150-200 mm wide plate as the top flange. For SFB, a steel plate is directly welded under the bottom flange of the hot-rolled profile. The beams are cambered in order to compensate for deflection under dead loads.	
<b>Pictures:</b> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Maximum span for the steel beam about 9,5 m and for the low core slab about 11,0 m. The most economical span is obtained when using standard structural grids like 7,2 by 7,2 meters.</li> <li>• Steel consumption varies in general between 15 kg/m<sup>2</sup> (for a grid 5 x 5 m) and 25 kg/m<sup>2</sup> (for a grid 7,8 x 7,8 m) for variable loads up to 500 kg/m<sup>2</sup>. For rectangular grids (ratio of 1 : 1,2) steel consumption is reduced by about 10 to 15%.</li> <li>• Fire: By adding longitudinal reinforcing bars and stirrups to the beam, fire ratings from 30 to 90 minutes may be achieved. As an alternative to this integrated fire protection, it is possible to protect the lower visible flange by means of sprays, intumescent paints or fire proofing plates.</li> <li>• The hollow core manufacturer's information derived from tests is relevant for sound and thermal insulation.</li> <li>• Corrosion protection is achieved with a relative humidity of up to 70%, by a shop primer of 25 η depth.</li> </ul>	
<b>Marketing information:</b> As a rough price indication, global costs may be estimated at about 75,- to 90,- € per sqm of gross floor area for the shell construction, depending on the country. This amount includes delivery of both steel and concrete elements, as well as erection of these two, together with grouting of the hollow core slabs and a standard 90 minutes fire protection of the steel beams.	
<b>Comments:</b> A pre-design free software IFBWIN is available on internet site of PROFILARBED. Slim floors have the advantage over traditional skeleton structures that in case of restricted building height, extra floors can be provided for the same height. In addition, the system allows unhindered passage for all the service and ventilation ducts below the floor, as no main beam is disturbing.	

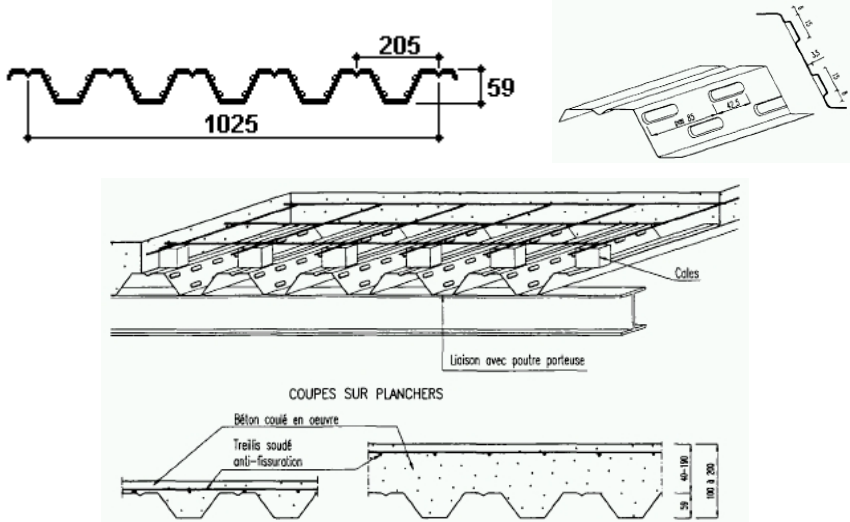
<b>System name:</b> Castellated beams	<b>Fabricator address:</b> GRÜNBAUER BV Industrieterrein Verrijn Stuart Venserweg 2 NL-1112 AR Diemen Tel : (+31) (0)20 - 699 03 00 Fax : (+31) (0)20 - 690 59 11 Email : info@grunbauer.nl Web site : www.grunbauer.nl
<b>Application field :</b> Beams	
<b>Product description :</b> Castellated beams	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>Castellated beams are made from standard hot-rolled I- H- or U-sections. The web of the beam is split lengthwise in a rack-shaped pattern. The halves so obtained are shifted a half-pitch in relation to one another and then welded together at the tops of the teeth. The result is a beam with a row of hexagonal holes in the body. The beam is much deeper than the original profile it is made from, while its weight is of course (almost) the same. It is also possible to weld square or rectangular plates between the cut halves, giving an even deeper castellated beam, now with octagonal holes in its body.</li> <li>Due to their greater depth, castellated beams allow greater bending moments than the rolled beams from which they are made. In other words, they have considerably greater bending stiffness than the profile before cutting. A big advantage! The admissible transverse force is smaller. For this reason, castellated beams are particularly suitable for large spans with small(er) loads. To prevent buckling of the open-work web, infill plates can easily be welded in (if and where necessary).</li> <li>Dimensions : IPE : height from 80 to 1100 mm ; HE-A : height from 100 to 1685 mm ; HE-B height from 100 to 1700 mm ; HE-M : height from 120 to 1712 mm</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>Prices available on the internet site of Grunbauer</li> </ul>	
<b>Comments :</b>	

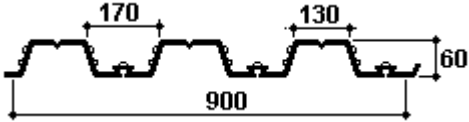
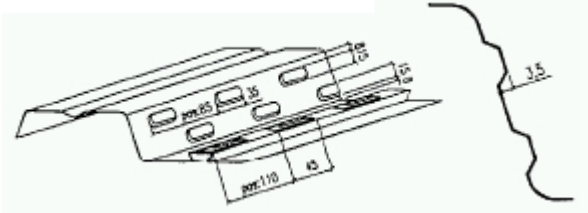
### 3.3. Floors

<b>System name:</b> Freeframe floors: FFF01, FFF02	<b>Fabricator address:</b> BANRO SECTIONS Ltd Manor Works, Pleck Road, Walsall, West Midlands, WS2 9ES Tel : +44 1922 724789 Fax : +44 1922 644460 Email : jle@banro.co.uk Web site : www.banro.co.uk
<b>Application field :</b> Floors	
<b>Product description :</b> Dry floor system	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: center; text-align: center;">   </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span>FFF01</span> <span>FFF02</span> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• FFF01: Frame: 149mm steel channel 1.5mm gauge (CH14915), Internal Lining: One layer 25mm chipboard flooring, External Lining: One layer 9mm Minerit, Insulation: 50mm mineral wool density 33kg/m<sup>3</sup> <ul style="list-style-type: none"> <li>– Weight 37 Kg/m<sup>2</sup>, Fire resistance 60, Sound insulation 48-70 dB, Thermal transmittance 0.42</li> </ul> </li> <li>• FFF02 Frame: FFF01 above and separated by 50mm x 6mm resilient strip at joist centres.           <ul style="list-style-type: none"> <li>– Weight 62 Kg/m<sup>2</sup>, Fire resistance 90, Sound insulation 60-58 dB, Thermal transmittance n.a.</li> </ul> </li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	



<p><b>System name:</b> Slimdek</p>	<p><b>Fabricator addresses:</b> Corus Construction Centre PO Box 1, Brigg Road, Scunthorpe, DN16 1BP United Kingdom Tel: +44 (0) 1724 405060 Fax: +44 (0) 1724 404224 Email: <a href="mailto:corusconstruction@corusgroup.com">corusconstruction@corusgroup.com</a></p>
<p><b>Application field:</b> Slimdek® is an engineered floor solution developed to offer a cost-effective, service-integrated, minimal depth floor for use in multi-storey steel framed buildings.</p>	
<p><b>Product description:</b> The system comprises of a hot rolled structural beam ( asymmetrical I-Section or a rectangular hollow section) and a cold formed galvanized steel decking makes this a very popular flooring system integrating various services within it.</p> 	
<p><b>Technical comments:</b></p> <ul style="list-style-type: none"> <li>• Shallow composite slab achieves excellent load capacity, diaphragm action and robustness.</li> <li>• ASB (asymmetric slimflor beams) achieves efficient composite action without shear studs.</li> <li>• ASB(Fire Engg) provides 60 minutes inherent fire resistance.</li> <li>• Lighter, thinner web ASB may be used unprotected in buildings requiring up to 30 minutes fire resistance or in fire-protected applications.</li> <li>• The cold formed decking spans up to 6.5 m without propping (dependent on slab weight).</li> <li>• Construction is light in weight.</li> <li>• Services can be integrated between the decking ribs passing through openings in the ASB.</li> <li>• Fabric energy storage can be utilised and enhanced through Airdek™ advanced energy system.</li> </ul>	
<p><b>Marketing information:</b></p>	
<p><b>Comments:</b></p>	

<b>System name:</b> HSA Haircol 59S	<b>Fabricator address:</b> HAIRONVILLE (Arcelor Group) Parc industriel des Hauts-Sarts B-4040 Herstal Tel : 00 32 (4) 240 67 11 Fax : 00 32 (4) 240 67 10 <a href="http://www.haironville.be">www.haironville.be</a>
<b>Application field:</b> Composite floor ; residential, offices, schools, industrial, ... buildings	
<b>Product description:</b> <ul style="list-style-type: none"> <li>Composite floor : ribbed steel sheet (galvanized) and reinforced concrete</li> <li>Steel sheets are fixed on a metal or concrete framing with nails, bolts or self-tapping screw.</li> </ul>	
<b>Pictures:</b> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>Total thickness of the floor : between 10cm and 25cm</li> <li>Nominal thickness of the steel sheet : 0,71mm ; 0,76mm ; 0,84mm ; 0,96mm ; 1,16mm ; 1,21mm</li> <li>Effective width of the steel sheet : 280 or 1025mm</li> <li>Profile height : 59mm</li> <li>The ribs have some embossments allowing the composite action (steel-concrete)</li> <li>All sort of ceiling can be associated to this floor : suspended ceiling, aesthetical ceiling, acoustical or thermal insulated ceiling, ceiling increasing the fireproof rate of the slab</li> <li>All sort of floor covering is admitted on the concrete</li> <li>CSTB technical assessment 3/93-245.</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b>	

<b>System name:</b> HSA Haircol 60S	<b>Fabricator address:</b> HAIRONVILLE (Arcelor Group) Parc industriel des Hauts-Sarts B-4040 Herstal Tel : 00 32 (4) 240 67 11 Fax : 00 32 (4) 240 67 10 <a href="http://www.haironville.be">www.haironville.be</a>
<b>Application field:</b> Composite floor ; residential, offices, schools, industrial, ... buildings	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Composite floor : ribbed steel sheet (galvanized) and reinforced concrete</li> <li>• Steel sheets are fixed on a metal or concrete framing with nails, bolts or self-tapping screw.</li> </ul>	
<b>Pictures:</b> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Total thickness of the floor : between 10cm and 20cm</li> <li>• Nominal thickness of the steel sheet : 0,71mm ; 0,84mm ; 0,96mm ; 1,21mm</li> <li>• Effective width of the steel sheet : 900mm</li> <li>• Profile height : 60mm</li> <li>• The ribs have some embossments allowing the composite action (steel-concrete)</li> <li>• All sort of ceiling can be associated to this floor : suspended ceiling, aesthetical ceiling, acoustical or thermal insulated ceiling, ceiling increasing the fireproof rate of the slab</li> <li>• All sort of floor covering is admitted on the concrete</li> <li>• CSTB technical assessment 3/95-259.</li> </ul>	
<b>Marketing information:</b> Reference of 1996 : 300 000 m <sup>2</sup>	
<b>Comments:</b>	

<b>System name:</b> Hoesch-Additivdecke	<b>Fabricator address:</b> Hoesch Siegerlandwerke Hauptverwaltung (ThyssenKrupp company) Geisweider Straße 13 D-57078 Siegen Tel. +49-271-8081488 Fax: +49-271-8081271
<b>Application field:</b> Floor slabs in car parks and other multi-storey buildings	
<b>Product description:</b> Load-bearing elements: cold-formed steel profiles, cladding: gypsum panels, plasterboard, <ul style="list-style-type: none"> <li>• Profiled steel sheet combined with a reinforced concrete slab</li> <li>• No composite action</li> <li>• Profiled steel sheet is used as casting and contributes to the load-bearing capacity of the whole floor</li> </ul>	
<b>Pictures:</b>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Main sector: multi-storey car parks</li> <li>• Max span: 5.5m without support during the concrete is built in</li> <li>• Diaphragm effect is provided by the concrete slab</li> <li>• Profiled steel sheet stabilises main beam during the concrete is built in</li> <li>• Up to 5kN/m<sup>2</sup> life load possible without shear reinforcement</li> <li>• Profile height 205mm</li> <li>• Fire resistance: F90 can be achieved depending on the reinforcement of the concrete slab</li> <li>• Corrosion resistance: class III according to DIN 55928-8 (very high) due to organic coating</li> <li>• Steel sheet thickness: 1.0 / 1.25 / 1.5 mm</li> </ul>	
<b>Marketing information:</b> <ul style="list-style-type: none"> <li>• Total use: approx. 2 000 000 m<sup>2</sup> floor space until 2001</li> </ul>	
<b>Comments:</b> <ul style="list-style-type: none"> <li>• Total height of the floor construction can be minimised, because the main beams can be integrated into the floor slab.</li> </ul>	

<b>System name:</b> Holorib HR 51/150	<b>Fabricator address:</b> Holorib (Deutschland) GmbH Blumenstrasse 38 D-63069 Offenbach Tel : 069/83836000 Fax : 069/83836002 Email : <a href="mailto:info@holorib.de">info@holorib.de</a> Internet : <a href="http://www.holorib.de">www.holorib.de</a>
<b>Application field:</b> Composite slab for multi-storey building and car-parks	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• composite slab composed of galvanised profiled steel deck with a reinforced concrete screed.</li> <li>• may be advantageously associated with a composite steel beam.</li> </ul>	
<b>Pictures:</b> Steel profile, Construction works, Spot welding <div data-bbox="140 712 1295 1299"> </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Steel sheet thickness : 0.75 / 0.88 / 1.00 / 1.25 mm</li> <li>• Max span : 2.94 m without support and with a thickness of 10 cm of concrete</li> <li>• Profile height : 51 mm</li> <li>• Geometrical advantage : The closed form and the notched ribs allow the composite action</li> <li>• Fire resistance : F180 can be achieved depending on the reinforcement of the concrete slab</li> <li>• Corrosion resistance : 22 µm of zinc</li> <li>• The lightness of the product make easy the installation</li> <li>• The lower face can be colored.</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b>	



**System name:**

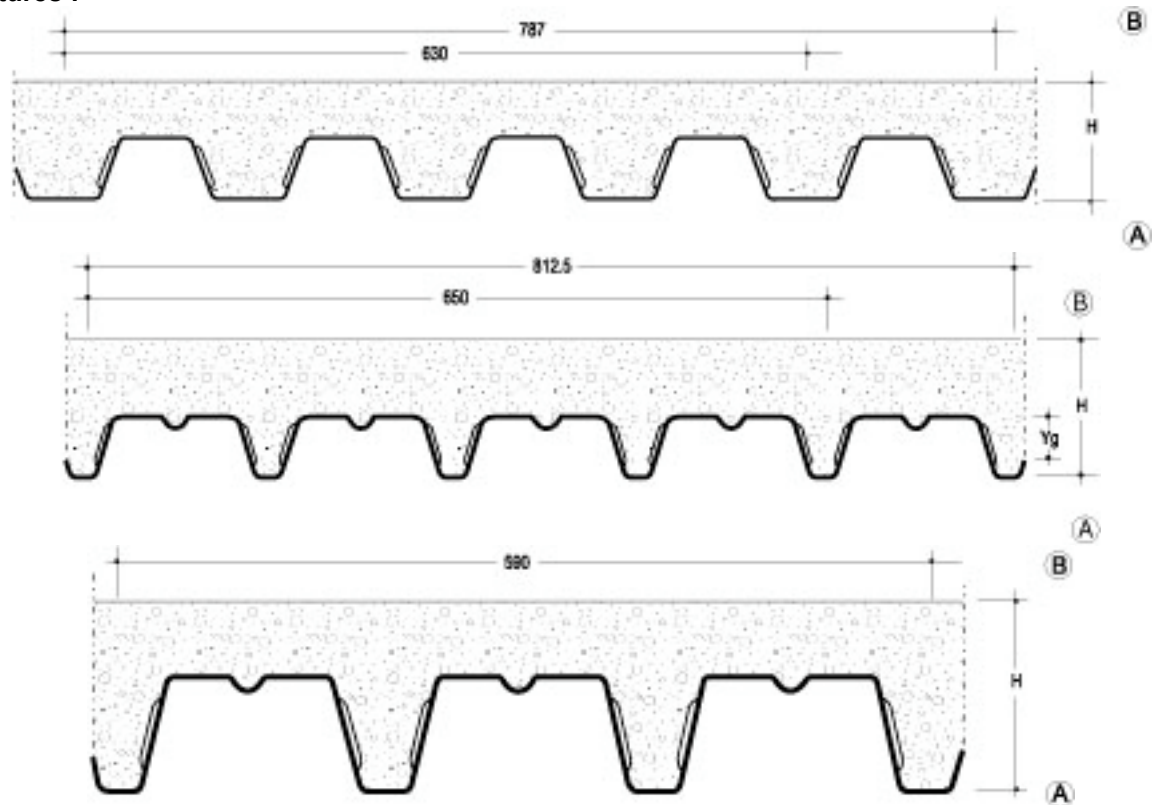
- E/S 4000 AM
- S/C 2000 AM
- R/C 4000 AM

**Fabricator address:**

ISOLPACK SpA  
 C.so Vittorio Emanuele, 99  
 10128 TORINO (ITALIA)  
 Tel : ++39 011 56075.11  
 Fax : ++39 011 5611713  
 Email : info@isolpack.com  
 Web site : www.isolpack.com

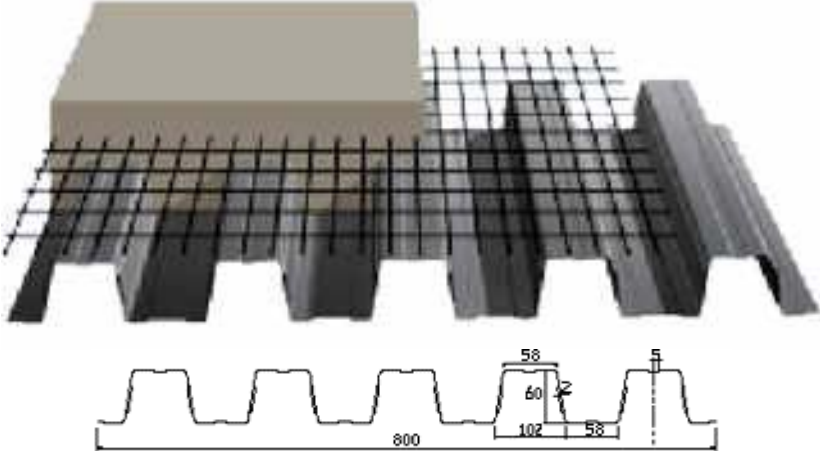
**Application field :** Floors



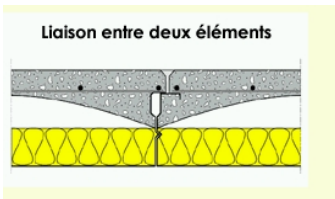
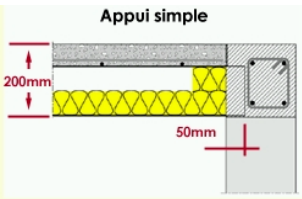

**Product description :** Corrugated steel sheet

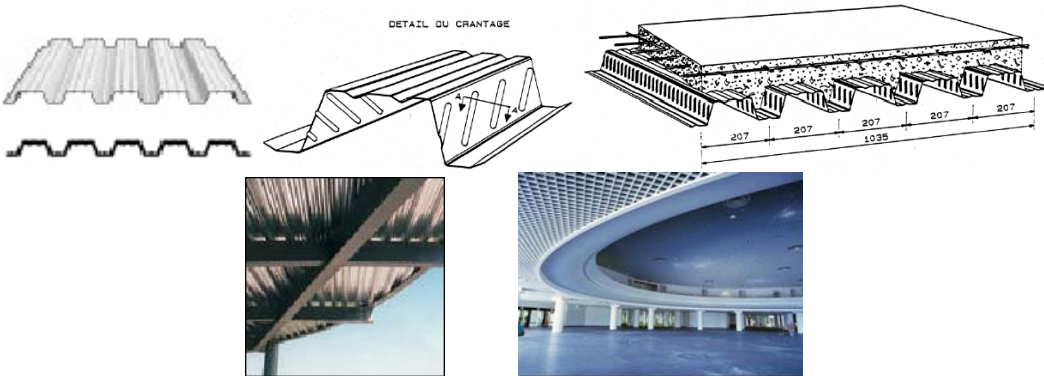
**Pictures :****Technical comments :**

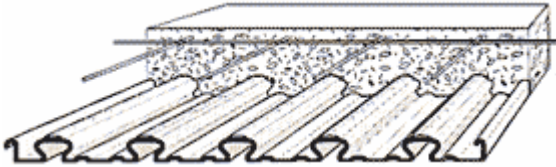
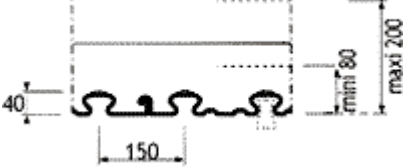
- Dimensions : length upon request from continuous production process. Thickness: from 0,6 up to 1,5 mm
- Steel according to EN 10147 type Fe E 250 G Norm.
- Durability (corrosion) : simple hot galvanized through “sendzimir” process, galvanised prepainted or plastified steel; stainless steel. Protective treatments available upon request: polyester coating for outdoors, non toxic prepainting when food is involved, silicon polyester, PVDF, thermoplastic Class A, application of PVC plastic films or other films.

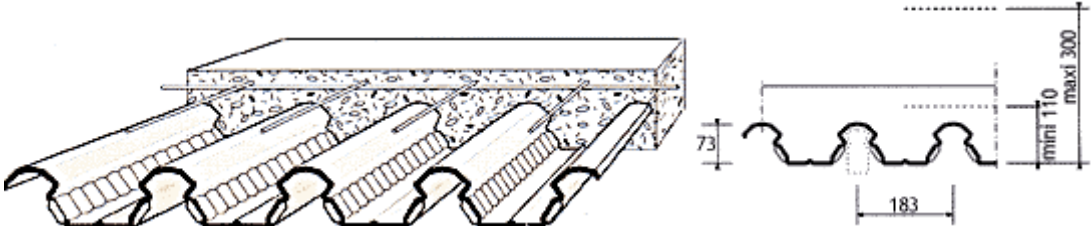
**Marketing information :****Comments :**

<b>System name:</b> ○ P60.800	<b>Fabricator address:</b> NV JORIS IDE Hille 174 8750 Zwevezele, Belgique Tel : +32 51 61 07 77 Fax: +32 51 61 07 79 Email : verkoop.belgie@jorisode.be Web site : www.jorisode.be
<b>Application field :</b> Floor	
<b>Product description :</b> Corrugated steel sheet	
<b>Pictures :</b> 	
<b>Technical comments :</b> • Dimensions: steel thickness from 0,5 to 0,75 mm	
<b>Marketing information :</b>	
<b>Comments :</b>	

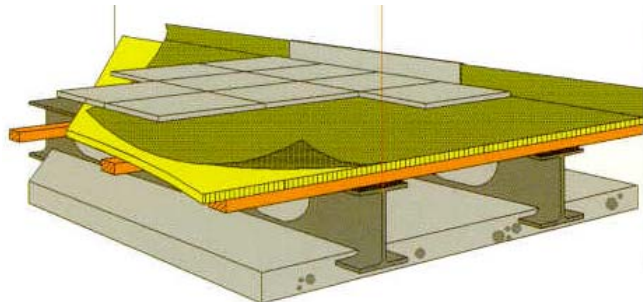
<b>System name:</b> COFRADAL 200	<b>Fabricator address:</b> PAB Est (Arcelor Group) 10, Rue du bassin de l'industrie - BP25 F-67017 STRASBOURG Tel : 00 33 (3) 88 41 48 75 Fax : 00 33 (3) 88 41 48 04 www.pab.tm.fr
<b>Application field:</b> Prefabricated composite floor ; residential, offices, schools, ... buildings	
<b>Product description:</b> Prefabricated composite floor : steel, concrete and insulation.	
<b>Pictures:</b> <div style="display: flex; flex-wrap: wrap; justify-content: space-around;">      </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Length : 1 up to 7.5m</li> <li>• Thickness : 200mm</li> <li>• Width : 1.2m</li> <li>• density of COFRADAL 200 : 180 kg/m<sup>2</sup></li> <li>• span (simple support) : 5m to 7,5m</li> <li>• acoustic attenuation index : 50dB (64dB with false ceiling)</li> <li>• thermal resistance is a function of the type and the thickness of the insulation (for example : 1,6 to 2,65 m<sup>2</sup>.°C/W with "Isover Panolène PB R" or "Isover Domisol coffrage")</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b> <ul style="list-style-type: none"> <li>• prefabricated floor – no concrete on building site</li> <li>• easy to set-up on site</li> </ul>	

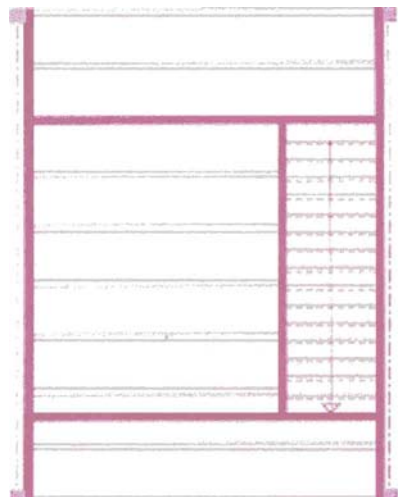
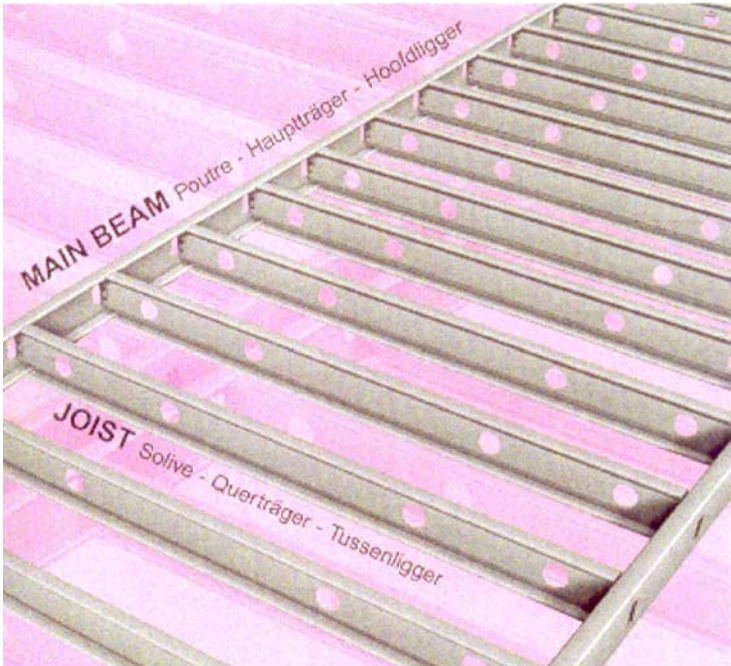
<b>System name:</b> COFRAPLUS 60	<b>Fabricator address:</b> PAB Est (Arcelor Group) 10, Rue du bassin de l'industrie - BP25 F-67017 STRASBOURG Tel : 00 33 (3) 88 41 48 75 Fax : 00 33 (3) 88 41 48 04 www.pab.tm.fr
<b>Application field:</b> Composite floor ; residential, offices, car-parks, schools, industrial, ... buildings (new construction or rehabilitation)	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Composite floor : ribbed steel sheet (galvanized or galvanized – prepainted) and reinforced concrete</li> <li>• Steel sheets are fixed on a metal or concrete framing with nails, bolts or self-tapping screw.</li> </ul>	
<b>Pictures:</b> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Total thickness of the floor : between 10cm and 28cm</li> <li>• Max. length of delivery : 15m</li> <li>• Nominal thickness of the steel sheet : 0,71mm ; 0,84mm ; 0,96mm ; 1,21mm</li> <li>• Effective width of the steel sheet : 1035mm</li> <li>• Profile height : 58mm</li> <li>• The ribs have some embossments allowing the composite action (steel-concrete)</li> <li>• COFRAPLUS 60 can be used in seismic zones</li> <li>• COFRAPLUS 60 admits built-in radiation heating (incorporated in the slab)</li> <li>• All sort of ceiling can be associated to the COFRAPLUS 60 : suspended ceiling, aesthetical ceiling, acoustical or thermal insulated ceiling, ceiling increasing the fireproof rate of the slab)</li> <li>• All sort of floor covering is admitted on the concrete</li> <li>• Accessories : boxes for electricity, phone, ...</li> <li>• COFRA 3 software integrate characteristics of COFRAPLUS 60, optimize the use conditions and the reinforcements (including fire-proofing)</li> <li>• CSTB technical assessment 3/99-333.</li> </ul>	
<b>Marketing information:</b> Reference : $\pm 3.000\text{m}^2$ until the end of September 1999	
<b>Comments:</b> This floor is proposed in the STYLTECH system.	

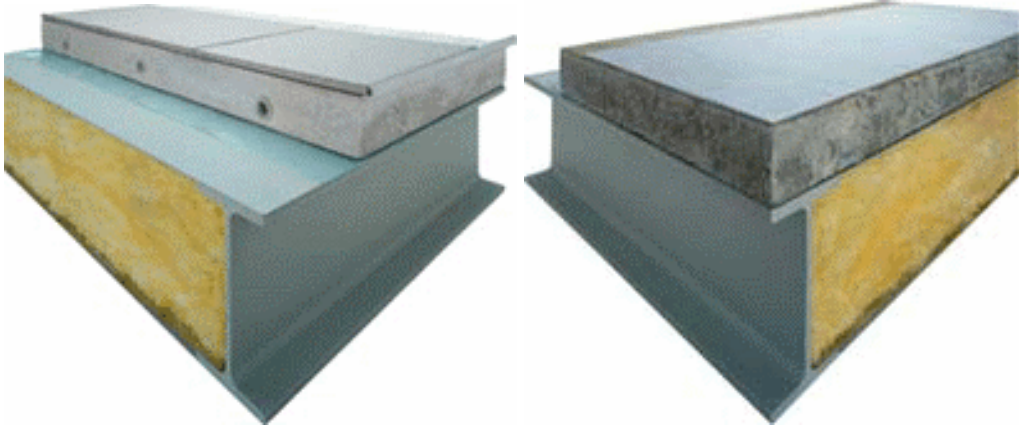
<b>System name:</b> Cofrastra 40	<b>Fabricator address:</b> PAB (Arcelor Construction) 32, Rue Gambetta BP62 F- 59264 ONNAING Tel : +33 3 27 23 90 00 Fax : +33 3 27 23 90 99 lwww.pab.tm.fr
<b>Application field:</b> Composite slab for multi-storey buildings and car parks.	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• composite slab composed of galvanised profiled steel deck with a reinforced concrete screed.</li> <li>• may be advantageously associated with a composite steel beam.</li> </ul>	
<b>Pictures:</b> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Main sector : multi-storey building</li> <li>• Max span : 7 m with support during the concrete is built in and 2.60 m without support</li> <li>• Profile height : 40 mm</li> <li>• Fire resistance : F30 without reinforcements and F180 can be achieved depending on the reinforcement of the concrete slab</li> <li>• Corrosion resistance : class II due to the galvanisation</li> <li>• The lightness of the product make easy the installation</li> <li>• Geometrical advantage : The closed form (in omega) and the notched ribs allow the composite action.</li> <li>• Steel sheet thickness : 0.75 / 0.85 mm</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b> <ul style="list-style-type: none"> <li>• The quantity of concrete can be minimised thanks to the limited height of the steel sheet</li> <li>• It is not appropriate for the floors on underfloor space that can't be visited.</li> </ul>	

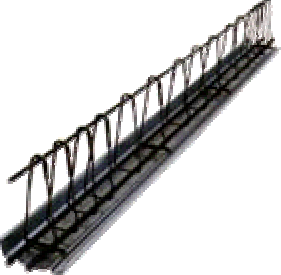
<b>System name:</b> Cofrastra 70	<b>Fabricator address:</b> PAB (Arcelor Construction) 32, Rue Gambetta BP62 F- 59264 ONNAING Tel : +33 3 27 23 90 00 Fax : +33 3 27 23 90 99 www.pab.tm.fr
<b>Application field:</b> Composite slab for multi-storey buildings and car parks.	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• composite slab composed of galvanised profiled steel deck with a reinforced concrete screed.</li> <li>• may be advantageously associated with a composite steel beam.</li> </ul>	
<b>Pictures:</b> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Main sector : multi-storey building</li> <li>• Max span : 6 m with support during the concrete is built in and 3.70 m without support</li> <li>• Profile height : 73 mm</li> <li>• Fire resistance : F30 without reinforcements and F180 can be achieved depending on the reinforcement of the concrete slab</li> <li>• Corrosion resistance : class II due to the galvanisation</li> <li>• The lightness of the product make easy the installation</li> <li>• Geometrical advantage : The closed form (in omega) and the notched ribs allow the composite action.</li> <li>• Steel sheet thickness : 0.75 / 1 mm</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b> <ul style="list-style-type: none"> <li>• This steel sheet is very interesting for slab without support during the construction, when there are support, the Cofratra 40 is more interesting.</li> <li>• The quantity of concrete can be minimised thanks to the limited height of the steel sheet</li> </ul>	



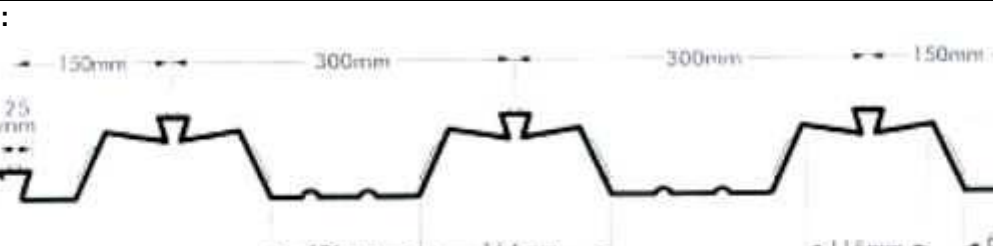
<b>System name:</b> INFRA + floor	<b>Fabricator address:</b> PreFab Limburg BV Kelperheide 50 NL-6037 SZ KELPEN-OLER Tel: +31-495-65 23 35 Fax: +31-495-65 23 36 E-mail: aplus@plex.nl
<b>Application field:</b> Floors; prefabricated reinforced concrete slab.	
<b>Product description:</b> Hot-rolled steel beam connected by a concrete slab on the bottom –side <ul style="list-style-type: none"> <li>• standard width of 2400 mm</li> <li>• standard height according to maximum span: 275mm/4.50m, 295mm/5.40m, 355mm/7.20m, 445mm/9.60m.</li> <li>• Self-weight: From 1.60 kN/m<sup>2</sup> (excluding the cover materials)</li> <li>• Concrete specifications:B40: according to NEN 5950 and NEN 6720.</li> </ul>	
<b>Pictures:</b> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Fire-resistance: Concrete floor: Non-flammable according to NEN 6064. The INFRA+ floor is fire resistant for a minimum of 90 minutes in accordance with the Bouwbesluit (Dutch Building Regulations). *</li> <li>• Vibration: measurements on existing building have shown that the minimum eigen-frequency is not less than 7 Hz.</li> <li>• Diaphragm effect has been tested.</li> <li>• Lateral –torsional buckling has been tested.</li> <li>• Acoustic properties: Noise insulation: The INFRA+ floor and the cover materials form a two-piece construction that, with the correct details, satisfies the requirements for offices and homes. *</li> <li>• Noise absorption: The desired reverberation time depends on the project and can be achieved through various technical solutions.</li> <li>• Thermal properties             <ul style="list-style-type: none"> <li>– Since there is no ceiling, the concrete acquires a large accumulating capacity</li> <li>– Ground level floors are available with insulation on the bottom, e.g. 80 mm EPS, Rc = 2.52 m<sup>2</sup>K/W. This includes the extra contact resistance produced by the two piece construction.</li> <li>– Linear expansion coefficient according to the calculation factor, NEN 2880:12.10<sup>-6</sup> [K<sup>-1</sup>].</li> </ul> </li> </ul> <p>* Report available on request.</p>	
<b>Marketing information:</b> This new type of floor has been used several times in different projects in The Netherlands.	
<b>Comments:</b> One of the main advantage of this type of floor is the flexibility because of the easy access to the services.	

<b>System name:</b> SADEF	<b>Fabricator address:</b> SADEF(a Voest-Alpine Krems company) Bruggesteinweg 60 B - 8830 Gits  <b>Tel. +32-51261211</b> Fax +32-51261301
<b>Application field:</b> 2D elements for floors, to be used in new constructions and refurbishment	
<b>Product description:</b> Main beams and joists to combine like in a "Meccano", following the load bearing capacity and the deflection limit; assembly system patented; service holes; corrosion protection (galvanizing + painting)	
<b>Pictures:</b> <div style="display: flex; align-items: center;">   </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Load-bearing capacities between 250 &amp; 500 kgf/m<sup>2</sup> (dead weight + imposed load)</li> <li>• Deflection limit between U500 &amp; U250</li> <li>• Staircases easily accommodated</li> <li>• Various acoustic performances depending on complementary layers</li> <li>• Fire performance of 30 or 60 minutes as a function of simple or double plasterboard on ceiling side</li> </ul> Floors prefabricated, easy to assemble or dismantle.	
<b>Marketing information:</b>	
<b>Comments:</b>	

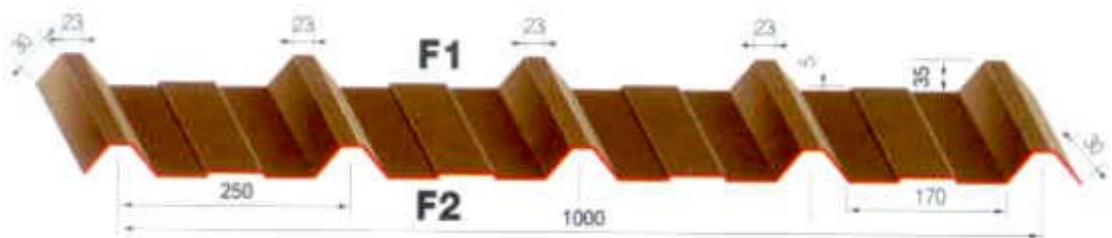
<b>System name:</b> Schunk	<b>Fabricator address:</b> Schunk & Co. GmbH Tempelsweg 8 D-47918 Tönisvorst/Krefeld Tel. +49-2151-70860 Fax +49-2151-708611
<b>Application field:</b> Floor	
<b>Product description:</b> Load-bearing elements for office buildings, schools, offices in industrial halls. <ul style="list-style-type: none"> <li>• Pre-fabricated 3D-elements</li> <li>• Frame of hot-rolled profiles</li> </ul>	
<b>Pictures:</b> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Thermal insulation: mineral wool</li> <li>• Floors: 0.7mm steel sheet, 120mm mineral wool, 2mm steel sheet, 50mm floor screed (heating system possible), tiles or other floor material</li> <li>• Fire resistance: F30</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b>	

<b>System name:</b> Swedeck	<b>Fabricator address:</b> SpanForm AB Tallhammarsvägen 11 SE-183 33 Vallentuna Sweden Phone : +46 8 511 717 00 Fax : +46 8 511 717 00 Email : info@spanform.se
<b>Application field:</b> SWEDECK is utilised in a variety of building such as car parks, supermarkets, offices, banks, industrial and hospitals.	
<b>Product description:</b> The SWEDECK system, is a shuttering and reinforcement system for insitu casting of slabs, providing free spans up to 18 meters and where the forms are non removable type. The system components are : <ul style="list-style-type: none"> <li>• mouldes consists of a thin profiled and galvanized steel plate</li> <li>• rolle formed bottom tray on which the reinforcement beams for the slab are placed</li> <li>• pre stiffed end cover plates for closing the end of the moulds</li> </ul>	
<b>Pictures:</b> Steel profile, Construction works, Spot welding <div style="display: flex; justify-content: space-around; align-items: center;">    </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Spans: 9-18 meters</li> <li>• Depth: 150-700 mm</li> <li>• Width: 600-1500 mm (Standard: 1200 mm)</li> <li>• Cover length: 1000 mm</li> <li>• Propping: 1200mm ctrs maximum</li> </ul> <b>Material:</b> <ul style="list-style-type: none"> <li>• Primary beams: Galvanized steel</li> <li>• End cover plate: Galvanized steel</li> <li>• Bottom tray: Galvanized steel</li> <li>• Reinforcement: Standard</li> <li>• Fire resistance: Standard = F60, F90 and F120 can be achieved depending on detailing.</li> <li>• Acoustics: Sound insulation is better than other conventional systems with comparable weight.</li> </ul>	
<b>Marketing information:</b> SpanForm AB is known as a specialist in this field. So far about 2000000 m2 floors have been built with SWEDECK system.	
<b>Comments:</b> The installation is simple and the components are easy to handle. The product SWEDECK is unique because of its rational design and very rapid installation.	

<b>System name:</b> R51	<b>Fabricator address:</b> STRUCTURAL METAL DECKS Ltd Mallard House, Christchurch Road, Ringwood, Hants, BH24 3AA UK Tel : +44 1425 471088 Fax : + 44 1425 471408 Email : technical@smdltd.co.uk Web site : www.smdltd.co.uk																																																
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<b>Product description :</b> Corrugated steel sheet																																																	
<b>Pictures :</b> <div style="text-align: center; margin-top: 10px;"> </div>																																																	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>Sectional properties:</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th rowspan="3">Nominal thickness mm</th> <th rowspan="3">Depth of profile mm</th> <th rowspan="3">Weight of profile kN/m<sup>2</sup></th> <th rowspan="3">Height of neutral axis mm</th> <th rowspan="3">Area of steel mm<sup>2</sup>/m</th> <th rowspan="3">Moment of inertia cm<sup>4</sup>/m</th> <th colspan="4">Moment capacity ultimate kN m/m</th> </tr> <tr> <th colspan="2">Sagging</th> <th colspan="2">Hogging</th> </tr> <tr> <th>Z28</th> <th>Z35</th> <th>Z28</th> <th>Z35</th> </tr> </thead> <tbody> <tr> <td>0,9</td> <td>51</td> <td>0,135</td> <td>16,2</td> <td>1603</td> <td>63,46</td> <td>4,75</td> <td>5,72</td> <td>4,51</td> <td>5,37</td> </tr> <tr> <td>1,0</td> <td>51</td> <td>0,150</td> <td>16,2</td> <td>1781</td> <td>71,27</td> <td>5,48</td> <td>6,61</td> <td>5,08</td> <td>6,27</td> </tr> <tr> <td>1,2</td> <td>51</td> <td>0,184</td> <td>16,2</td> <td>2153</td> <td>85,47</td> <td>6,91</td> <td>8,44</td> <td>6,22</td> <td>7,68</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>Maximum spans (m) for unpropped conditions for up to 10kN/m<sup>2</sup> imposed loading for grades of steel Z28 &amp; Z35 (0.9, 1.0, 1.2 gauge)               <ul style="list-style-type: none"> <li>– for lightweight concrete (wet density 1935 kg/m<sup>3</sup>) from 2,05 up to 3,81 m</li> <li>– for normal weight concrete (wet density 2450 kg/m<sup>3</sup>) from 1,89 up to 3,59 m</li> </ul> </li> <li>Fire resistance tables available in the internet site</li> </ul>		Nominal thickness mm	Depth of profile mm	Weight of profile kN/m <sup>2</sup>	Height of neutral axis mm	Area of steel mm <sup>2</sup> /m	Moment of inertia cm <sup>4</sup> /m	Moment capacity ultimate kN m/m				Sagging		Hogging		Z28	Z35	Z28	Z35	0,9	51	0,135	16,2	1603	63,46	4,75	5,72	4,51	5,37	1,0	51	0,150	16,2	1781	71,27	5,48	6,61	5,08	6,27	1,2	51	0,184	16,2	2153	85,47	6,91	8,44	6,22	7,68
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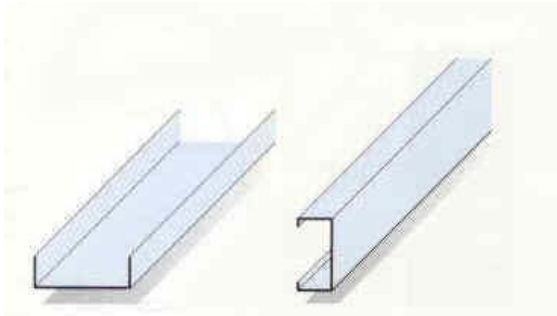
<b>System name:</b> TR60	<b>Fabricator address:</b> STRUCTURAL METAL DECKS Ltd Mallard House, Christchurch Road, Ringwood, Hants, BH24 3AA UK Tel : +44 1425 471088 Fax : + 44 1425 471408 Email : technical@smdltd.co.uk Web site : www.smdltd.co.uk																																		
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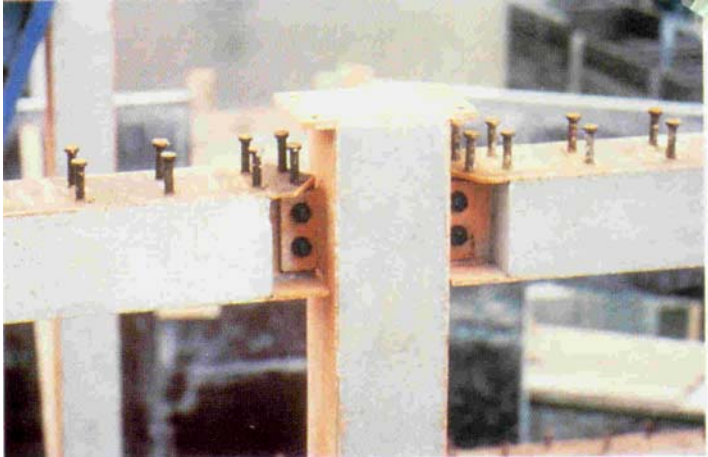
<b>System name:</b> <ul style="list-style-type: none"> <li>○ 1000.35</li> <li>○ 1000.45</li> <li>○ 1000.45V</li> <li>○ 850.29</li> </ul>	<b>Fabricator address:</b> TECTONIA (Groupe Corus) 22, avenue Jean de Beco F-59720 LOUVROIL Tel : 03.27.53.05.20 Fax : 03.27.53.05.21 Web site : <a href="http://www.tectonia.com">www.tectonia.com</a>
<b>Application field :</b> Floor	
<b>Product description :</b> Corrugated steel sheet	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions: width: 850 to 1000 mm ; length : 1,8 to 14 m</li> <li>• Loading resistance : 1,25 to 3,4 m</li> <li>• Fire resistance: M0 (CSTB test)</li> <li>• Durability (corrosion) : galvanised steel, lacquer</li> <li>• Floors answer to vibration: DTU 40.35 / NF P 34-205-1</li> <li>• Certificates or standards : ISO 9002</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Produced quantity: 30 000 tons/year</li> <li>• Price order: on quotation ; jobbing only</li> <li>• Market in progression</li> </ul>	
<b>Comments :</b>	

<p><b>System name:</b></p> <p>Hollow core concrete flooring system</p>	<p><b>Fabricator addresses:</b>  <b>TermoDeck International Services</b>          PO Box 4805,13 Victoria Square, London SW1W OXA, UK          Tel: +44(0)171-821 5066          Fax +44(0)171-828 1871          Email:<a href="mailto:moreinfo@termodeck.com">moreinfo@termodeck.com</a></p>
<p><b>Application field:</b>          TermoDeck® is an integrated system for providing and controlling a comfortable climate within buildings in a cost effective and environmentally friendly way.</p>	
<p><b>Product description:</b></p> <p>TermoDeck is a fan-assisted, heating, cooling and ventilation system that uses the high thermal mass of structural, hollowcore floor slabs through which warmed or cooled fresh air is distributed. This enables the slabs to behave as passive heat exchange elements that release heat to, or absorb heat from, the air in the slabs</p>	
	
<p><b>Technical comments:</b></p> <ul style="list-style-type: none"> <li>• Utilisation of the thermal mass of the TermoDeck in combination will produce a very efficient environmental control solution</li> <li>• TermoDeck in conjunction with simple, refrigerant-free mechanical ventilation, simple ductwork, and low U-value materials, creates an holistic system that is quiet in operation, unobtrusive in appearance</li> <li>• The slabs can span up to 16 metres enabling them to cover more than one room.</li> <li>• Energy consumption is half that of a conventional building of this type</li> <li>• High proportion (around 85%) of the energy contained in the exhaust air can be re-circulated</li> </ul>	
<p><b>Marketing information:</b></p>	
<p><b>Comments:</b></p>	

### 3.4. Columns

<b>System name:</b> <input type="radio"/> U section <input type="radio"/> C section	<b>Fabricator address:</b>
<b>Application field:</b> Light steel structure	
<b>Product description:</b> cold formed steel profiles.	
<b>Pictures:</b> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>•</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b>	

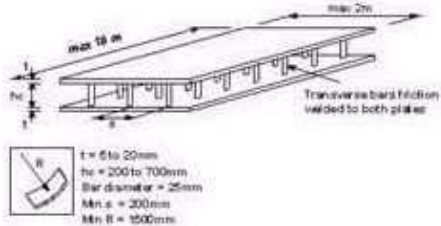





<b>System name:</b> <input type="radio"/> European section HE, UC <input type="radio"/> Wide flange section HD	<b>Fabricator address:</b>
<b>Application field:</b> Steel building	
<b>Product description:</b> Hot rolled steel profiles.	
<b>Pictures:</b> <div data-bbox="175 481 758 1377"> <p><u>European standard section ranges</u></p> <p>Legend:            ▲ IPE            ■ HEA            ■ HEB            ■ HEM</p> <p>Diagram labels: h (mm), b (mm)</p> </div> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Very wide range of cross-sections. The cross-sections are characterised by a compact height/width ratio in order to enhance the plastic modulus which play a role in the buckling of the elements.</li> <li>• 5 different steel grades : S235, S275, S355, S420 and S460</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b> A pre-design free software PSL is available on internet site <a href="http://www.profilarbed.lu">www.profilarbed.lu</a>	

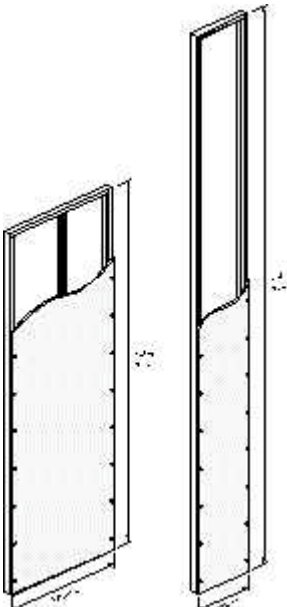
<b>System name:</b> Steel-Concrete composite column	<b>Fabricator address:</b>
<b>Application field:</b> Multi-storey buildings	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• The reinforced concrete encasing the steel section is assumed to support part of the vertical load and increase their fire resistance</li> <li>• A partial encasement in concrete provides a composite column with substantial fire resistance.</li> </ul>	
<b>Pictures:</b> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Max height of the column : depend on the section of the steel beam</li> <li>• The open form of steel H-sections facilitates filling with concrete between the flanges</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b> <p>The increase in rigidity of the section due to the presence of the concrete and reinforcement may be considerable. Starting at several percent for the smallest practical beams, the increased in rigidity may exceed 20 % for the largest beams in their final condition.</p>	





### 3.5. Walls

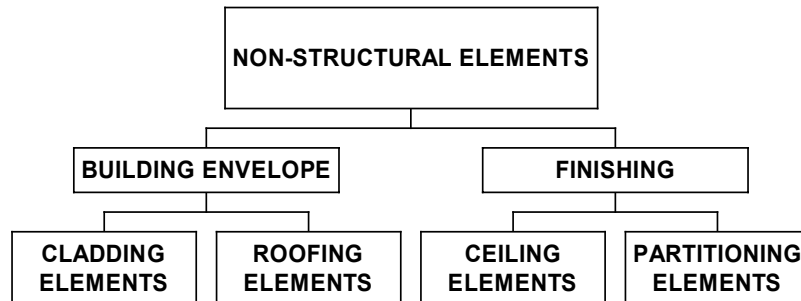
<b>System name:</b> Bi-steel	<b>Fabricator addresses:</b>  <b>Corus Construction &amp; Industrial</b> PO Box 1,Brigg Road Scunthorpe, North Lincolnshire, UK DN16 1BP Tel: 0044(0)1724404040 Fax: 0044(0)1724405564 Email: <a href="mailto:john.theos@corusgroup.com">john.theos@corusgroup.com</a>
<b>Application field:</b> Bi-steel is a composite, modular construction system. It is a strong, impermeable and rapid construction system especially beneficial for blast protection, reduced construction thickness, leak resistance, or for very short construction programme	
<b>Product description:</b> A Bi-Steel panel consists of two parallel face plates connected by an array of transverse bars. The bar connectors are simultaneously friction welded at each end to the steel face plates. Straight or curved Bi-Steel panels can be produced to suit a diverse range of structures.	
<b>Pictures:</b>      	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Straight or curved Bi-Steel panels can be produced to suit a diverse range of structures</li> <li>• Bi-Steel panels are prefabricated into modules prior to delivery, minimising on-site construction time</li> <li>• For ease of fabrication Bi-Steel is manufactured to tight dimensional tolerances. There is full quality control to ISO 9001 on plate and bar production</li> <li>• Bi-Steel solutions can be designed using procedures within TM5-1300. Full quality documentation is available upon request</li> <li>• Bi-Steel is usually produced in S275 or S355 carbon steel. Where aesthetics or corrosion resistance are important stainless steels may be used. Plate thickness and steel grade can be varied; even faceplates on the same panel can be different.</li> <li>• Steel modules may be used unfilled or filled with concrete, wax, sand, thermal insulation material or other materials depending on the final application. To gain the full benefits of great strength, energy absorbing characteristics and impact resistance the Bi-Steel modules are filled with concrete</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b>	

<b>System name:</b> FREEFRAME Panel Assembly: ○ CH7312 ○ CH7315 ○ CH9312 ○ CH9315 ○ CH14912 ○ CH14915	<b>Fabricator address:</b> BANRO SECTIONS Ltd Manor Works, Pleck Road, Walsall, West Midlands, WS2 9ES Tel : +44 1922 724789 Fax : +44 1922 644460 Email : jle@banro.co.uk Web site : www.banro.co.uk
<b>Application field :</b> Wall	
<b>Product description :</b> Panel	
<b>Pictures :</b> 	
<b>Technical comments :</b> • Dimensions : width from 73 to 149 mm , gauge : 1,2 to 1,5.	
<b>Marketing information :</b>	
<b>Comments :</b>	

## 4. Non-structural elements

### 4.1. Introduction

The following scheme presents a general classification of the different non-structural elements:



### BUILDING ENVELOPE

The primary functions of the **building envelope** are to ensure the weathertightness (watertightness and windtightness) of the building. It concerns all the outside components of the buildings (cladding and roofing elements).

Steel solutions are increasingly used in cladding and in roofing applications for different reasons :

- Lightweight,
- sustainable systems,
- High quality standards induced by industrialised production,
- Responding to the highest building physics requirements imposed by new ecological regulations,
- Rapid construction,
- Competitive price.

The range of steel products for cladding as for roofs includes single skin, double skin and composite systems, with both visible and hidden fastenings.

Steel products provide to the professionals optimised solutions for the different buildings (with respect to activities) : industrial (industrial plant, storage building), service industry buildings (offices, schools, hospitals, sport and culture buildings), residential (one-family or multi-storey dwelling), agriculture building, ... Steel solutions also suit to all types of buildings : new or rehabilitation.

The requirements for façade and roof are slightly different although both needs to be weathertight, durable and to provide sufficient thermal and acoustical insulation as described hereafter.

#### Weathertightness

The extremes of climatic conditions vary geographically.

Watertightness does not depend on the panels used, but on the type of sealing at the laps, which subsequently depends on the shape and the pitch of the **roof**. The weathertightness of the roof is clearly paramount, particularly for low pitches.

One important facet of a roof sheet is its ability to withstand local point loads as well as to sustain walking of persons on it during construction as in service for maintenance purposes. This aspect governs the minimum thickness acceptable for a roof sheet.

A good choice will not only prevent roof failure but also allow an optimal economical construction.

For the **Cladding**, since the sheets will normally be vertical, the weatherproofing requirements are less rigorous. For facades, appearance and aesthetic is a major consideration in the selection of the particular system to be used.

#### Durability

Galvanised pre-painted steel guarantees the necessary corrosion resistance.

Hot dip galvanised steel presents zinc coating of 275 g/m<sup>2</sup> or a coating thickness of 20 mm on each side. There are different types of organic coatings, which have all their specific properties. It is very important to

choose the appropriate coating for a particular use and exposure. The major coatings are (ranked in increasing price order) : Polyester (PE), Polyurethane (PU or PUR), Plastisol (PVC) and Fluoropolymers (PVDF or Polyvinylidenfluoride).

Besides mechanical properties (abrasion and impact resistance), paint adhesion, flexibility and corrosion resistance, the exterior durability or weatherability is very significant in architectural applications such as **roofing**. UV radiation is one of the causes of the deterioration of a coating exposed to the atmosphere.

Furthermore, the angle of incidence of the sun on the surface plays an important role for the durability of the elements. Therefore cladding systems allow the full range of colors to be used without excessive surface temperature, due to the lower angle of incidence of the sun, so giving the architect the widest possible scope for creative use of colors.

### **Thermal insulation and ventilation**

The energy efficiency of buildings becomes more and more important according to the European Directives which intend to reduce the CO<sub>2</sub> emissions and then the energy consumption. That is the reason why the new and the future thermal regulations are getting more severe. In an economical point of view an efficient thermal insulation is essential to reduce the operational cost of the buildings.

The insulation can be integrated or associated to steel sheet. It is very important avoid condensation in the inner side of the steel sheet. The condensation will lead to corrosion problems and damage the insulation material. Therefore all the air gaps should be carefully filled with insulation material. Some systems are especially designed for room having a high or very high hygrometry, as for example swimmingpools or some plants producing a lot of water vapor (paper mills, laundries, ...).

Metal **roofing** systems are well suited for efficient thermal insulation against heat loss in winter and heat gain in summer.

### **Acoustic insulation**

Acoustical insulation could be divided in two components: sound reduction and sound absorption.

- Sound reduction can be achieved by a double skin/mineral wool system using polyethylene sealing strips and special profiles.
- Sound absorption is realized by the combination of a perforated inner liner sheet with mineral wool on top. The perforation ratio must exceed 20%.

## **FINISHING**

**Ceilings** steel systems are mostly used in case of suspended ceiling. They are built with cassettes or strips made with prepainted steel or stainless steel.

Suspended ceiling allow to hide the fluid pipes and other electrical devices for example. Such ceiling could also perform an efficient acoustic insulation. Moreover, in the case of fluid pipes, the ceiling can participate in heating or cooling the rooms by radiation.

The **partitioning** is due to comfort and functionality requirements. The modern partition is light and uses different (dry) elements to have an high level of thermal, acoustical and in some cases fire performances.

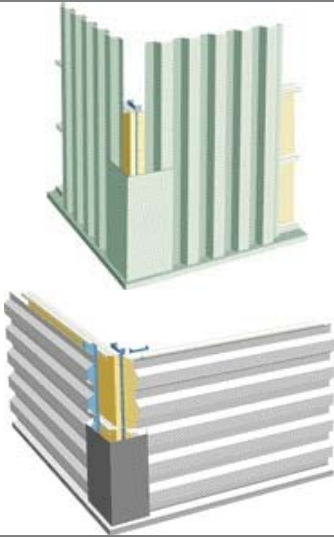
Often partitioning systems are designed to be mobile, detachable, removable or extensible. In this case, steel solutions are the most convenient.

The present chapter includes 90 sheets from which

- building envelope
  - 38 cladding elements, see chapter 4.2,
  - 38 roofing elements, see chapter 4.3,
- finishing
  - 6 ceiling systems, see chapter 4.4,
  - 8 partitioning systems, see chapter 4.5.

## 4.2. Cladding systems

There are four main categories of cladding systems. Their characteristics are:



### Wall cladding

Light façade, built of low mass materials as ribbed (sinusoidal or trapezoidal) steel sheets, single or double skin with integrated insulation.

This cladding is mechanically fastened. Giving appropriate attention to joint detailing, wall cladding can be fixed vertically, horizontally, diagonally or in combinations.

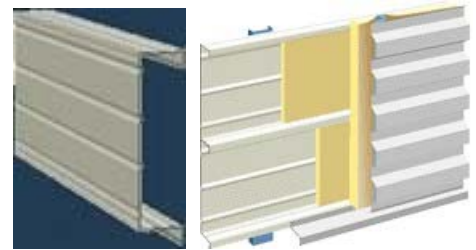
Wall cladding is often 0,5mm thick. To allow selection of the required profile and thickness, the majority of manufacturers publish catalogues containing suggested fixing and sealing details together with allowable loads for the range of span conditions for both pressure and suction actions.

The cladding suits to new construction and also to rehabilitation.

### Liner tray for double skin cladding

This cassettes system realises the inside finishing of the wall. It supports the insulation (mineral wool) and the outside cladding wall (horizontally or vertically fastened).

To improve the acoustic inside the building, the cassettes are perforated on the visible face.



### Architectural wall cladding

Cladding with a smooth surface that is mechanically fastened (visible or hidden fastenings) on a light frame.

Those elements generally don't ensure the tightness of the cladding.

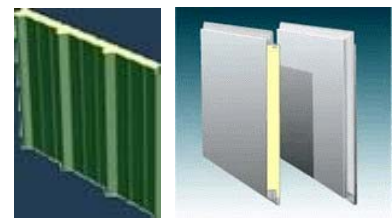
### Insulated panels Composite or Sandwich Panels

Prefabricated systems consisting of panels where the insulating material (polyurethane foam or rock wool) is integrated between two metal skins (galvanised and coated) ; the outer skin can be smooth or ribbed.

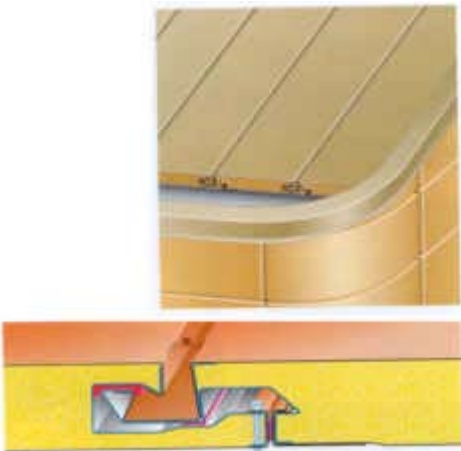
This composite system gives robust stiff panels, with the further benefit of rapid erection since the whole skin is fastened in one operation.

They are suitable for plane or curved facades.


The thickness of the sandwich panel depends on the need of thermal insulation, the span and the fasteners distribution depend on the wind loads, snow loads and the thermal gradient.

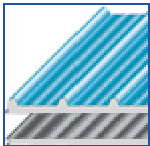
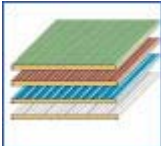


#### 4.2.1. Sandwich panels

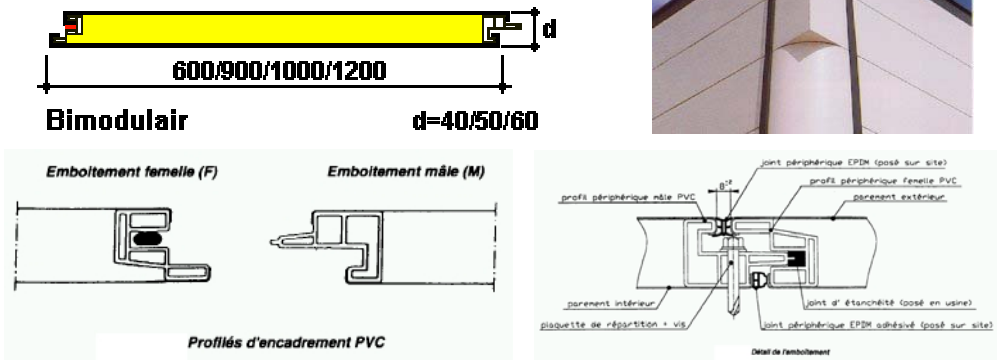
<b>System name:</b> ○ Toiture plane TI60 – TI80	<b>Fabricator address:</b> AFCA 26, rue de l'étang BP 27 54110 LANEUVILLE-DEVANT-NANCY Tel : 03 83 26 18 30 Fax : 03 83 26 19 02 Email : info@afca-sa.fr Web site : www.afca-sa.fr
<b>Application field :</b> Cladding	
<b>Product description :</b> Sandwich panel	
<b>Pictures :</b>  	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions: TI60 – TI80 : width : 500 to 1000 mm</li> <li>• Durability : galvanised steel Z275 &amp; Z350</li> <li>• Thermal resistance : TI60 – TI80 : polyurethane foam 35-40 kg/m<sup>2</sup> ; <math>\lambda = 0,025 \text{ W/m}^2 \text{ h}^\circ\text{C}</math></li> <li>• Fire resistance : TI60 – TI80 : M1</li> <li>• Acoustic performance : 28 dBA (TI80) ; 25 dBA (TI60)</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order : on quotation (one week to get a quote)</li> <li>• Produced quantity by year : (very low volume for particular business)</li> </ul>	
<b>Comments :</b>	

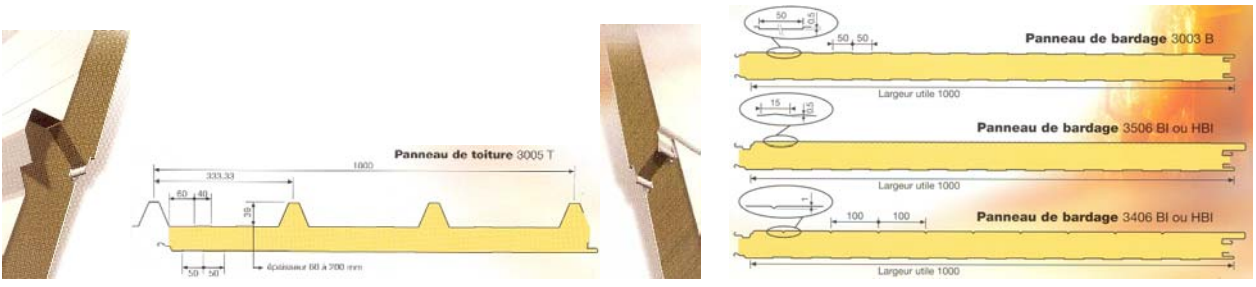




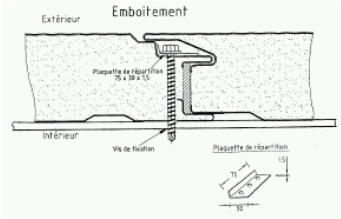
<b>System name:</b> Sandwich Panel P Sandwich Panel W	<b>Fabricator address:</b> GASELL PROFIL AB Box 7 SE-231 08 ANDERSLÖV, Sweden Tel : +46 410 214 00 Fax : +46 410 216 30 Email : <a href="mailto:export@gasell.com">export@gasell.com</a> Web site : <a href="http://www.gasell.com">www.gasell.com</a> and <a href="http://www.gasell.co.uk">www.gasell.co.uk</a>
<b>Application field :</b> Wall and cladding	
<b>Product description :</b> The Gasell composite panels are of unique design and have a variety of surface shapes to meet the designer's choice. The lightweight panels combine strength and stability having excellent spanning properties and a high insulation value provided by its' CFC free polyurethane core. The high performance panel is fitted with sealant materials at joints to improve air and weather tightness can can also be secret fixed to provide an attractive facade. The panels are supplied with the edge turned down for cleaner joints.	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : overall width : 915 mm standard; length : up to 10 m, panel Thickness : 35 to 120 mm</li> <li>• Thermal performances : K-Values : 0,64 to 0,20 W/m²K</li> <li>• Fire resistance : comply with DIN 4102 and ÖNORM 3800, and are classified in building materials category B1</li> <li>• Durability (corrosion) : CFC free polyurethane foam core, exterior and interior skin : standard 0.60mm galvanised steel as per DIN 17162 with quality class Z275 (275g/m³ total to both sides). Other thickness available on request. Exterior Surface : PVF2 Kynar 500 25 micron. Interior Surface : polyester coating 15 micron and protective film 150 micron</li> <li>• Certificates or standards : FM Approved: Subject to the conditions of Approval as a Class 1 insulated wall panel when installed as described in the current edition of the FMRC Approvable Guide and FMRC Report J.1.2V0A1.AM.</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order : 25,4 to 36,5 euros/m², depending on thickness (80 to 200 mm)</li> </ul>	
<b>Comments :</b>	

<b>System name:</b> <ul style="list-style-type: none"> <li>○ Insulating Panels</li> <li>○ Wall panels</li> </ul>	<b>Fabricator address:</b> GRUPPO MARCEGAGLIA Marcegaglia S.p.A. via Bresciani, 16 I-46040 GAZOLDO IPPOLITI MANTOVA Tel : +39 . 0376 685 1 Fax : +39 . 0376 685 600 Email : info@gruppomarcegaglia.com Web site : www.gruppomarcegaglia.com
<b>Application field :</b> Cladding and roof	
<b>Product description :</b> Sandwich panels. <ul style="list-style-type: none"> <li>• Insulating Panels: BROLLO self-supporting panels are made of two metal sheets bonded by a polyurethane foam insulation layer.</li> <li>• Wall panels: Insulated metal panels for indoor and outdoor walls, designed to satisfy the widest ranging civil and industrial building requirements</li> </ul>	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Insulating Panels</p> </div> <div style="text-align: center;">  <p>Wall panels</p> </div> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : thickness min. 0,6 - max. 15 , size min. 500 - max. 12000, width min. 450 - max. 1000, length up to 12000</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

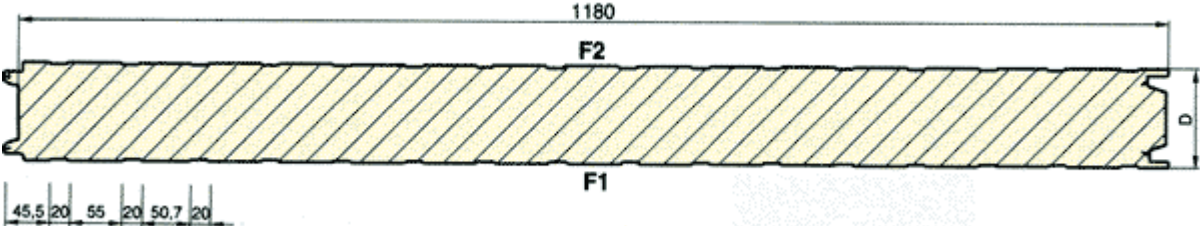
<b>System name:</b> PROMISOL 1001TSA PROMISOL 1003BA	<b>Fabricator address:</b> HAIRONVILLE (Arcelor Group) Parc industriel des Hauts-Sarts B-4040 Herstal Tel : 00 32 (4) 240 67 11 Fax : 00 32 (4) 240 67 10 <a href="http://www.haironville.be">www.haironville.be</a>
<b>Application field:</b> Sandwich panel cladding and roofing ; sportive, industrial, ... buildings	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Cladding with sandwich panels "steel sheet - polyurethane foam - steel sheet" (galvanized steel sheets eventually prepainted – min. thickness : 0,5mm)</li> <li>• Spigot joints are longitudinal</li> <li>• Metal, wood or concrete framing.</li> </ul>	
<b>Pictures:</b> <div style="display: flex; align-items: center; justify-content: space-around;">   </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Size : length up to 12m ; effective width 1m ; thickness 60, 80 or 100mm</li> <li>• Cladding panels don't participate to the building global stability</li> <li>• burning behavior classification : M1 or M2 (function of thickness and composition)</li> <li>• heat exchange coefficient <math>K_c = 0.42</math> to <math>0.19 \text{ W/m}^2.\text{K}</math> (according to the thickness, the type of panel, ...)</li> <li>• Sound insulation : transmission loss <math>R_w = 26\text{dB}</math> ; average sound absorption <math>\alpha = 0.52</math></li> <li>• CSTB technical assessment 5/00-1477</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b>	


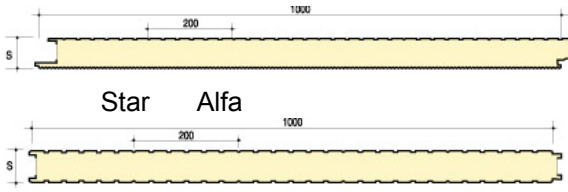
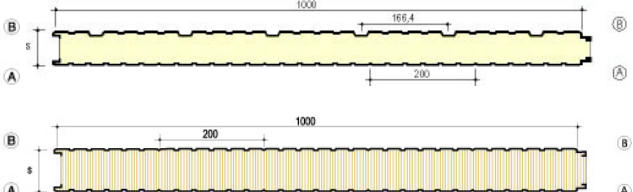
<b>System name:</b> PROMISOL Fi4CN	<b>Fabricator address:</b> HAIRONVILLE (Arcelor Group) Parc industriel des Hauts-Sarts B-4040 Herstal Tel : 00 32 (4) 240 67 11 Fax : 00 32 (4) 240 67 10 <a href="http://www.haironville.be">www.haironville.be</a>
<b>Application field:</b> Sandwich panel cladding ; commercial, industrial, agricultural, ... buildings (heated or not, but not cooled)	
<b>Product description:</b> <ul style="list-style-type: none"> <li>Cladding with sandwich panels "steel sheet - polyurethane foam - steel sheet" (prepainted-galvanized steel sheets – min. thickness : 0,75mm)</li> <li>Spigot joints are longitudinal and transverse (joints on the 4 sides of the panel) ; the attachments (self-tapping screw) are hidden</li> <li>Metal, wood or concrete framing</li> <li>Some licensed undertaking set up the panels and some precautions must be taken (transport, materials handling, ...).</li> </ul>	
<b>Pictures:</b> <div style="text-align: center;">  <p><b>Bimodulair</b> <span style="margin-left: 100px;"><b>d=40/50/60</b></span></p> <p><i>Emboitement femelle (F)      Emboitement mâle (M)</i></p> <p><i>Profilés d'encadrement PVC</i></p> <p><i>Détail de l'emboitement</i></p> </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>Size : length 0.4m up to 6m ; effective width 0.4m up to 1.2m ; thickness 40, 50 or 60mm</li> <li>Cladding panels don't participate to the building global stability</li> <li>burning behavior classification : M1 or M2 (function of thickness and composition)</li> <li>heat exchange coefficient Kc and linear loss coefficient k functions of thickness (Kc = 0.48, 0.39 and 0.33 W/m².K and k = 0.13, 0.11 and 0.10 W/m.K)</li> <li>surface density of panels : 13.4kg/m² (thickness 40mm), 13.8 kg/m² (thickness 50mm) and 14.2 kg/m² (thickness 60mm)</li> <li>CSTB technical assessment 2/98-643</li> </ul>	
<b>Marketing information:</b> Reference of 1999 : 800 000m²	
<b>Comments:</b> Some curved sandwich panels can do an half-round fillet.	

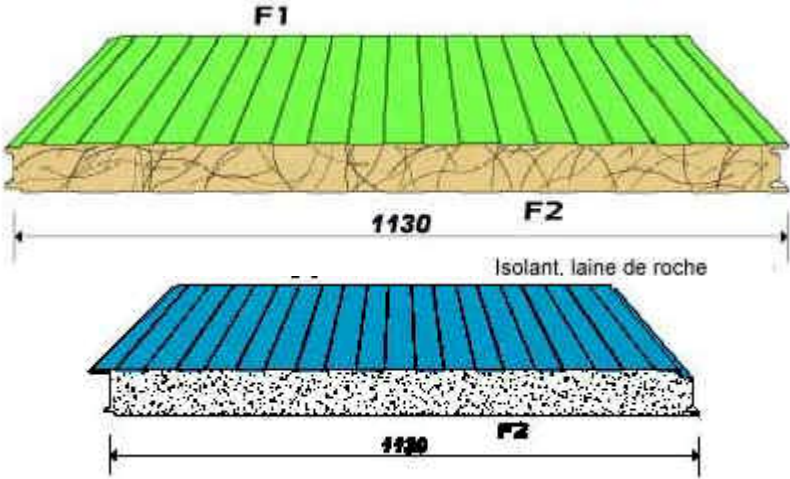
<b>System name:</b> PROMISTYL	<b>Fabricator address:</b> HAIRONVILLE (Arcelor Group) Parc industriel des Hauts-Sarts B-4040 Herstal Tel : 00 32 (4) 240 67 11 Fax : 00 32 (4) 240 67 10 <a href="http://www.haironville.be">http://www.haironville.be</a>
<b>Application field:</b> Sandwich panel cladding and roofing ; commercial, offices, schools, ... buildings	
<b>Product description:</b> <ul style="list-style-type: none"> <li>Cladding with sandwich panels "steel sheet – mineral wool - steel sheet" (prepainted-galvanized steel sheets)</li> <li>Spigot longitudinal joints are vertical or horizontal ; the attachments are exposed or hidden.</li> </ul>	
<b>Pictures:</b> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>Size : length 2m up to 15m ; effective width 1m ; thickness 60 up to 200mm</li> <li>Fire resistance : 1/2h (thickness 60mm), 1 hour (thickness 80mm), 2 hours (thickness 100mm)</li> <li>Burning behavior classification : M0 (mineral wool)</li> <li>Façades :           <ul style="list-style-type: none"> <li>Thermal insulation : heat exchange coefficient <math>K_c = 0.60, 0.45</math> and <math>0.37 \text{ W/m}^2\cdot\text{K}</math> (thickness 60, 80 and 100mm)</li> <li>Sound insulation : transmission loss <math>R_w = 36, 37</math> and <math>38\text{dB}</math> (thickness 60, 80 and 100mm) ; sound absorption <math>\alpha = 0.9, 0.93</math> and <math>0.95</math> (thickness 60, 80 and 100mm)</li> </ul> </li> <li>Roof :           <ul style="list-style-type: none"> <li>min. slopes of roof : 10%</li> <li>Thermal insulation : heat exchange coefficient <math>K_c = 0.60, 0.42</math> and <math>0.35 \text{ W/m}^2\cdot\text{K}</math> (thickness 60, 80 and 100mm)</li> <li>Sound insulation : transmission loss <math>R_w = 21, 23</math> and <math>26\text{dB}</math> (thickness 60, 80 and 100mm) ; sound absorption <math>\alpha = 0.9, 0.93</math> and <math>0.95</math> (thickness 60, 80 and 100mm)</li> </ul> </li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b> <ul style="list-style-type: none"> <li>sound absorption can be improved using perforated sheet (in this case, sandwich panel is only used as internal partition wall)</li> <li>thickness 120, 150 and 200mm : tests for characterizing fire resistance, thermal and sound insulation are ongoing</li> </ul>	

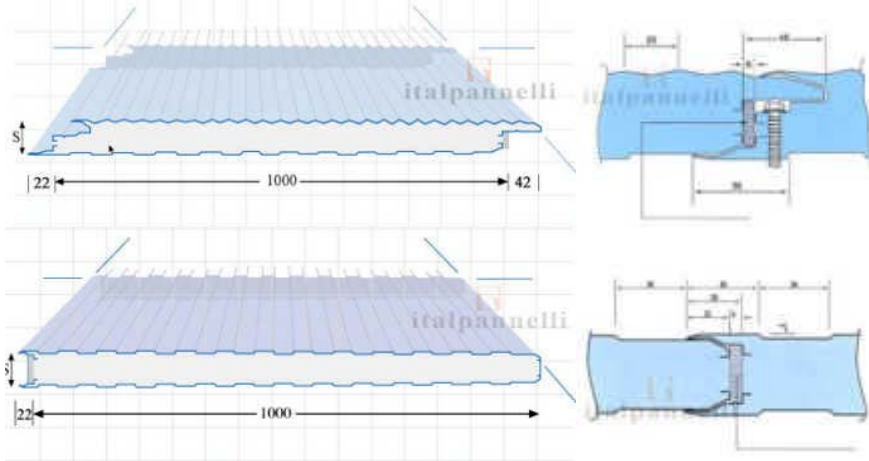
<b>System name:</b> PROMLINE 2000 B – 2000 HB	<b>Fabricator address:</b> HAIRONVILLE (Arcelor Group) Parc industriel des Hauts-Sarts B-4040 Herstal Tel : 00 32 (4) 240 67 11 Fax : 00 32 (4) 240 67 10 <a href="http://www.haironville.be">http://www.haironville.be</a>
<b>Application field:</b> Sandwich panel cladding ; commercial, industrial, agricultural, ... buildings (heated or not, but not cooled)	
<b>Product description:</b> <ul style="list-style-type: none"> <li>Cladding with sandwich panels "steel sheet - polyurethane foam - steel sheet" (galvanized steel sheets)</li> <li>Spigot longitudinal joints are vertical, horizontal or skew ; the crossing attachments are hidden</li> <li>External steel sheet is lightly ribbed (min. thickness : 0,63mm) ; internal steel sheet is ribbed (min. thickness : 0,5mm).</li> <li>Metal, wood or concrete framing.</li> </ul>	
<b>Pictures:</b> <div style="display: flex; align-items: center; justify-content: space-around;">    </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>Size : length up to 16m ; effective width 1m ; thickness 40 up to 100mm</li> <li>Cladding panels don't participate to the building global stability</li> <li>burning behavior classification : M1 or M2 (function of thickness and composition)</li> <li>heat exchange coefficient <math>K_c</math> and linear loss coefficient <math>k</math> functions of thickness (<math>K_c = 0,54</math> to <math>0,22 \text{ W/m}^2 \cdot \text{K}</math> and <math>k = 0,18</math> to <math>0,03 \text{ W/m} \cdot \text{K}</math>)</li> <li>CSTB technical assessment 2/00-786</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b>	




<b>System name:</b> IND products	<b>Fabricator address:</b> ISOCAB Treurnietstraat 10 8531 Harelbeke – Bavikhove BELGIUM Tel : +32 (0)56 73 43 11 Fax : +32 (0)56 73 43 22 Email : Isocab@Isocab.be Web site : www.isocab.be
<b>Application field :</b> Cladding	
<b>Product description :</b> Sandwich panel	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : width 1,18 m, thickness from 40 to 220 mm</li> <li>• Durability (corrosion) : the basic material is always galvanised steel Z 275. As finishing the customer can make a choice between : polyester 15 micron, polyester 25 micron, plastisol 100 micron, plastisol 200 micron, PVDF 25 micron different thickness and colours (optional).</li> <li>• Loading resistance : adapted from needs ; up to 6 m span</li> <li>• Thermal performances : from 0,57 up to 0,11 W/m<sup>2</sup> K</li> <li>• Acoustic performances : up to 32 dB</li> <li>• Fire resistance : M0</li> <li>• Certificates or standards : conform to DTU specifications (Veritas agreement).</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Produced quantity by year : one big factory (Perpignan) ; leader on agroalimentary market</li> <li>• Price : on quotation</li> <li>• Market : 2002 was better than 2003. Bad prevision for 2004. Bad results due to global situation of construction</li> <li>• Society position : market parts in progression in France and for the export.</li> </ul>	
<b>Comments :</b>	

<b>System name:</b> ○ Wall ○ Star ○ Alfa ○ Alfa 2 ○ Fibermet	<b>Fabricator address:</b> ISOLPACK SpA C.so Vittorio Emanuele, 99 10128 TORINO (ITALIA) Tel : ++39 011 56075.11 Fax : ++39 011 5611713 Email : info@isolpack.com Web site : www.isolpack.com
<b>Application field</b> : Cladding	
<b>Product description</b> : Sandwich panel	
<b>Pictures :</b> <div style="text-align: center;">  </div> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Star    Alfa</p> <p>Alfa 2</p> </div> <div style="text-align: center;">  <p>Fibermet</p> </div> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>Steel according to EN 10147 type Fe E 250 G Norm.</li> <li>Durability (corrosion) : simple hot galvanised through “sendzimir” process, galvanised prepainted or plastified steel; stainless steel. Protective treatments available upon request: polyester coating for outdoors, non toxic prepainting when food is involved, silicon polyester, PVDF, thermoplastic Class A, application of PVC plastic films or other films.</li> <li>Isolpack Wall (Star, Alfa, Alfa 2):           <ul style="list-style-type: none"> <li>Dimensions : width up to 1000 mm; length upon request from continuous production process. Thickness: up to 200.</li> <li>Thermal performance : Polyurethane self-extinguishing resins (PUR). The mean density of the insulating foam is 35-40 Kg/m<sup>3</sup>. The minimum content of the closed cells is 95-98%. The thermal transmission coefficient K (Kcal/m<sup>2</sup> h° C) is determined dividing the value lambda (0.019) by the thickness S of foam contained in the panels. To simplify the calculation of the coefficient K, we consider the polyurethane contained into the ribs as uniformly distributed on the whole surface.</li> </ul> </li> <li>Isolpack Fibermet:           <ul style="list-style-type: none"> <li>Dimensions: width mm 1000; length upon request from continuous production process. Standard insulating thicknesses: mm 50/80/100. Panels of non standard thicknesses can be supplied upon request previous agreement on minimum quantities.</li> <li>Thermal performance : made through a special configuration insulating layer, produced in high density mineral fibre (80-100 Kg/m<sup>3</sup> . lambda = 0.043 W/mK), perpendicularly placed at the sheet plane.</li> </ul> </li> </ul>	
<b>Marketing information</b> :	
<b>Comments</b> :	


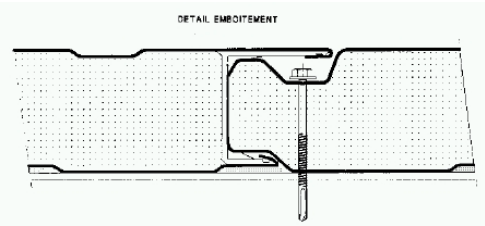
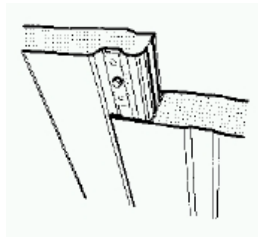
<b>System name:</b> Polystyrène insulated panels: ○ ISOSTEEL WALL, Rockwool insulated panels : ○ VULCASTEEL WALL, ○ VULCASTEEL WALL ALPHA, ○ VULCASTEEL WALL INV, ○ VULCASTEEL WALL INV ALPHA	<b>Fabricator address:</b> ISOMETALL S.A. Z.I. de la Baraque Fraiture route de La Roche B-6960 MANHAY Tel : 0032 (0) 80 41 81 60 0032 Fax : (0) 80 41 81 61 Email : info@isometall.com Web site : www.isometall.be
<b>Application field :</b> Cladding	
<b>Product description :</b> Sandwich panel. The profiled sheets proposed are made out of sheet steel galvanised base on standard NF EN 10147, class Fe E 320 G.	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions: width : 1 m ; length: from 1,6 m to 14 m</li> <li>• Loading resistance: data depending of the product available on the internet site.</li> <li>• Fire resistance : M0 (CSTB test : 3 hours fire resistant in 80 mm)</li> <li>• Acoustic performances: high / very high (often solded for acoustic performances)</li> <li>• Durability / corrosion : corrosion treatment by lacquer</li> <li>• Certificates or standard: ISO 9000 quality system</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Produced quantity: 90 000 m<sup>2</sup>/year</li> <li>• Price order : on quotation only</li> <li>• Construction cost : same costs as a traditional sandwich panel</li> <li>• Demolition costs / recycling costs : 100% recyclable ; using specialised societies for recycling</li> <li>• Market information: in constant progression, high impact of legislation on this progression.</li> <li>• Customer perception: appreciated products, especially for security (fire resistance) and acoustic performances.</li> </ul>	
<b>Comments :</b>	

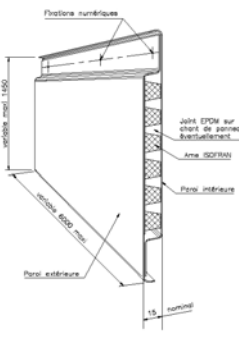



<b>System name:</b> <ul style="list-style-type: none"> <li>○ Top</li> <li>○ Mec</li> <li>○ Mec Jumbo dry</li> </ul>	<b>Fabricator address:</b> ITALPANNELLI Strada Provinciale Bonifica Km 13.500 I-64010 ANCARANO Tel : 40 39 0861/72021 Fax : 40 39 0861/870078 Email : info@italpannelli.it Web site : www.italpannelli.it
<b>Application field :</b> Cladding	
<b>Product description :</b> Monolithic insulated panels	
<b>Pictures :</b> 	
<b>Technical comments :</b> * (function of thickness, ...) <ul style="list-style-type: none"> <li>• Dimensions : length : 2 to 8 m, width : 1000 to 1200 mm, thickness : 25 to 150 mm</li> <li>• Loading resistance : 40 to 500 Kg/m<sup>2</sup>. Weight of panels equipped with steel supports 0,50 mm : 8,60 to 13,85 Kg/m<sup>2</sup>. Dimensional stability : 0,5 - 1,0% (Uniplast Projekt 517) from -25 °C to +70 °C for 48 hours.</li> <li>• Fire resistance : Category 0 to 2 in conformity with Ministerial Decree of 26 June 1984. Panels can be supplied on demand with special foam, which can obtain a better fire resistance classification in conformity with the norms DIN 4102 (foam B2 - panel B1) or AFNOR (M1). Self-extinguishing polyurethane rigid foam density : 40 ± 4 kg/m<sup>3</sup></li> <li>• Thermal performances: conductivity coefficient : 0,14 to 0,71 W/m.K *</li> <li>• Durability (corrosion) : different treatments :               <ul style="list-style-type: none"> <li>– Nominal thickness of galvanised and prepainted steel support : 0,50 mm (UNI – EN 10143)</li> <li>– Galvanised steel : SENDZIMIR system, in conformity with UNI - EN 10142 and UNI – EN 10147 norms.</li> <li>– Prepainted steel : SENDZIMIR system, with coating of polyester-silicone or PVDF based resins, as well as thermoplastication cat. A.</li> <li>– On demand, coating having special qualities of resistance to corrosion can be supplied.</li> </ul> </li> <li>• Certificates ISO 9002 BVQI</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order : on quotation only</li> <li>• Produced quantity : in France : 300 000 – 600 000 m<sup>2</sup></li> <li>• Market in progression over the last five years</li> <li>• Customer perception : quality, number of products</li> </ul>	
<b>Comments :</b>	


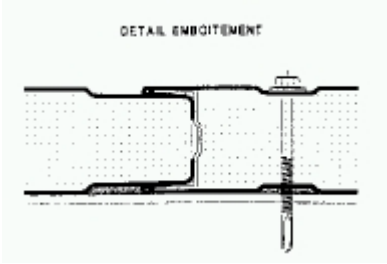
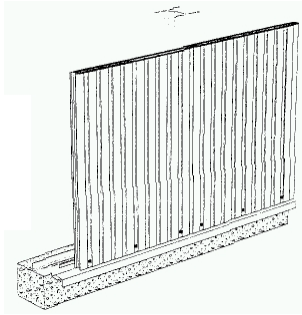
<b>System name:</b> <ul style="list-style-type: none"> <li>○ Sandwich panel</li> <li>○ Ecopanel</li> </ul>	<b>Fabricator address:</b> NV JORIS IDE Hille 174 8750 Zwevezele, Belgique Tel : +32 51 61 07 77 Fax: +32 51 61 07 79 Email : verkoop.belgie@jorisode.be Web site : www.jorisode.be
<b>Application field :</b> Cladding	
<b>Product description :</b> Sandwich panel	
<b>Pictures :</b> <div data-bbox="204 593 1401 963"> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : from 3 to 15 meters</li> <li>• Insulation:           <ul style="list-style-type: none"> <li>– Rigid polyurethane foam (<math>45 \text{ kg/m}^3</math>), Thickness 40 mm ( <math>K=0,5</math>), 60 mm ( <math>K=0,34</math>), 80 mm ( <math>K=0,26</math>),</li> <li>– Rockwool (<math>90\text{-}120 \text{ kg/m}^3</math>), Thickness 60-160 mm, <math>K = 0,66</math> to <math>0,27</math>.</li> <li>– Polystyrene (<math>20 \text{ kg/m}^3</math>), Thickness 60-180 mm, <math>K = 0,55</math> to <math>0,20</math>.</li> </ul> </li> <li>• Durability (corrosion) : galvanised steel (<math>275\text{gr/m}^2</math>), <math>25\mu</math> polyester layer or <math>200\mu</math> plastisol layer</li> <li>• Combustibility class: A0 (rockwool), A1 (polystyrene) and B3 (PUR)</li> <li>• Certificates or standards : Veritas agreement for P35/207/1035 &amp; P25/25/267/1070.</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order : 21,07 € to 30,99 €, linear meter. Plastisol <math>200\mu</math> : +1 €/m<sup>2</sup></li> <li>• Minimum order size 100 m<sup>2</sup></li> </ul>	
<b>Comments :</b>	




<b>System name:</b> Elysée	<b>Fabricator address:</b> PAB Est (Arcelor Group) 10, Rue du bassin de l'industrie - BP25 F-67017 STRASBOURG Tel : 00 33 (3) 88 41 48 75 Fax : 00 33 (3) 88 41 48 04 www.pab.tm.fr
<b>Application field:</b> Sandwich panel cladding ; offices, schools, commercial, industrial, agricultural, ... buildings (heated or not, but not cooled)	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Cladding with sandwich panels "steel sheet - polyurethane foam - steel sheet" (smooth faces)</li> <li>• Some licensed undertaking set up the panels and some precautions must be taken (transport, materials handling, ...)</li> <li>• Spigot longitudinal joints are horizontal, vertical or skew (45°) and the crossing attachments (self-tapping screw, self-drilling screw) are hidden</li> <li>• Galvanized, with zinc-aluminum alloy or stainless steel sheets, eventually prepainted.</li> <li>• Metal, wood or concrete framing.</li> </ul>	
<b>Pictures:</b> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Size : length 1,5m up to 6m ; effective width 1m ; thickness 50mm</li> <li>• Cladding panels don't participate to the building global stability</li> <li>• burning behavior classification : M2</li> <li>• heat exchange coefficient <math>K = 0,52 \text{ W/m}^2 \cdot \text{K}</math></li> <li>• surface density of panels : <math>16 \text{ kg/m}^2</math></li> <li>• CSTB technical assessment 2/98-614 and 2/98-613</li> </ul>	
<b>Marketing information:</b> Reference of 1999 : $1500 \text{ m}^2$ (vertical laying) and $8000 \text{ m}^2$ (horizontal laying)	
<b>Comments:</b> Elysée panels can be bent, curved. This panel is proposed in the STYLTECH system.	


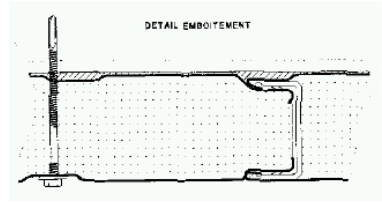


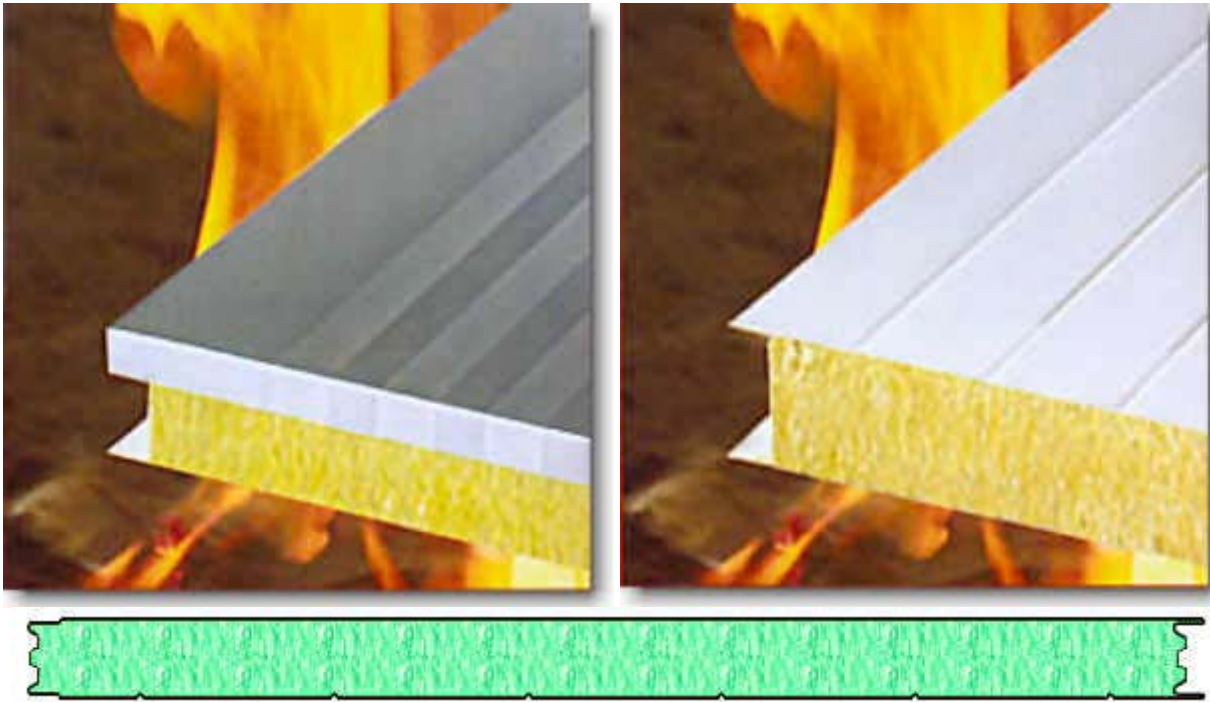
<b>System name:</b> HAINAUT	<b>Fabricator address:</b> PAB Nord (Arcelor Group) 32, Rue Gambetta F- 59264 ONNAING Tel : 00 33 (3) 27 23 90 00 Fax : 00 33 (3) 27 23 90 99 www.pab.tm.fr
<b>Application field:</b> Sandwich panel cladding ; offices, schools, commercial, industrial, agricultural, ... buildings (positive temperature)	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Cladding with sandwich panels "steel sheet - polyurethane foam - steel sheet" (steel sheets are lightly ribbed)</li> <li>• Longitudinal joints are horizontal, vertical or skew</li> <li>• Spigot longitudinal joints are vertical and the crossing attachments (self-drilling screw, self-tapping screw) are hidden</li> <li>• Some licensed undertaking set up the panels and some precautions must be taken (transport, materials handling, ...)</li> <li>• galvanized, with zinc-aluminum alloy or stainless steel sheets (min. thickness : 0,5mm), eventually prepainted.</li> <li>• Metal, wood, concrete or masonry framing.</li> </ul>	
<b>Pictures:</b> <div style="display: flex; justify-content: space-around; align-items: center;">    </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Size : length 2m up to 12m ; effective width 1111mm ; thickness 40, 50, 60 and 80mm</li> <li>• Cladding panels don't participate to the building global stability</li> <li>• air permeability of the longitudinal joint between panels : <math>0,31 \text{ m}^3/\text{h.m}^2</math> à 100Pa</li> <li>• burning behavior classification : M1 or M2 (function of thickness and composition)</li> <li>• heat exchange coefficient Kc and linear loss coefficient k functions of thickness (<math>K_c = 0,53</math> to <math>0,27 \text{ W/m}^2.\text{K}</math> and <math>k = 0,05</math> to <math>0,02 \text{ W/m.K}</math>)</li> <li>• CSTB technical assessment 2/00-808</li> </ul>	
<b>Marketing information:</b> <ul style="list-style-type: none"> <li>• Reference of 2001 : 500.000m<sup>2</sup></li> </ul>	
<b>Comments:</b> <ul style="list-style-type: none"> <li>• HAINAUT LINE panel : external steel sheet very lightly ribbed</li> <li>• This panel is proposed in the STYLTECH system.</li> </ul>	

<b>System name:</b> ISOFRAN	<b>Fabricator address:</b> PAB Montataire (Arcelor Group) Route de St Leu BP 80114 F-60761 MONTATAIRE Cedex Tel : 00 33 (3) 44 55 71 59 Fax : 00 33 (3) 44 55 77 36 www.pab.tm.fr
<b>Application field:</b> Built-up cladding ; new construction or rehabilitation (can be set on a previous concrete or masonry building)	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Composite product made up of two steel skins with a flexible knitted textile core.</li> <li>• Panels are screwed on a vertical or horizontal steel framing ; the crossing attachments are hidden.</li> <li>• Some licensed undertaking set up the panels and some precautions must be taken (transport, materials handling, ...)</li> <li>• galvanized, with zinc-aluminum alloy or stainless steel sheets (min. thickness : 0,5mm), eventually prepainted.</li> </ul>	
<b>Pictures:</b> <div style="display: flex; align-items: center;">     </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Size : length max. 6m (length function of the width) ; width max. 1450mm ; thickness 15,5mm</li> <li>• Cladding panels don't participate to the building global stability</li> <li>• burning behavior classification : M1 – M4 (according to the coating)</li> <li>• surface density of panels : 14kg/m<sup>2</sup> ; density of panels : 890kg/m<sup>3</sup></li> <li>• a complementary insulation can be set between the building and the cladding (ventilated with the air circulating between the insulation and the panel)</li> <li>• sound insulation : 27,9 dB "bruit rose"</li> <li>• CSTB technical assessment 2/01-881</li> </ul>	
<b>Marketing information:</b> Reference : 15.000m <sup>2</sup> on site in 2000 (25.000m <sup>2</sup> since 1997)	
<b>Comments:</b> Isofran panels can be bent, curved.	

<b>System name:</b> ONDATHERM 103	<b>Fabricator address:</b> PAB Est (Arcelor Group) 10, Rue du bassin de l'industrie - BP25 F-67017 STRASBOURG Tel : 00 33 (3) 88 41 48 75 Fax : 00 33 (3) 88 41 48 04 www.pab.tm.fr
<b>Application field:</b> Sandwich panel cladding ; offices, schools, commercial, industrial, agricultural, ... buildings (positive temperature).	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Cladding with sandwich panels "steel sheet - polyurethane foam - steel sheet" (steel sheets are lightly ribbed).</li> <li>• Some licensed undertaking set up the panels and some precautions must be taken (transport, materials handling, ...).</li> <li>• Spigot longitudinal joints are horizontal, vertical or skew and the crossing attachments (self-drilling screw, self-tapping screw, lag screw) are exposed</li> <li>• galvanized, with zinc-aluminum alloy or stainless steel sheets (min. thickness : 0,5mm), eventually prepainted.</li> <li>• Metal, wood, concrete or masonry framing.</li> </ul>	
<b>Pictures:</b> <div style="display: flex; justify-content: space-around; align-items: center;">    </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Size : length 2m up to 17m ; effective width 1m ; thickness 30 up to 120mm</li> <li>• Cladding panels don't participate to the building global stability</li> <li>• air permeability of the longitudinal joint between panels : <math>0,31 \text{ m}^3/\text{h.m}^2</math> à 100Pa</li> <li>• burning behavior classification : M1 or M2 (function of thickness and composition)</li> <li>• heat exchange coefficient <math>K_c</math> and linear loss coefficient <math>k</math> functions of thickness (<math>K_c = 0,73</math> to <math>0,18 \text{ W/m}^2.\text{K}</math> and <math>k = 0,02</math> to <math>0,01 \text{ W/m.K}</math>)</li> <li>• CSTB technical assessment 2/00-819</li> </ul>	
<b>Marketing information:</b> Reference of 2001 : several millions of square meters	
<b>Comments:</b> This panel is proposed in the STYLTECH system.	

<b>System name:</b> ONDATHERM 135	<b>Fabricator address:</b> PAB Est (Arcelor Group) 10, Rue du bassin de l'industrie - BP25 F-67017 STRASBOURG Tel : 00 33 (3) 88 41 48 75 Fax : 00 33 (3) 88 41 48 04 www.pab.tm.fr
<b>Application field:</b> Sandwich panel cladding ; offices, schools, commercial, industrial, agricultural, ... buildings (positive temperature)	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Cladding with sandwich panels "steel sheet - polyurethane foam - steel sheet" (ribbed steel sheets)</li> <li>• Some licensed undertaking set up the panels and some precautions must be taken (transport, materials handling, ...)</li> <li>• Spigot longitudinal joints are horizontal or vertical and the crossing attachments are exposed</li> <li>• galvanized, with zinc-aluminum alloy or stainless steel sheets, eventually prepainted.</li> <li>• Metal, wood or concrete framing.</li> </ul>	
<b>Pictures:</b> <div style="display: flex; justify-content: space-around; align-items: center;">    </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Size : length 2m up to 17m ; effective width 1m ; thickness 70 and 100mm</li> <li>• Cladding panels don't participate to the building global stability</li> <li>• burning behavior classification : M1 or M2 (function of thickness and composition)</li> <li>• heat exchange coefficient <math>K_c = 0,43 \text{ W/m}^2.\text{K}</math> (thickness 70mm) and <math>K_c = 0,27 \text{ W/m}^2.\text{K}</math> (thickness 100mm)</li> <li>• surface density of panels : <math>11\text{kg/m}^2</math> (thickness 70mm) and <math>12 \text{ kg/m}^2</math> (thickness 100mm)</li> <li>• CSTB technical assessment 2/00-797.</li> </ul>	
<b>Marketing information:</b> Reference of 2001 : more than 2000m <sup>2</sup> (horizontal laying)	
<b>Comments:</b>	

<b>System name:</b> ONDATHERM 213	<b>Fabricator address:</b> PAB Nord (Arcelor Group) 32, Rue Gambetta BP62 F - 59264 ONNAING Tel : 00 33 (3) 27 23 90 00 Fax : 00 33 (3) 27 23 90 99 www.pab.tm.fr
<b>Application field:</b> Sandwich panel cladding ; offices, schools, commercial, industrial, agricultural, ... buildings (positive temperature)	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Cladding with sandwich panels "steel sheet - polyurethane foam - steel sheet" (steel sheets are lightly ribbed)</li> <li>• Some licensed undertaking set up the panels and some precautions must be taken (transport, materials handling, ...)</li> <li>• Spigot longitudinal joints are vertical and the crossing attachments (self-drilling screw, self-tapping screw, lag screw) are exposed</li> <li>• galvanized, with zinc-aluminum alloy or stainless steel sheets (min. thickness : 0,5mm), eventually prepainted.</li> <li>• Metal, wood, concrete or masonry framing.</li> </ul>	
<b>Pictures:</b> <div style="display: flex; justify-content: space-around; align-items: center;">   </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Size : length 2m up to 12m ; effective width 1111mm ; thickness 30 up to 80mm</li> <li>• Cladding panels don't participate to the building global stability</li> <li>• air permeability of the longitudinal joint between panels : <math>0,31 \text{ m}^3/\text{h.m}^2</math> à 100Pa</li> <li>• burning behavior classification : M1 or M2 (function of thickness and composition)</li> <li>• heat exchange coefficient <math>K_c</math> and linear loss coefficient <math>k</math> functions of thickness (<math>K_c = 0,7</math> to <math>0,27 \text{ W/m}^2.\text{K}</math> and <math>k = 0,02</math> to <math>0,01 \text{ W/m.K}</math>)</li> <li>• CSTB technical assessment 2/00-820</li> </ul>	
<b>Marketing information:</b> Reference of 2001 : more than one million square meters	
<b>Comments:</b> This panel is proposed in the STYLTECH system.	

<b>System name:</b> Fireproof panel	<b>Fabricator address:</b> PFLAUM & SÖHNE GESMBH Ganglgutstr. 89 A-4050 Traun Email : office@pflaum.co.at Web site : www.pflaum.co.at
<b>Application field :</b> Cladding, partitions, roofs and ceilings	
<b>Product description :</b> The alternative to concrete in F30, F60, F90 and <b>F180</b> . The insulation core of the panel is non combustible acc. fire resistance class A1. An element thickness of 70 mm responds to F30 & W60, a thickness of 100 mm responds to F60 & W90. An element thickness of 120 mm achieves F90. The panels are available with different profile designs and thickness.	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : width :915 mm or 1100 mm. Special construction widths : between 500 mm and 1200 mm. length : standard length at most 10 m. Thickness : 35, 40, 50, 60, 70, 80, 100, 120, 140, 160, 180, 200 mm. At panels of series L and V, 2 mm must be added to the standard thickness because of the profile design.</li> <li>• Fire resistance : behaviour to fire : (thickness/class) 70mm/F30    80mm/F60    120mm/F90    100mm/F180</li> <li>• Acoustic performances : sound insulation : 35 to 60 mm : 34dB, 70 to 200mm : 35dB</li> <li>• Thermal value : K-values : 35 mm 1,19 W/m²K    200 mm 0,24 W/m²K</li> <li>• Durability (corrosion) : resistance class K III / DIN 55 928 part 8. Outer and inner plate: 0,55 mm - 0,75 mm sendzimir galvanised steel acc. DIN 17162, polyester or PVDF coated. Insulation: Mineral fibre plates in a web form, non combustible acc. fire resistance class A1. Sealant: For tongue- and groove joint acc. demands of the fire resistance class. Higher steel thickness upon request. Polyester coating 25 µm, PVDF 80/20, Kynar 500 appr. 25 µm. Colours in stock: RAL 9002, RAL 9006, RAL 9010. Further colours acc. Pflaum-Colour-Spektrum (available upon request). Surface protection : The panels are supplied with a protection foil.</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	



**System name:**

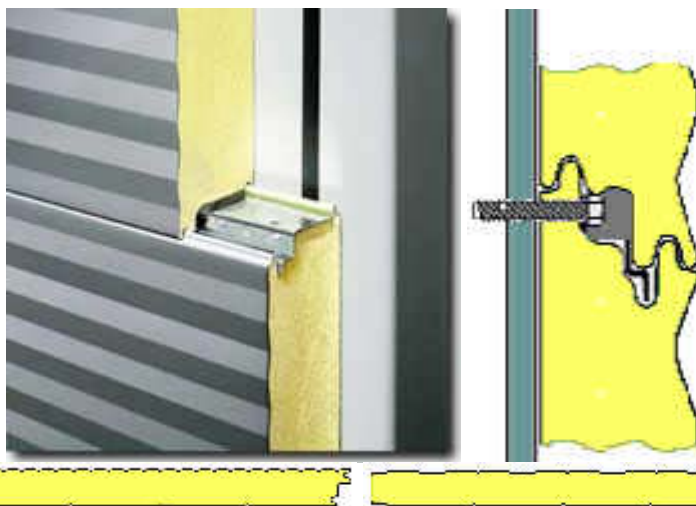
- P type
- W type

**Fabricator address:**

PFLAUM & SÖHNE GESMBH  
 Ganglgutstr. 89  
 A-4050 Traun  
 Email : office@pflaum.co.at  
 Web site : www.pflaum.co.at

**Application field :** Wall and cladding

**Product description :** Sandwich panel

**Pictures :****Technical comments :**

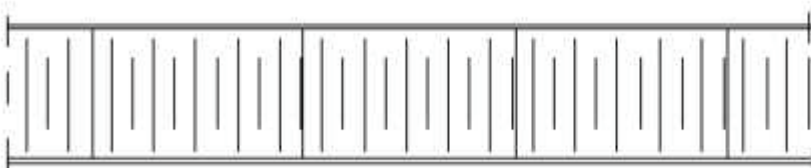
- Dimensions : width : 915 mm (series W+P), 610 mm - 915 mm (series P) with invisible fixation upon request ; Thickness : series W: 35 mm - 120 mm, series P: 50 mm - 120 mm ; Length : at most 10 m, special lengths upon request
- Fire resistance : the Pflaum sandwich panels are hardly flammable / hardly combustible and respond to building material class B1. Because of the missing air the fire isn't transmitted neither in vertical nor in horizontal direction
- Acoustic performances : sound insulation: >25 dB (at a sheet thickness of 0,55 mm)
- Thermal performances : insulation : the PUR hard foam with steam tight steel sheets on both sides responds to demands acc. DIN 18164 part 1 and DIN 4108. K-values : from 0,64 W/m²K in 35 mm to 0,20 W/m²K in 120 mm. Diffusion of vapour through the cover shells of the Pflaum panels is not possible
- Certificates :

Product	Certificate no.	Designation	Authority	Country
sandwich panel	3372/93	B1-, Tr1-certificate	IBS Linz	Austria
sandwich panel	Z-10.4-177	German approval for building materials	DIfB Berlin	Germany
sandwich panel	2/96-477	Avis Technique Hor.	CSTB (F)	France
sandwich panel	2/96-478	Avis Technique Ver.	CSTB (F)	France
sandwich panel	AT-15-2691/97	Polish approval	ITB Warschau (P)	Poland, Czech, Hungary, Rumania ,Russia
sandwich panel	C1-97-0102	Czech approval	VUPS Prag (CZ)	Poland, Czech, Hungary, Rumania ,Russia
sandwich panel	893 055	incombustibility	Pavus (CZ)	Poland, Czech, Hungary, Rumania ,Russia
sandwich panel	002-02/575	Romanian approval	Lab. Centr.	Poland, Czech, Hungary, Rumania ,Russia
sandwich panel	A-959-1998	Hungarian approval	EMI Budapest (H)	Poland, Czech, Hungary, Rumania ,Russia
sandwich panel	AT.9001.1.4.0327	Russian approval	FZS Moskau	Poland, Czech, Hungary, Rumania ,Russia

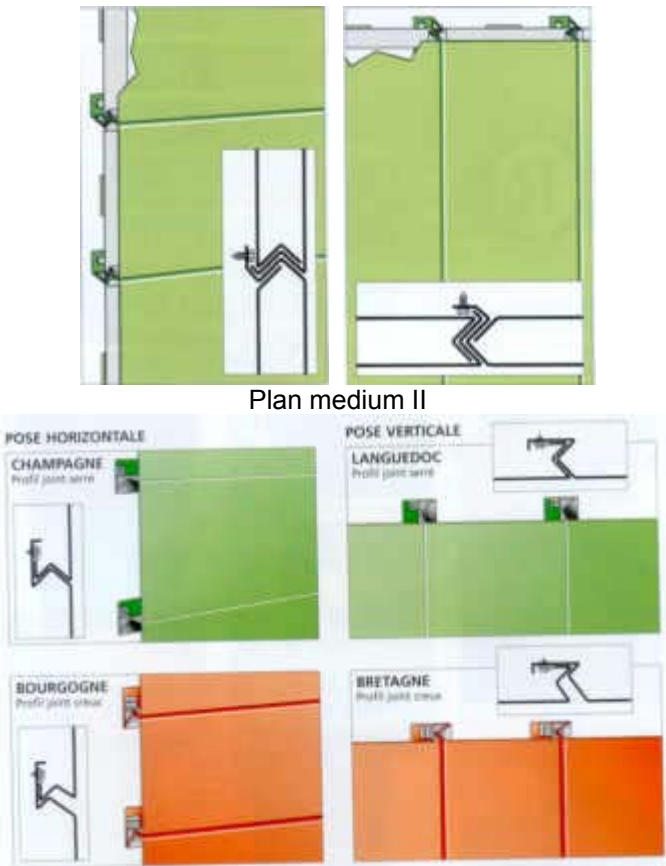
**Marketing information :****Comments :**


<b>System name:</b> <ul style="list-style-type: none"> <li>○ Hoesch Isowand</li> <li>○ Hoesch Isowelle</li> <li>○ Hoesch Isorock</li> </ul>	<b>Fabricator address:</b> PLANNJA AB 69 High Street, Maidenhead, Berkshire SL6 1JX UK Tel : +44 (0)1628 637313 Fax : +44 (0)1628 674940 Email : <a href="mailto:enquire@plannja.co.uk">enquire@plannja.co.uk</a> Web site : <a href="http://www.plannja.com">www.plannja.com</a> <a href="http://www.plannja.co.uk">www.plannja.co.uk</a>
<b>Application field :</b> Cladding and roof	
<b>Product description :</b> Sandwich panels	
<b>Pictures :</b> <div style="text-align: center;"> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>All Hoesch panels are manufactured from Galfan® - a special zinc, aluminium alloy galvanised steel sheet which has superior properties to conventional zinc galvanised sheet. The layer thickness on each side is 255 g/m<sup>2</sup>.</li> </ul> <div style="border: 1px solid black; width: 350px; height: 150px; margin: 10px auto; position: relative;"> <div style="position: absolute; top: 10px; left: 10px; width: 100px; height: 80px; background-color: red;"></div> <div style="position: absolute; top: 50px; left: 20px; width: 150px; height: 80px; background-color: blue;"></div> <div style="position: absolute; top: 50px; left: 300px; width: 80px; height: 60px; background-color: green; border-radius: 50%;"></div> </div> <ul style="list-style-type: none"> <li>PVF<sup>2</sup> KYNAR 500® - a high quality two part paint system containing 70% PVF<sup>2</sup> resin applied to a nominal dry film thickness of 25 microns including primer. PVF<sup>2</sup> KYNAR 500 is accepted as providing the longest aesthetic life of any paint system currently available.</li> <li>A technically advanced coating system consisting of a bonded polyvinylflouride film TEDLAR, PLATAL® applied to a thickness of 40 microns over a 10 µm primer.</li> <li>Hoesch isorock® has been specially designed to provide fire protection. The panel is available non-combustible (NB) and fire resistant to DIN4102</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> Ecosta	<b>Fabricator address:</b> PSI Panneaux Sandwich Isosta 19 Rue de l'Industrie F-89100 SENS Tel : 03.86.83.44.44 Fax : 03.86.83.44.40 Email : info@psi-isosta.fr Web site : www.isosta.fr
<b>Application field :</b> Cladding	
<b>Product description :</b> Sandwich panel. A filler block of the type "TIGHT", from "CB-E" family, with multiple walls	
<b>Pictures :</b> <div data-bbox="609 577 1058 1182" data-label="Image"> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : width : 1200, vertical cladding</li> <li>• Fire resistance : no particular fire resistance : M1 class</li> <li>• Thermal performance : high thermal performance due to styrofoam insulator</li> <li>• Acoustic performance : no required acoustic performances</li> <li>• Durability (corrosion) : laquer layer</li> <li>• Certificates or standards : "Avis Technique C.S.T.B n° 2/99-731"</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order : on quotation only</li> </ul>	
<b>Comments :</b>	

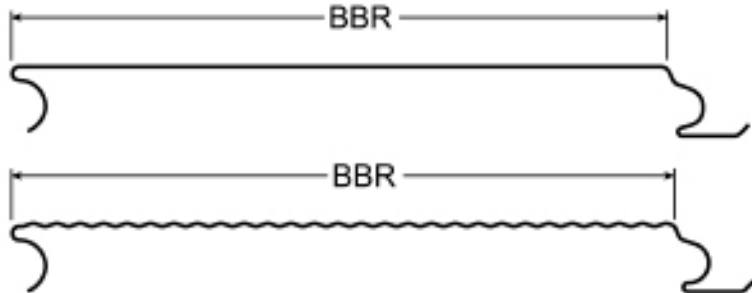
<b>System name:</b> RANNILA Panel	<b>Fabricator address:</b> RANNILA STEEL OY Kalkkimäentie 1 FI-62800 VIMPELI Tel : +358 20 477 17 Fax : +358 20 477 7700 Email : timo.koivisto@rannila.com Web site : www.rannila.com																														
<b>Application field :</b> Cladding																															
<b>Product description :</b> Rannila Panel fulfils the requirements of class I. In class I the core consists solely of laminated mineral wool, with the mineral fibres positioned at right angles to the panel faces. The load bearing capability is mainly based on the performance of the composite structure. Special mineral wool, so called structural mineral wool, is used as the core material (Rock wool SWP 50 N and glass wool OL-P-80).																															
<b>Pictures :</b>																															
<b>Technical comments :</b> <ul style="list-style-type: none"><li>• Dimensions : length (max) : 1200 mm ; width : 1200 mm ; thickness class: 80 mm to 200 mm; weight: 15 to 35 kg/m<sup>2</sup></li><li>• Fire resistance : The fire properties of Rannila Panel relating to its fire resistance and material properties have been tested. The panel has a standard approval. The latest standard approval rating can be checked on the Internet through Rannila's web site or from Rannila's technical support department. The table below shows the fire resistance properties of Rannila Panel by panel type, when used as firewall:</li></ul>																															
<table><tr><th>Class/ thickness</th><th>80</th><th>100</th><th>125</th><th>150</th><th>200</th></tr><tr><td>E130</td><td>R50 4.0 m</td><td>R50 and G80 6.0 m, 4.0 m</td><td>R50 and G80 6.0 m, 4.0 m</td><td>R50 and G80 6.0 m, 6.0 m</td><td>R50 and G80 6.0 m, 6.0 m</td></tr><tr><td>E160</td><td>R50 4.0 m</td><td>R50 and G80<sup>1)</sup> 6.0 m, 4.0 m</td><td>R50 and G80<sup>2)</sup> 6.0 m, 4.0 m</td><td>R50 and G80 6.0 m, 6.0 m</td><td>R50 and G80 6.0 m, 6.0 m</td></tr><tr><td>E190</td><td></td><td></td><td>R50 6.0 m</td><td>R50 6.0 m</td><td>R50 6.0 m</td></tr><tr><td>E1120</td><td></td><td></td><td>R50 6.0 m</td><td>R50 6.0 m</td><td>R50 6.0 m</td></tr></table> <p>Fire resistance class - Thickness class</p>		Class/ thickness	80	100	125	150	200	E130	R50 4.0 m	R50 and G80 6.0 m, 4.0 m	R50 and G80 6.0 m, 4.0 m	R50 and G80 6.0 m, 6.0 m	R50 and G80 6.0 m, 6.0 m	E160	R50 4.0 m	R50 and G80 <sup>1)</sup> 6.0 m, 4.0 m	R50 and G80 <sup>2)</sup> 6.0 m, 4.0 m	R50 and G80 6.0 m, 6.0 m	R50 and G80 6.0 m, 6.0 m	E190			R50 6.0 m	R50 6.0 m	R50 6.0 m	E1120			R50 6.0 m	R50 6.0 m	R50 6.0 m
Class/ thickness	80	100	125	150	200																										
E130	R50 4.0 m	R50 and G80 6.0 m, 4.0 m	R50 and G80 6.0 m, 4.0 m	R50 and G80 6.0 m, 6.0 m	R50 and G80 6.0 m, 6.0 m																										
E160	R50 4.0 m	R50 and G80 <sup>1)</sup> 6.0 m, 4.0 m	R50 and G80 <sup>2)</sup> 6.0 m, 4.0 m	R50 and G80 6.0 m, 6.0 m	R50 and G80 6.0 m, 6.0 m																										
E190			R50 6.0 m	R50 6.0 m	R50 6.0 m																										
E1120			R50 6.0 m	R50 6.0 m	R50 6.0 m																										
<ul style="list-style-type: none"><li>• Acoustic performances: Rannila Panel effectively suppresses sound passing through a wall. Its use as a partition wall is a very efficient way of reducing the sound from a factory to the office block. The table below shows airborne noise insulation factor RW (dB) for Rannila Panel walls with different structural thickness:</li></ul>																															
<table><tr><th>Rannila Panel</th><th>Type R50 (dB)</th><th>Type G80 (dB)</th></tr><tr><td>80</td><td>32</td><td>30</td></tr><tr><td>100</td><td>33</td><td>31</td></tr><tr><td>125</td><td>33</td><td>31</td></tr><tr><td>150</td><td>34</td><td>32</td></tr><tr><td>200</td><td>35</td><td>33</td></tr></table>		Rannila Panel	Type R50 (dB)	Type G80 (dB)	80	32	30	100	33	31	125	33	31	150	34	32	200	35	33												
Rannila Panel	Type R50 (dB)	Type G80 (dB)																													
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100	33	31																													
125	33	31																													
150	34	32																													
200	35	33																													
<ul style="list-style-type: none"><li>• Thermal performances: The Rannila Panel wall structure has a thermal insulation capacity according following tables:</li></ul>																															
<table><tr><th>Type Rannila Panel</th><th>Thickness class (mm)</th><th>U-value W (m<sup>2</sup> K)</th></tr><tr><td>80 R50</td><td>80</td><td>0.50</td></tr><tr><td>100 R50</td><td>100</td><td>0.43</td></tr><tr><td>125 R50</td><td>125</td><td>0.33</td></tr><tr><td>150 R50</td><td>150</td><td>0.28</td></tr><tr><td>200 R50</td><td>200</td><td>0.21</td></tr></table>		Type Rannila Panel	Thickness class (mm)	U-value W (m <sup>2</sup> K)	80 R50	80	0.50	100 R50	100	0.43	125 R50	125	0.33	150 R50	150	0.28	200 R50	200	0.21												
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125 R50	125	0.33																													
150 R50	150	0.28																													
200 R50	200	0.21																													
<ul style="list-style-type: none"><li>• Certificates: ISO 9001 quality system standard</li></ul>																															
<b>Marketing information :</b>																															
<b>Comments :</b>																															

#### 4.2.2. Cassettes


<b>System name:</b> <ul style="list-style-type: none"> <li>○ Plan Medium II</li> <li>○ Plan de l'Infini</li> </ul>	<b>Fabricator address:</b> AFCA 26, rue de l'étang BP 27 F-54110 LANEUVILLE-DEVANT-NANCY Tel : 03 83 26 18 30 Fax : 03 83 26 19 02 Email : <a href="mailto:info@afca-sa.fr">info@afca-sa.fr</a> Web site : <a href="http://www.afca-sa.fr">www.afca-sa.fr</a>
<b>Application field :</b> Cladding	
<b>Product description :</b> Steel sheet cassette	
<b>Pictures :</b> <div style="text-align: center;">  <p>Plan medium II</p> <p>Plan de l'infini</p> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Measurements : 200-1000 mm width ; length 8100 mm max</li> <li>• Durability : galvanised steel Z275 &amp; Z350, painted</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order : on quotation (one week to get a quote)</li> <li>• Produced quantity by year : 15 000 m<sup>2</sup>/year . The typical project is 200 – 4 000 m<sup>2</sup></li> </ul>	
<b>Comments :</b>	


<p><b>System name:</b></p> <p>Kalzip Façade systems</p>	<p><b>Fabricator addresses:</b></p> <p>Corus Bausysteme GmbH  August-Horch-Str. 20-22  D-56070 Koblenz  T +49 (0) 2 61/8 91-0  F +49 (0) 2 61/8 20 38</p>
<p><b>Application field:</b></p> <p>Kalzip recessed joint facade flat panel system is fully modular and includes related elements, such as windows, doors, louvres and solar shade, to complete the building facade</p>	
<p><b>Product description:</b> Kalzip modular panel system is a flat aluminium or steel faced, insulated, demountable panel system with vertical aluminium mullions and 16mm vertical and horizontal recessed joints.</p>	
 <p>The images illustrate the Kalzip facade system in various applications. The left image shows a modern building corner with a combination of glass and metal panels. The middle image is a close-up of the panel joint and mullion system, showing the recessed joint and the 'Windsafe Center' logo. The right image shows a large curved facade of a building, demonstrating the system's flexibility in design.</p>	
<p><b>Technical comments:</b></p> <ul style="list-style-type: none"> <li>• Panels, windows, louvres individually removable and a comprehensive range of fully integrated louvre systems</li> <li>• Curved, cranked and corner panel forms</li> <li>• Factory fitted gaskets</li> <li>• Energy efficient. panels achieve current 'u' value allowing for thermal movement, integrity maintained</li> <li>• Lamination technology. optically flat - maximum deviation 1 mm per 3m</li> <li>• Lightweight system. can reduce structural requirements</li> <li>• Overclad - narrow section carrier complete wall - structural box mullion</li> <li>• Passed full CWCT testing P.ENV 13050 &amp; BS 8200 and Quality assured to BS EN ISO 9002: 1994</li> <li>• Tested to 1 hour integrity, 1/2 hour insulation. (Isocore(r) panels only)</li> <li>• Tested to BS EN ISO 140-3: 1995 and BS 5821: Part 3: 1984 - weighted sound reduction 27dB-41 dB</li> <li>• Polyester. plastisol &amp; PVdF coil-coatings with polyester, powder post-coatings</li> <li>• Anodised finish</li> <li>• 1500 x 3600 max panel sizes (steel) and 1500 x 3000 max panel sizes (aluminium)</li> <li>• Thermally broken windows and panels</li> </ul>	
<p><b>Marketing information:</b></p>	
<p><b>Comments:</b></p>	

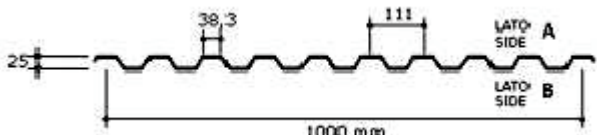
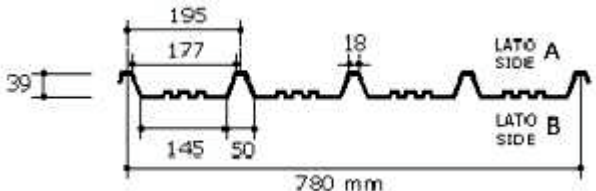




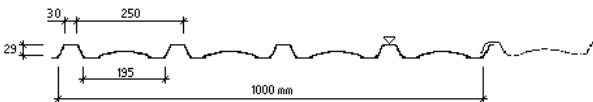
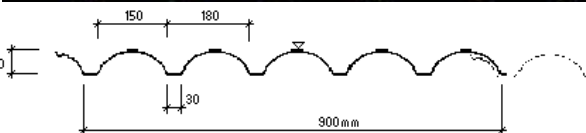


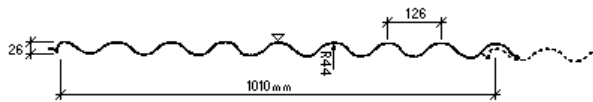
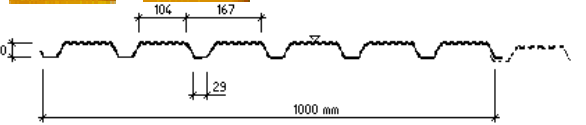
<b>System name:</b> Linear facade system	<b>Fabricator address:</b> PFLAUM & SÖHNE GESMBH Ganglgutstr. 89 A-4050 Traun Email : office@pflaum.co.at Web site : www.pflaum.co.at																									
<b>Application field :</b> Cladding																										
<b>Product description :</b> Steel sheet cassette																										
<b>Pictures :</b> 																										
<b>Technical comments :</b> <ul style="list-style-type: none"><li>• Dimensions : width : 200 mm and 300 mm, special widths : 200 mm - 400 mm ; Colours in stock: RAL 9002, 9006, 9010. Further colours are to be taken from Pflaum-Colour-Spectrum. Horizontal, vertical or diagonal fixation, on substructure or directly. Length: Upon request, recommended maximum length: 14 m. Surcharge for sublenghts under 1,0 m.</li><li>• Fire resistance : behaviour to fire : Acc. OENORM B 3800 and DIN 4102 part 1 and 4 non combustible materials of class A.</li><li>• Thermal performances : insulation : the structure of the system enables the insertion of any thermal insulation materials without problems.</li><li>• Durability (corrosion) : corrosion resistance class KIII / DIN 55 928 part 8</li><li>• Moisture resistance : cross section of ventilation : Acc. OENORM B 2219 the free vertical cross-section of ventilation is 200 cm²/m at least and 500cm²/m at most. The moisture dries without problems if the Pflaum modular strip is used.</li><li>• Certificates :</li></ul>																										
<table><tr><th>Product</th><th>Certificate no.</th><th>Designation</th><th>Authority</th><th>Country</th></tr><tr><td>linear element</td><td>Z-2113/95</td><td>Polish approval</td><td>ITB Warschau (P)</td><td>Poland, Czech, Hungary, Rumania ,Russia</td></tr><tr><td>linear element</td><td>C-99-102</td><td>Czech approval</td><td>VUPS Prag (CZ)</td><td>Poland, Czech, Hungary, Rumania ,Russia</td></tr><tr><td>linear element</td><td>002-02/611</td><td>Romanian approval</td><td>Lab. Centr.</td><td>Poland, Czech, Hungary, Rumania ,Russia</td></tr><tr><td>linear element</td><td>A-959-1998</td><td>Hungarian approval</td><td>EMI Budapest (H)</td><td>Poland, Czech, Hungary, Rumania ,Russia</td></tr></table>	Product	Certificate no.	Designation	Authority	Country	linear element	Z-2113/95	Polish approval	ITB Warschau (P)	Poland, Czech, Hungary, Rumania ,Russia	linear element	C-99-102	Czech approval	VUPS Prag (CZ)	Poland, Czech, Hungary, Rumania ,Russia	linear element	002-02/611	Romanian approval	Lab. Centr.	Poland, Czech, Hungary, Rumania ,Russia	linear element	A-959-1998	Hungarian approval	EMI Budapest (H)	Poland, Czech, Hungary, Rumania ,Russia	
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linear element	002-02/611	Romanian approval	Lab. Centr.	Poland, Czech, Hungary, Rumania ,Russia																						
linear element	A-959-1998	Hungarian approval	EMI Budapest (H)	Poland, Czech, Hungary, Rumania ,Russia																						
<b>Marketing information :</b>																										
<b>Comments :</b>																										

#### 4.2.3. Corrugated steel sheets and insulated corrugated steel sheets

<b>System name:</b> <ul style="list-style-type: none"> <li>○ BATIBAC</li> <li>○ BATIREGUL</li> </ul>	<b>Fabricator address:</b> BATIROC Avenue Jean Monet - Z.I. 54920 VILLERS- LA- MONTAGNE Tel : 03 82 44 04 08 Fax : 03 82 26 13 43 Email : <a href="mailto:batiroc@batiroc.fr">batiroc@batiroc.fr</a> Web site : <a href="http://www.batiroc.fr">www.batiroc.fr</a>
<b>Application field :</b> Cladding and roof	
<b>Product description :</b> Steel sheet	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions: length : 1 m, width : 25, 35 or 45 mm</li> <li>• Loading resistance : 2,5 – 3 m span</li> <li>• Fire resistance: M0</li> <li>• Durability (corrosion) : galvanised steel, lacquer. More optional layers</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Produced quantity: 1 000 000 m<sup>2</sup></li> <li>• Price order: on quotation only</li> </ul>	
<b>Comments :</b>	

<b>System name:</b> BATITHERM	<b>Fabricator address:</b> BATIROC Avenue Jean Monet - Z.I. 54920 VILLERS- LA- MONTAGNE Tel : 03 82 44 04 08 Fax : 03 82 26 13 43 Email : <a href="mailto:batiroc@batiroc.fr">batiroc@batiroc.fr</a> Web site : <a href="http://www.batiroc.fr">www.batiroc.fr</a>
<b>Application field :</b> Cladding and roof	
<b>Product description :</b> Insulated steel sheet	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : length : 1 m, width : 80 mm</li> <li>• Loading resistance : 2,5 – 3 m span</li> <li>• Fire resistance : M1</li> <li>• Durability (corrosion) : galvanised steel, lacquer. More optional layers</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Produced quantity: 50 000 m<sup>2</sup></li> <li>• Price order: on quotation only</li> </ul>	
<b>Comments :</b>	

<b>System name:</b> <ul style="list-style-type: none"> <li>○ Trapezoidal Sheets</li> <li>○ Trapezoidal curved Sheets</li> </ul>	<b>Fabricator address:</b> FRATELLI RE Via T.Tasso, 3/5 I-20030 BARLASSINA (MI) Tel :+39 0362 565251 Fax : +39 0362 564433 Email : info@refratelli.com Web site : www.refratelli.com
<b>Application field :</b> Cladding and roof	
<b>Product description :</b> For the realisation of Roofs Coverings, Walls, False Ceiling, Alloy-Cement and No-Alloy-Cement Slabs, obtained through coils profiling in: <ul style="list-style-type: none"> <li>• Sendzimir galvanised Steel in accordance with UNI EN 10147</li> <li>• Prepainted galvanised Steel in Coil Coating with a basis of polyester resin, silicon polyester, PVDF, high thickness Multilayer</li> </ul>	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Trapezoidal sheet RGL 25/9</p> </div> <div style="text-align: center;">  <p>Trapezoidal curved sheet RGL 39/4 C</p> </div> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : <ul style="list-style-type: none"> <li>– Trapezoidal Sheets : length : 836 to 1000 mm ; width : 18 to 100 mm</li> <li>– Trapezoidal curved Sheets : length : 780 to 1000 mm ; width : 25 to 55 mm</li> </ul> </li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> GA profiles	<b>Fabricator address:</b> GASELL PROFIL AB Box 7 SE-231 08 ANDERSLÖV, Sweden Tel : +46 410 214 00 Fax : +46 410 216 30 Email : <a href="mailto:export@gasell.com">export@gasell.com</a> Web site : <a href="http://www.gasell.co.uk">www.gasell.co.uk</a>
<b>Application field :</b> Cladding	
<b>Product description :</b> Corrugated steel sheet. The huge range of profiles are spliced into three categories; Shallow profiles (GA-10-20-22-26-29) from 10 to 29 mm height, Medium profiles (GA 45-48-50-55) and Deep profiles (GA 60-70-118)	
<b>Pictures :</b> <div style="display: flex; flex-wrap: wrap;">         </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : maximum sheet length : 5 to 18,5 m, width : 600 to 1100 mm, nominal thickness : 0,4 to 1,0 mm.</li> <li>• Loading resistance : Yield point : 250 to 350 N/mm<sup>2</sup>, weight : 0,04 to 0,11 kN/m<sup>2</sup>. Support reaction (width of support 30 mm) : 2,46 to 27,55 kN/m. Bending moment (narrow – wide flange in compression) : 0,21-0,22 to 12,73-10,81 kNm/m. Moment of inertia (narrow – wide flange in compression) : 0,6-0,5 to 253,0-249,0 .10<sup>4</sup>.mm<sup>4</sup>/m. Usual maximum loads (support width = 30 mm) : 17,55 kN/m<sup>2</sup> with two supports 43,87 with three supports.</li> <li>• Certificates and standards : Sheet material is structural steel hot-dip zinc coated, Z275 according to European Standard EN 10147. Standard approval certificate issued by the National Board of Housing Building and Planning, Sweden.</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order : GA30E-105 : 6,7 to 8,4 euros/m<sup>2</sup> depending on layer (polyester or PVF Kynar) ; GA45-30 : 6,6 to 8,6 euros/m<sup>2</sup> depending on layer (polyester or PVF Kynar)</li> </ul>	
<b>Comments :</b>	

<b>System name:</b> UltraSHEET®	<b>Fabricator address:</b> HADLEY GROUP PO Box 92 Downing Street Smethwick West Midlands B66 2PA UK Tel : +44 121 555 1300 Fax : +44 121 555 1301 Email : <a href="mailto:info@hadleygroup.co.uk">info@hadleygroup.co.uk</a> Web site : <a href="http://www.hadleygroup.co.uk">www.hadleygroup.co.uk</a>
<b>Application field :</b> Cladding and roof	
<b>Product description :</b> Corrugated coated steel sheet	
<b>Pictures :</b> <div data-bbox="236 613 820 1048" data-label="Image"> </div> <div data-bbox="844 624 1283 1059" data-label="Image"> </div>	
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b>	



**System name:**

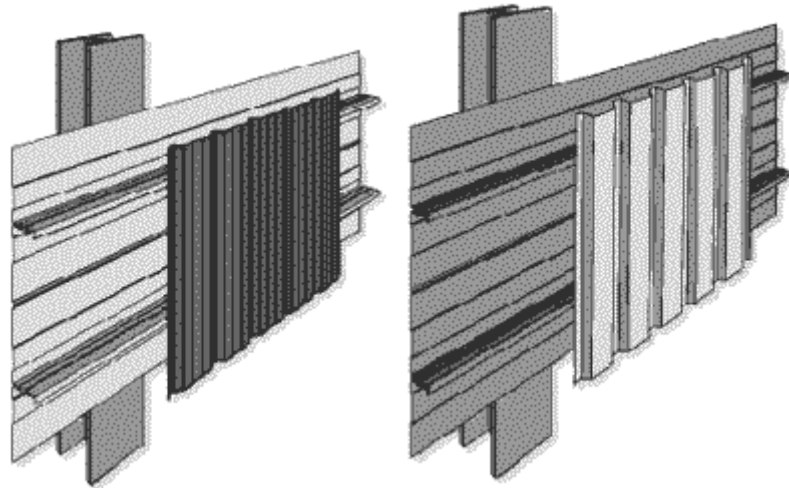
- IB wall cladding
- IC interior

**Fabricator address:**

ISOCAB  
Treurnietstraat 10  
B-8531 Harelbeke – Bavikhove  
Tel : +32 (0)56 73 43 11  
Fax : +32 (0)56 73 43 22  
Email : Isocab@Isocab.be  
Web site : www.isocab.be

**Application field :** Wall and roof cladding

**Product description :** Steel sheets panels

**Pictures :****Technical comments :**

- Dimensions : the profiles can be delivered per 10 mm with a minimum length of 2000 mm and a maximum length of 18 000 mm. See table below for details

	Height (mm)	Module (mm)	Profiles	With R	Without R
IB 24.1100/5R	24	1100	5x140	x	-
IB 31.1035/S	31	1035	5x118	-	x
IB 35.1000/5	35	1000	5x118	x	-
IB 39.1000/4(R)	39	1000	4x180	x	x
IB 40.915/5(R)	40	915	5x119	x	x

	Height (mm)	Module (mm)	Profile	With R	Option P
IC 70.500/1R	70	500	1	x	x
IC 90.500/1R	90	500	1	x	x
IC 95.400/1R	95	400	1	x	x
IC 95.450/1R	95	450	1	x	x
IC 100.600/1R	100	600	1	x	x

R = brace

R = brace  
P = perforated ø 5mm

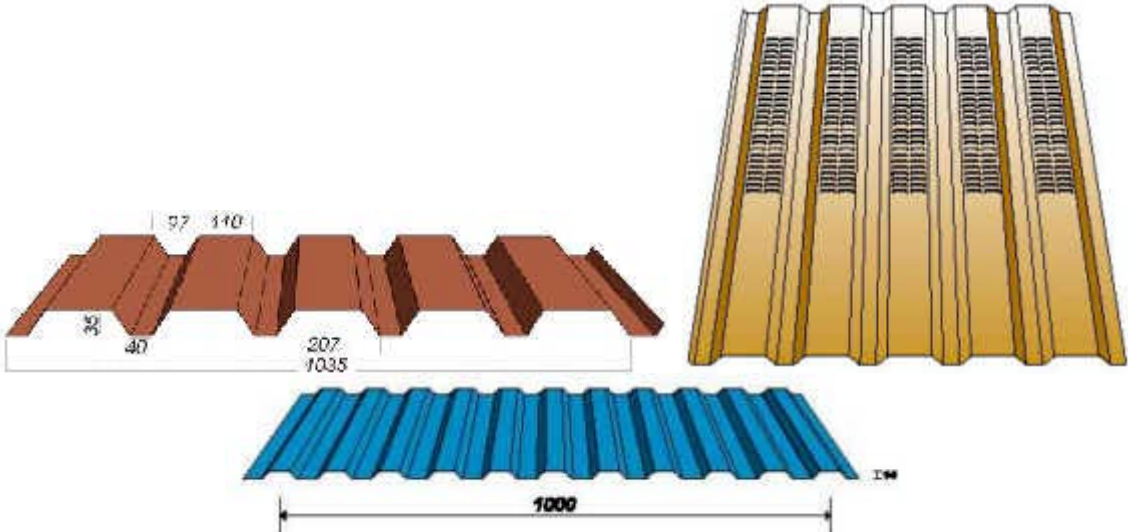
- Durability (corrosion) : the basic material is always galvanised steel Z 275. As finishing the customer can make a choice between : polyester 15 micron, polyester 25 micron, plastisol 100 micron, plastisol 200 micron, PVDF 25 micron different thickness and colours (optional).
- Loading resistance : 0 to 4 m span
- Fire resistance : M0
- Certificates or standards : conform to DTU specifications (Veritas agreement).

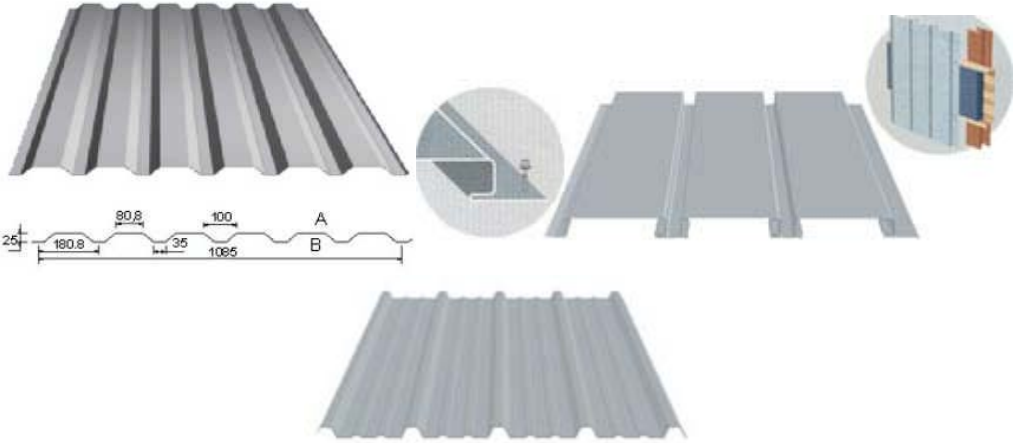
**Marketing information :**


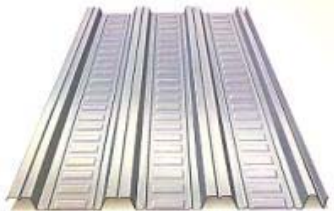

- Produced quantity by year : 2 production factories / success story : Toyota Valenciennes with 60 000 m<sup>2</sup>
- Price : on quotation
- Market : 2002 was better than 2003. Bad prevision for 2004. Bad results due to global situation of construction
- Society position : market parts in progression in France and for the export.

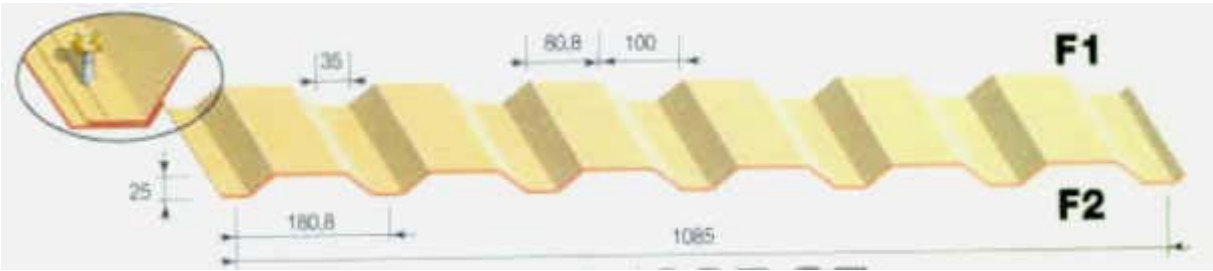
**Comments :**

<b>System name:</b> <ul style="list-style-type: none"> <li>○ E/P 3000</li> <li>○ CT/C 200</li> <li>○ R/W 1000</li> </ul>	<b>Fabricator address:</b> ISOLPACK SpA C.so Vittorio Emanuele, 99 10128 TORINO (ITALIA) Tel : ++39 011 56075.11 Fax : ++39 011 5611713 Email : info@isolpack.com Web site : www.isolpack.com
<b>Application field :</b> Cladding and roof	
<b>Product description :</b> Corrugated steel sheet	
<b>Pictures :</b> <div data-bbox="564 622 943 875" data-label="Image"> </div> <div data-bbox="225 898 1294 1473" data-label="Figure"> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : width up to 1045 mm, length upon request from continuous production process. Thickness: from 0,6 up to 1.5 mm</li> <li>• Steel according to EN 10147 type Fe E 250 G Norm.</li> <li>• Durability (corrosion) : simple hot galvanised through “sendzimir” process, galvanised prepainted or plastified steel; stainless steel. Protective treatments available upon request: polyester coating for outdoors, non toxic prepainting when food is involved, silicon polyester, PVDF, thermoplastic Class A, application of PVC plastic films or other films.</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	









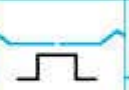








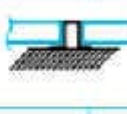


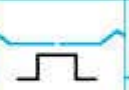








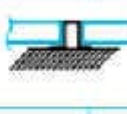


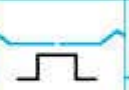








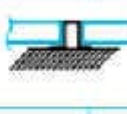

<b>System name:</b> Cladding profil <ul style="list-style-type: none"> <li>○ 1035x30</li> <li>○ 1000x14</li> <li>○ with slots</li> </ul>	<b>Fabricator address:</b> ISOMETALL S.A. Z.I. de la Baraque Fraiture route de La Roche B-6960 MANHAY Tel : 0032 (0) 80 41 81 60 0032 Fax : (0) 80 41 81 61 Email : info@isometall.com Web site : www.isometall.be
<b>Application field :</b> Cladding	
<b>Product description :</b> The profiled sheets proposed are made out of sheet steel galvanised base on standard NF EN 10147, class Fe E 320 G.	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions: width : 1130 mm ; length: from 1,6 m to 14 m</li> <li>• Loading resistance: depending of the product :</li> <li>• Fire resistance : M0 (CSTB test : 66 mn fire resistant in 80 mm, 46 mn in 60 mm, 1h40 in 100mm)</li> <li>• Acoustic performances: high / very high (often sold for acoustic performances)</li> <li>• Durability (corrosion) corrosion treatment by lacquer</li> <li>• Certificates or standard: ISO 9000 quality system</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Produced quantity: 2100 000 m<sup>2</sup>/year</li> <li>• Price order : on quotation only</li> <li>• Construction cost : same costs as a traditional sandwich panel</li> <li>• Demolition costs / recycling costs : 100% recyclable ; using specialised societies for recycling</li> <li>• Market information: in constant progression, high impact of legislation on this progression.</li> <li>• Customer perception: appreciated products, especially for security (fire resistance) and acoustic performances.</li> </ul>	
<b>Comments :</b>	

<b>System name:</b> <ul style="list-style-type: none"> <li>○ P19.155.1090</li> <li>○ P25.267.1070</li> <li>○ P33.250.1000</li> <li>○ P35.207.1035</li> <li>○ P90.500</li> <li>○ Plank profile</li> </ul>	<b>Fabricator address:</b> NV JORIS IDE Hille 174 8750 Zwevezele, Belgique Tel : +32 51 61 07 77 Fax: +32 51 61 07 79 Email : verkoop.belgie@jorisode.be Web site : www.jorisode.be
<b>Application field :</b> Cladding	
<b>Product description :</b> Corrugated steel sheet	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : length from 1 up to 13 meters, steel thickness from 0,5 to 0,75 mm</li> <li>• Durability (corrosion) : galvanised steel (275gr/m<sup>2</sup>), 25μ polyester layer or 200μ plastisol layer</li> <li>• Certificates or standards : Veritas agreement for P35/207/1035 &amp; P25/25/267/1070.</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order : 5,25 € to 5,85 €, linear meter</li> </ul>	
<b>Comments :</b>	

<b>System name:</b> <ul style="list-style-type: none"> <li>○ PS 20B</li> <li>○ PS 30/30V</li> <li>○ PS 40</li> <li>○ PS 45 F</li> <li>○ PS 60</li> </ul>	<b>Fabricator address:</b> PLANNJA AB 69 High Street, Maidenhead, Berkshire SL6 1JX UK Tel : +44 (0)1628 637313 Fax : +44 (0)1628 674940 Email : <a href="mailto:enquire@plannja.co.uk">enquire@plannja.co.uk</a> Web site : <a href="http://www.plannja.com">www.plannja.com</a> <a href="http://www.plannja.co.uk">www.plannja.co.uk</a>
<b>Application field :</b> Cladding and roof	
<b>Product description :</b> The Plannja cladding sheeting profiles have 15 different profiles with various coatings, colours and designs.	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: center; text-align: center;">    </div> <div style="display: flex; justify-content: space-around; align-items: center; text-align: center;"> <span>PS 20B</span> <span>PS 40</span> <span>PS 60</span> </div>	
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> Bardage : <ul style="list-style-type: none"> <li>○ Vertical et horizontal 1085.25</li> <li>○ Vertical et horizontal 1035.25</li> <li>○ Vertical et horizontal 1000.37</li> <li>○ Vertical et horizontal 1000.46</li> <li>○ Vertical creux 1000.45</li> <li>○ Vertical 915.40</li> <li>○ Vertical 840.25</li> <li>○ Vertical et horizontal 930.44</li> <li>○ Vertical creux 1070.25</li> <li>○ Vertical relief 1070.25</li> </ul>	<b>Fabricator address:</b> TECTONIA (Groupe Corus) 22, avenue Jean de Beco F-59720 LOUVROIL Tel : 03.27.53.05.20 Fax : 03.27.53.05.21 (M. Laurent) Web site : <a href="http://www.tectonia.com">www.tectonia.com</a>
<b>Application field :</b> Cladding	
<b>Product description :</b> Corrugated steel sheet	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : 840 to 1085 mm ; length : 1,8 to 14 m</li> <li>• Loading resistance (pan) : 1,25 to 3,40 m</li> <li>• Durability (corrosion) : galvanised steel, painted</li> <li>• Fire resistance : M0 (CSTB test)</li> <li>• Certificates or standards : ISO 9002</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Produced quantity : 30 000 tons/year</li> <li>• Price order : on quotation ; jobbing only</li> <li>• Market in progression</li> </ul>	
<b>Comments :</b>	



<b>System name:</b> Gamme Outremer : <ul style="list-style-type: none"><li>○ Neptune</li><li>○ Ulysse</li><li>○ Poséïdon</li><li>○ Triton</li><li>○ Martinique</li><li>○ Caraïbes</li></ul>	<b>Fabricator address:</b> TOLARTOIS Parc d'activités Washington Avenue de la ferme du roy BP 213 F-62404 BÉTHUNE CEDEX Tel : 33 (0) 3 21 64 75 75 Fax : 33 (0) 3 21 64 75 76 Email : <a href="mailto:contact@tolmega.com">contact@tolmega.com</a> Web site : <a href="http://www.tole-perforee.com">www.tole-perforee.com</a>																																																								
<b>Application field :</b> Wall facing, wall cladding (interior and exterior), ceiling cladding																																																									
<b>Product description :</b> Horizontal or vertical ribs made to specific Dimensions, from galvanised steel, pre-painted steel or stainless steel. Several models even have perforations or vanes between the ribs.																																																									
<b>Pictures :</b> <div><ul style="list-style-type: none"><li>• Sirène </li><li>• Neptune </li><li>• Ulysse </li><li>• Poséïdon </li><li>• Triton </li><li>• Martinique </li><li>• Caraïbe </li></ul></div>																																																									
<b>Technical comments :</b> <ul style="list-style-type: none"><li>• Dimensions : length : up to 6 m. For detail, see table below :</li></ul> <table><tr><th>Rib</th><th>Sirène</th><th>Martinique</th><th>Triton</th><th>Ulysse</th><th>Neptune</th><th>Poseidon</th><th>Caraïbe</th></tr><tr><td>Centre distance between ribs (mm)</td><td>100</td><td>50</td><td>155</td><td>267</td><td>558</td><td>100</td><td>201</td></tr><tr><td>Effective width (mm)</td><td>900</td><td>950</td><td>927</td><td>800</td><td>1076</td><td>800</td><td>1222</td></tr><tr><td>Average weight (Kg/m<sup>2</sup>)</td><td>8,8</td><td>8,4</td><td>8,6</td><td>9,4</td><td>8,5</td><td>12</td><td>8,6</td></tr><tr><td>Covering neighbouring panels width-wise</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>Covering panels end-to-end length-wise</td><td>Vertical rib</td><td></td><td>Horizontal rib</td><td></td><td></td><td></td><td></td></tr><tr><td>Horizontal or vertical rib</td><td>yes</td><td>yes</td><td>yes</td><td>yes</td><td>yes</td><td>yes</td><td>vertical</td></tr></table> <div><ul style="list-style-type: none"><li>♦ these values can be slightly different depending on the material and the thickness used</li><li>♦ real value to take into account when calculating the surface to cover</li><li>♦ galvanised steel DX 51D thickness 1mm</li></ul></div>		Rib	Sirène	Martinique	Triton	Ulysse	Neptune	Poseidon	Caraïbe	Centre distance between ribs (mm)	100	50	155	267	558	100	201	Effective width (mm)	900	950	927	800	1076	800	1222	Average weight (Kg/m <sup>2</sup> )	8,8	8,4	8,6	9,4	8,5	12	8,6	Covering neighbouring panels width-wise								Covering panels end-to-end length-wise	Vertical rib		Horizontal rib					Horizontal or vertical rib	yes	yes	yes	yes	yes	yes	vertical
Rib	Sirène	Martinique	Triton	Ulysse	Neptune	Poseidon	Caraïbe																																																		
Centre distance between ribs (mm)	100	50	155	267	558	100	201																																																		
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Covering neighbouring panels width-wise																																																									
Covering panels end-to-end length-wise	Vertical rib		Horizontal rib																																																						
Horizontal or vertical rib	yes	yes	yes	yes	yes	yes	vertical																																																		
<b>Marketing information :</b> <ul style="list-style-type: none"><li>• Price : on quotation only</li><li>• Produced quantity : 20 000 m2 by year</li><li>• Speed erection : easy to install (5 to 10 % more time to install than traditional cladding). Easier to install with 1m/1m size.</li><li>• customer perception : large choice of products, good adaptability to customer needs (colors and Size).</li></ul>																																																									
<b>Comments :</b> Example: Polyester for exterior 1 or 2 surfaces according to RAL. Pre-painted steel on DX 51D galvanised base: RAL 9010, other RAL colours on request																																																									



### 4.3. Roofing systems

The roof may be divided in two category according to the slope:

- High pitched roofs work only under watershedding conditions
- Low pitched roofs work under waterstanding conditions

Both types of roofs need different measures and design details to insure weathertightness in particular:

The requirements for sealing, but also for structural lightweight framing are not only influenced by the slope itself but by other parameters too such as quantity of rainfall, wind force, resistance to people walking on the roof for maintenance, snow build-up and ice damming at the eaves.

Whatever the slope of the roof and the profiles used, special attention has to be paid to the sealing and the fixing of the panels (one to another) and to the perimeter of the building (wind uplift), the penetrating flashings and the rooflights. Critical points are the valley gutters, especially on high-sloped roofs.

The characteristics of the various roof systems are:



#### Single roof cladding

The profiles of the roofing panels can be categorised as sinusoidal, trapezoidal and ribbed. Steel sheet roofing thickness varies from 0,6 to 0,7mm (according to dead load, insulation load, maintenance load, wind and snow loads).

Roof panels, whatever the profile, can be flat or curved.

There are also roof tile systems, which are sheets that simulate roof tiles. They are produced in a number of different profiles. Some profiles are more difficult to use on a roof with many hips and valleys.

Ready-to-use components, such as hip and corner sheets, sealing strips and chimney pieces are common.

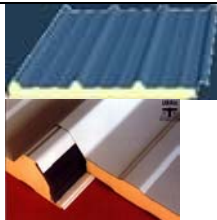
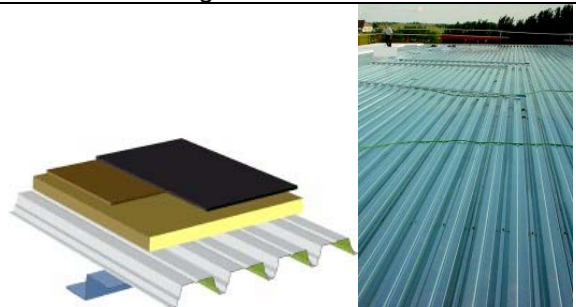
Profiles influence the method and frequency of attachments. The thermal expansion of metal has to be taken into account by using sliding clips or connections and appropriate sealant.

In a double skin roof, the main function of the internal sheet is to support the insulation, although by incorporating suitable perforations it may assist in improving the acoustic properties of the building.

#### Roof decking

Ribbed sheets (flat or curved) are used for flat roofs to support the insulation and the tightness. The choice of the profile depends on the functionality, the thickness of the insulation and the span.

In such arrangements it is important to ensure that the insulation can safely span the troughs between adjacent upper flanges of the corrugations.



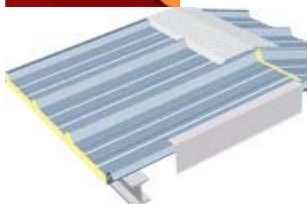
#### Insulated panels, Composite or Sandwich Panels

Prefabricated systems consisting of panels where the insulating material (polyurethane foam or rock wool) is integrated between two metal skins (galvanised and coated). Composite panels are available with traditional type trapezoidal outer skins and through fasteners.


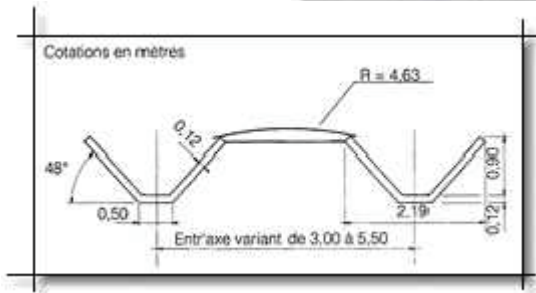
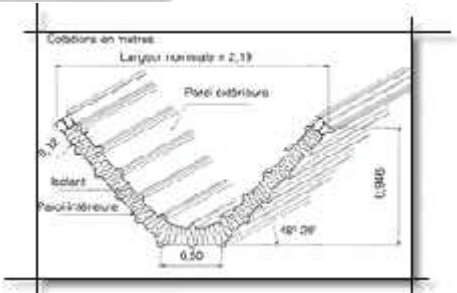
This composite system gives robust stiff panels, with the further benefit of rapid erection since the whole skin is fastened in one operation.


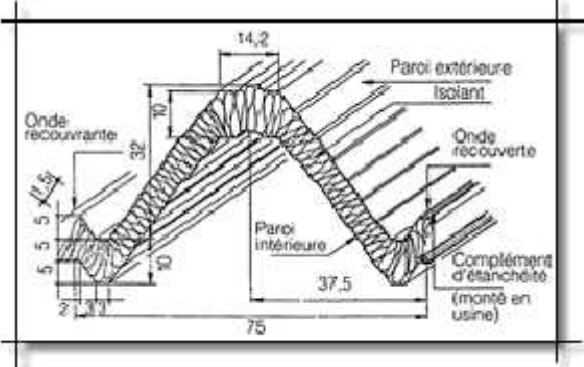
They are suitable for plane or curved roofs.

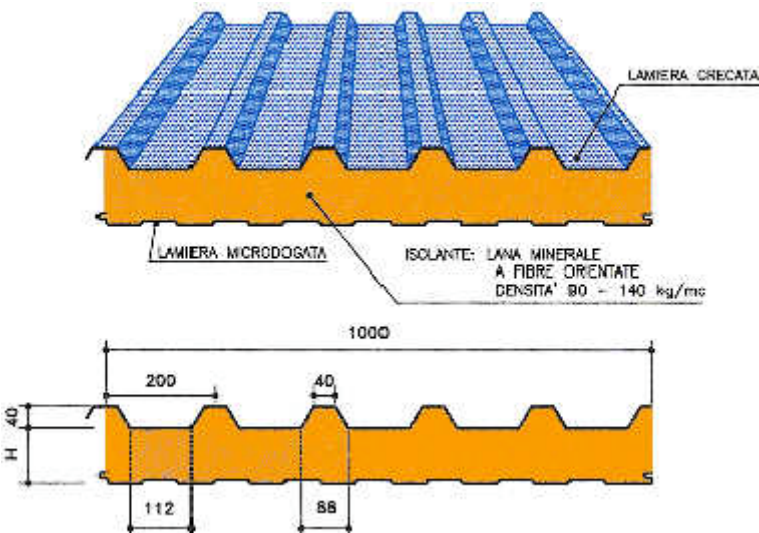
The thickness of the sandwich panel depends on the need of thermal insulation and the span. The fasteners distribution depends on the wind loads, snow loads and the thermal gradient.



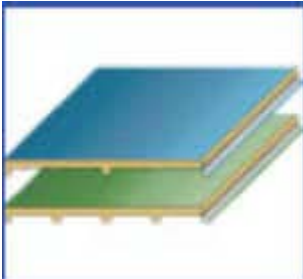
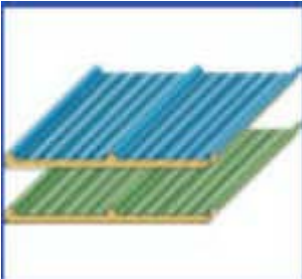
### 4.3.1. Sandwich panels

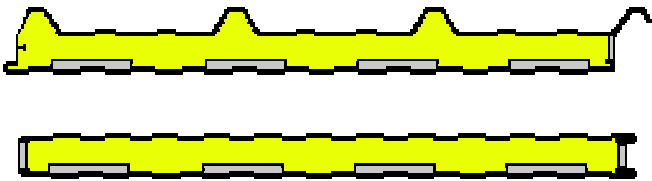
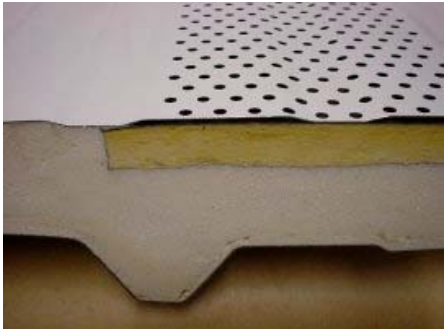
<b>System name:</b> ANGULA	<b>Fabricator address:</b> BATIROC Avenue Jean Monet - Z.I. F-54920 VILLERS- LA- MONTAGNE Tel : 03 82 44 04 08 Fax : 03 82 26 13 43 Email : <a href="mailto:batiroc@batiroc.fr">batiroc@batiroc.fr</a> Web site : <a href="http://www.batiroc.fr">www.batiroc.fr</a>
<b>Application field :</b> Roofs	
<b>Product description :</b> Self-supporting roofs Angula are intended for the construction of buildings of great range : from 15 up to 25 meters. To form a roof, shells are associated with opaque and translucent intercalated curved covers.	
<b>Pictures :</b> <div style="text-align: center;">  </div> <div style="display: flex; justify-content: space-around; align-items: flex-end;">   </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : : length from 15 up to 25 meters, width 2,19 m, axis to axis from 3 to 3,50 m, wave height 0,95 m.</li> <li>• Loading resistance : Self-supporting up to 25 meters</li> <li>• Fire resistance: M0</li> <li>• Thermal performances : 120 mm glass-wool insulator</li> <li>• Durability (corrosion) : galvanised steel, lacquer. More optional layers</li> <li>• Certificates or standards : "Avis technique CSTB"</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Produced quantity: 100 000 m<sup>2</sup>/year</li> <li>• Price order: on quotation only</li> </ul>	
<b>Comments :</b>	

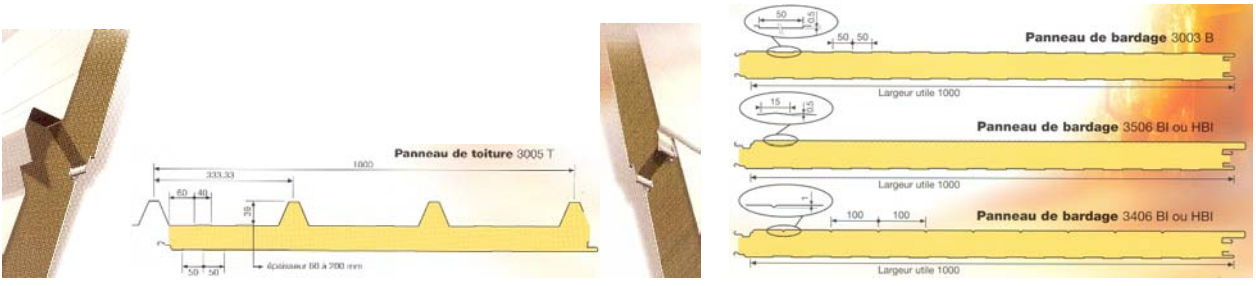
<b>System name:</b> ○ ISOCOQUE	<b>Fabricator address:</b> BATIROC Avenue Jean Monet - Z.I. F-54920 VILLERS- LA- MONTAGNE Tel : 03 82 44 04 08 Fax : 03 82 26 13 43 Email : <a href="mailto:batiroc@batiroc.fr">batiroc@batiroc.fr</a> Web site : <a href="http://www.batiroc.fr">www.batiroc.fr</a>
<b>Application field :</b> Roof	
<p><b>Product description :</b> ISOCOQUE is an insulating roofing element which can reach a 18 meters length without intermediate structure. ISOCOQUE is a roofing element ready to install. It presents, in only one element the following functions: the watertight roofing, the heat insulation, the soundproofing, the ceiling, the structure and the finish. Simple and rapid to install, together assembled Isocoques by covering of their edges form a self-supporting roof laid on a wood, steel or concrete structure.</p>	
<p><b>Pictures :</b></p> <div style="display: flex; align-items: center;">   </div>	
<p><b>Technical comments :</b></p> <ul style="list-style-type: none"> <li>• ISOCOQUE:           <ul style="list-style-type: none"> <li>– Dimensions: length up to 17 meters span, width 0,75 m, wave height 0,32 m.</li> <li>– Loading resistance : self supporting up to 17 meters</li> <li>– Fire resistance: M0</li> <li>– Thermal performances : glass-wool insulator (Isocoque) ; no insulator (Deltabac)</li> <li>– Durability (corrosion) : galvanised steel, lacquer. More optional layers</li> <li>– Certificates or standards : “Avis technique CSTB”</li> </ul> </li> </ul>	
<p><b>Marketing information :</b></p> <ul style="list-style-type: none"> <li>• Produced quantity: 5 000 – 10 000 m<sup>2</sup>/year</li> <li>• Price order: on quotation only</li> </ul>	
<p><b>Comments :</b></p>	

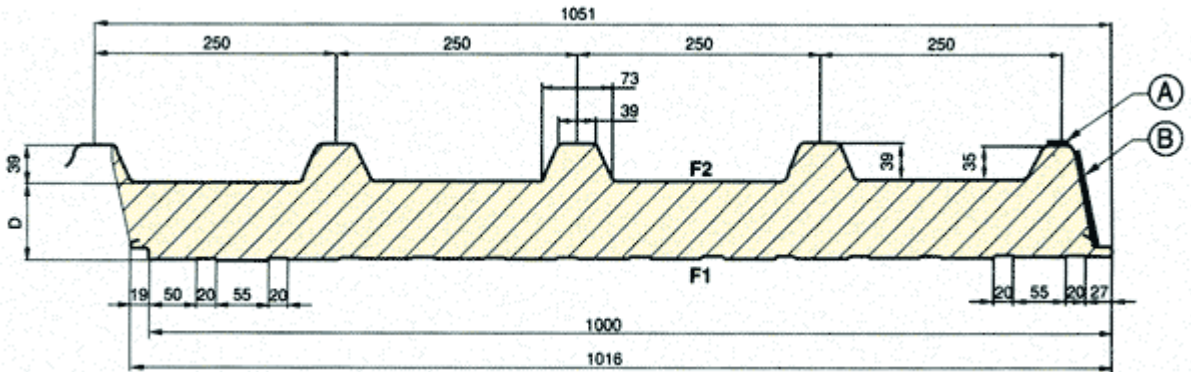
<b>System name:</b> <ul style="list-style-type: none"> <li>○ REPI FIRE</li> <li>○ REPI SOUND</li> </ul>	<b>Fabricator address:</b> FRATELLI RE Via T.Tasso, 3/5 20030 BARLASSINA (MI) Italy Tel : +39 0362 565251 Fax : +39 0362 564433 Email : info@refratelli.com Web site : www.refratelli.com
<b>Application field :</b> Roof	
<b>Product description :</b> <ul style="list-style-type: none"> <li>• The REPI FIRE panels are metallic panels with insulation made of mineral wool fit for the realisation of Roofs Coverings, Walls, Internal Division of industrial and civil building</li> <li>• The REPI SOUND panels are metallic panels with insulation made of mineral wool fit for the realisation of Roofs Coverings, Walls, Internal Division of industrial and civil building</li> </ul>	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : max. length: 10800 mm ; width: 1000 mm</li> <li>• Fire resistance : The REPI FIRE panels present good performance of FIRE RESISTANCE. Submitted to test according to the regulation of the circular 91 of 14.09.61 by authorised institutes, they have obtained classification REI 30 - 45 - 60 - 120 - 180. The REPI FIRE panels are constituted of two trapezoidal or microgrooved metallic supports with interposed insulation of oriented fibre mineral wool which is arranged in fillets perpendicularly to the two metallic supports.</li> <li>• Acoustic performances : The REPI SOUND panel obtains the soundabsorbent power thanks to its typical Perforated Sheet exposed to noise. Acoustic tests have attributed to the REPI SOUND panels values of RW equal to 32dB, 33dB, 35dB, which face the problems concerning noise reduction. In order to increase the soundproofing power, it is possible to produce a monolithic panel supplied with triple sheet, that is to say with a thin metallic sheet between two insulating layers.</li> <li>• Durability (corrosion) : The REPI SOUND panels are made of two trapezoidal, microgrooved or flat metallic supports obtained by cold-process profiling the sheet coils. The materials which are used are : galvanised Steel, prepainted Galvanised Steel or Stainless Steel</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

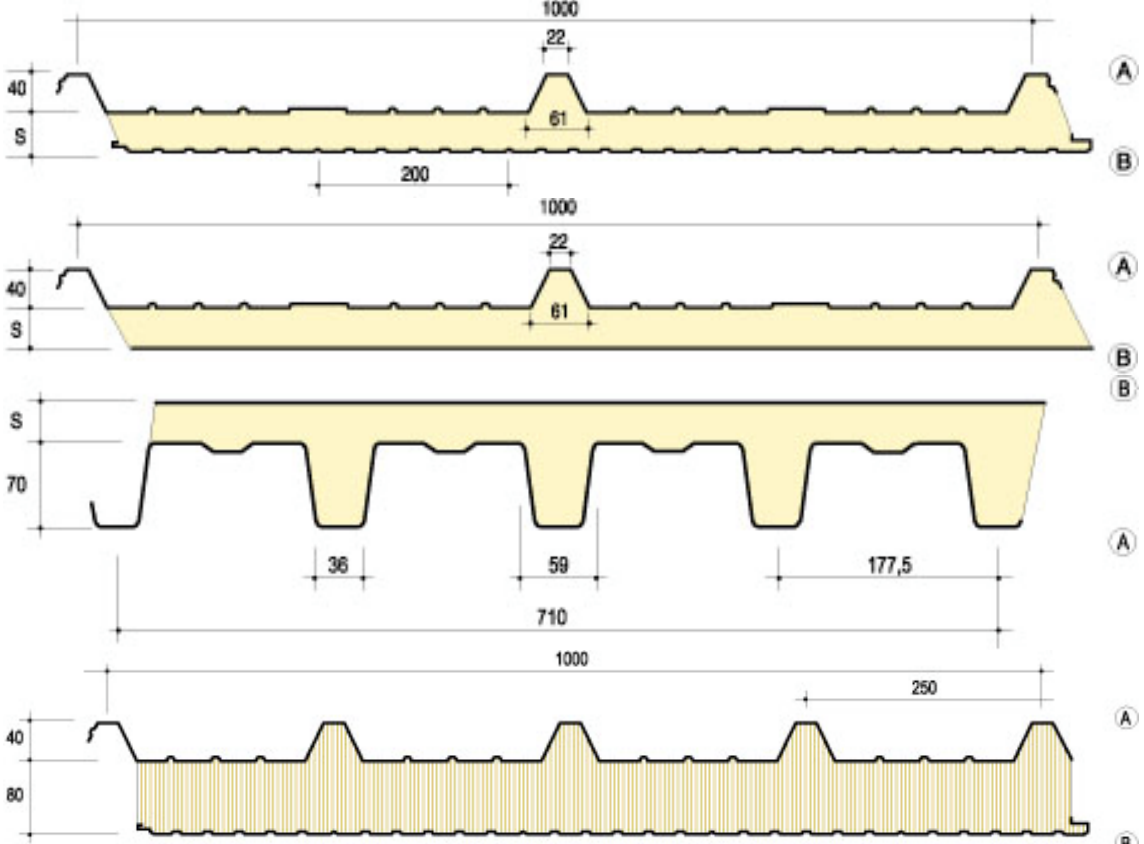


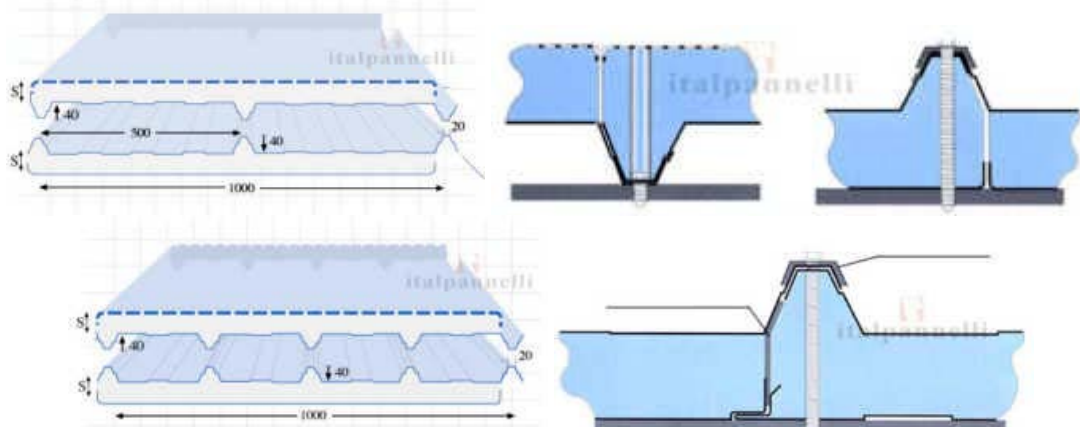
<b>System name:</b> <ul style="list-style-type: none"> <li>○ Deck roofing panels</li> <li>○ Roofing panels</li> </ul>	<b>Fabricator address:</b> GRUPPO MARCEGAGLIA Marcegaglia S.p.A. via Bresciani, 16 I-46040 GAZOLDO IPPOLITI MANTOVA Tel : +39 . 0376 685 1 Fax : +39 . 0376 685 600 Email : info@gruppomarcegaglia.com Web site : www.gruppomarcegaglia.com
<b>Application field :</b> Cladding and roof	
<b>Product description :</b> Sandwich panels	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <span>Deck roofing panels</span> <span>Roofing panels</span> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : thickness min. 0,6 - max. 15 , size min. 500 - max. 12000, width min. 450 - max. 1000, length up to 12000</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> PROMISOL 1001TSA PROMISOL 1003BA	<b>Fabricator address:</b> HAIRONVILLE (Arcelor Group) Parc industriel des Hauts-Sarts B-4040 Herstal Tel : 00 32 (4) 240 67 11 Fax : 00 32 (4) 240 67 10 <a href="http://www.haironville.be">www.haironville.be</a>
<b>Application field:</b> Sandwich panel cladding and roofing ; sportive, industrial, ... buildings	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Cladding with sandwich panels "steel sheet - polyurethane foam - steel sheet" (galvanized steel sheets eventually prepainted – min. thickness : 0,5mm)</li> <li>• Spigot joints are longitudinal</li> <li>• Metal, wood or concrete framing.</li> </ul>	
<b>Pictures:</b> <div style="display: flex; align-items: center; justify-content: space-around;">   </div> <p><b>d= 60 - 80 - 100 mm</b></p>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Size : length up to 12m ; effective width 1m ; thickness 60, 80 or 100mm</li> <li>• Cladding panels don't participate to the building global stability</li> <li>• burning behavior classification : M1 or M2 (function of thickness and composition)</li> <li>• heat exchange coefficient <math>K_c = 0.42</math> to <math>0.19 \text{ W/m}^2.\text{K}</math> (according to the thickness, the type of panel, ...)</li> <li>• Sound insulation : transmission loss <math>R_w = 26\text{dB}</math> ; average sound absorption <math>\alpha = 0.52</math></li> <li>• CSTB technical assessment 5/00-1477</li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b>	

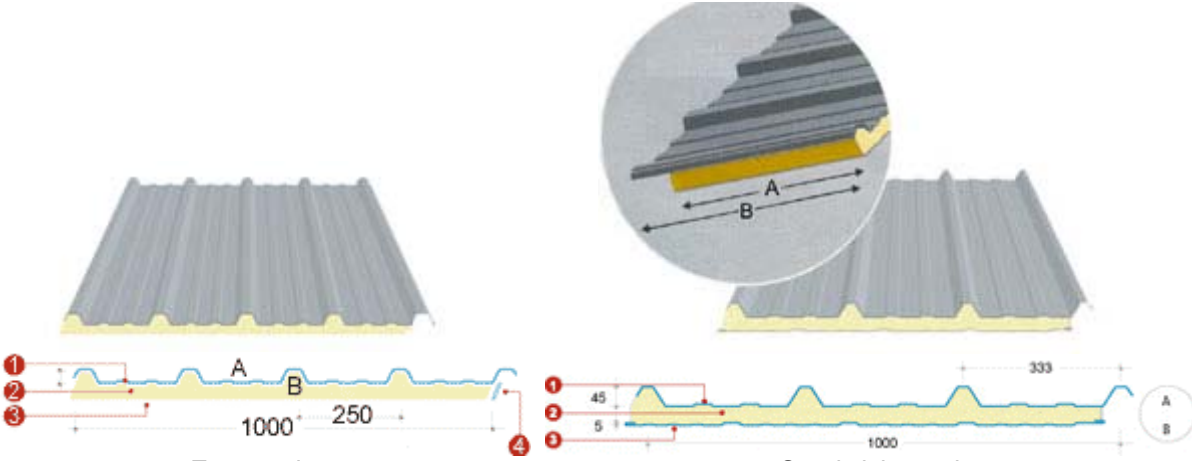
<b>System name:</b> PROMISTYL	<b>Fabricator address:</b> HAIRONVILLE (Arcelor Group) Parc industriel des Hauts-Sarts B-4040 Herstal Tel : 00 32 (4) 240 67 11 Fax : 00 32 (4) 240 67 10 <a href="http://www.haironville.be">http://www.haironville.be</a>
<b>Application field:</b> Sandwich panel cladding and roofing ; commercial, offices, schools, ... buildings	
<b>Product description:</b> <ul style="list-style-type: none"> <li>Cladding with sandwich panels "steel sheet – mineral wool - steel sheet" (prepainted-galvanized steel sheets)</li> <li>Spigot longitudinal joints are vertical or horizontal ; the attachments are exposed or hidden.</li> </ul>	
<b>Pictures:</b> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>Size : length 2m up to 15m ; effective width 1m ; thickness 60 up to 200mm</li> <li>Fire resistance : 1/2h (thickness 60mm), 1 hour (thickness 80mm), 2 hours (thickness 100mm)</li> <li>Burning behavior classification : M0 (mineral wool)</li> <li>Façades :           <ul style="list-style-type: none"> <li>Thermal insulation : heat exchange coefficient <math>K_c = 0.60, 0.45</math> and <math>0.37 \text{ W/m}^2\cdot\text{K}</math> (thickness 60, 80 and 100mm)</li> <li>Sound insulation : transmission loss <math>R_w = 36, 37</math> and <math>38\text{dB}</math> (thickness 60, 80 and 100mm) ; sound absorption <math>\alpha = 0.9, 0.93</math> and <math>0.95</math> (thickness 60, 80 and 100mm)</li> </ul> </li> <li>Roof :           <ul style="list-style-type: none"> <li>min. slopes of roof : 10%</li> <li>Thermal insulation : heat exchange coefficient <math>K_c = 0.60, 0.42</math> and <math>0.35 \text{ W/m}^2\cdot\text{K}</math> (thickness 60, 80 and 100mm)</li> <li>Sound insulation : transmission loss <math>R_w = 21, 23</math> and <math>26\text{dB}</math> (thickness 60, 80 and 100mm) ; sound absorption <math>\alpha = 0.9, 0.93</math> and <math>0.95</math> (thickness 60, 80 and 100mm)</li> </ul> </li> </ul>	
<b>Marketing information:</b>	
<b>Comments:</b> <ul style="list-style-type: none"> <li>sound absorption can be improved using perforated sheet (in this case, sandwich panel is only used as internal partition wall)</li> <li>thickness 120, 150 and 200mm : tests for characterizing fire resistance, thermal and sound insulation are ongoing</li> </ul>	

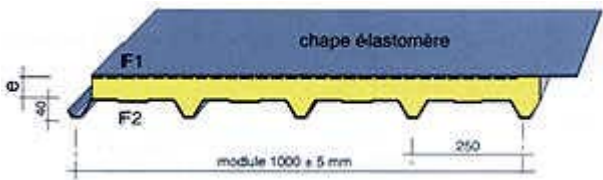
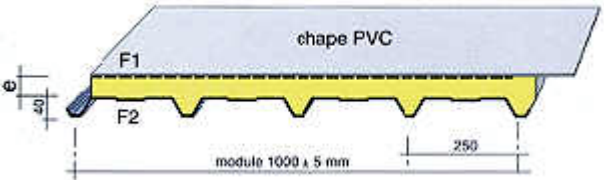
<p><b>System name:</b></p> <p><b>IND product</b></p>	<p><b>Fabricator address:</b>          ISOCAB          Treurnietstraat 10          B-8531 Harelbeke – Bavikhove          Tel : +32 (0)56 73 43 11          Fax : +32 (0)56 73 43 22          Email : <a href="mailto:Isocab@Isocab.be">Isocab@Isocab.be</a>          Web site : <a href="http://www.isocab.be">www.isocab.be</a></p>
<p><b>Application field :</b> Roof</p>	
<p><b>Product description :</b> Sandwich panel : The Isocab profiles are suitable for all kind of constructions for industry, shops or workplaces.</p>	
<p><b>Pictures :</b></p> 	
<p><b>Technical comments :</b></p> <ul style="list-style-type: none"> <li>• Dimensions : thickness from 40 to 220 mm</li> <li>• Durability (corrosion) : the basic material is always galvanised steel Z 275. As finishing the customer can make a choice between : polyester 15 micron, polyester 25 micron, plastisol 100 micron, plastisol 200 micron, PVDF 25 micron different thickness and colours (optional).</li> <li>• Loading resistance : adapted from needs ; up to 6 m span</li> <li>• Thermal performances : from 0,47 to 0,11 W/m<sup>2</sup> K</li> <li>• Acoustic performances : up to 32 dB</li> <li>• Fire resistance : M0</li> <li>• Certificates or standards : conform to DTU specifications (Veritas agreement).</li> </ul>	
<p><b>Marketing information :</b></p> <ul style="list-style-type: none"> <li>• Produced quantity by year : one big factory (Perpignan) ; leader on agroalimentary market</li> <li>• Price : on quotation</li> <li>• Market : 2002 was better than 2003. Bad prevision for 2004. Bad results due to global situation of construction</li> <li>• Society position : market parts in progression in France and for the export.</li> </ul>	
<p><b>Comments :</b></p>	

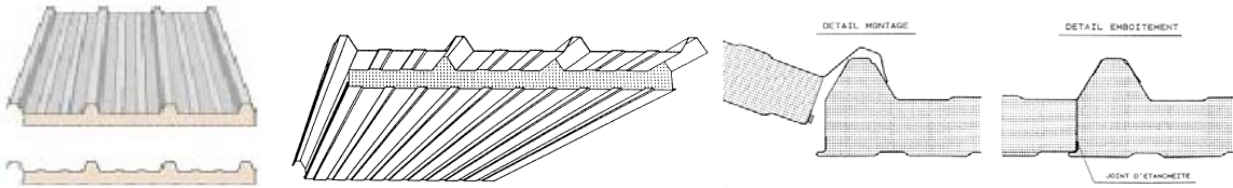
<b>System name:</b> <ul style="list-style-type: none"> <li>○ DELTA</li> <li>○ KAPPA</li> <li>○ SIGMA</li> <li>○ LITHOS 5</li> </ul>	<b>Fabricator address:</b> ISOLPACK SpA C.so Vittorio Emanuele, 99 I-10128 TORINO Tel : ++39 011 56075.11 Fax : ++39 011 5611713 Email : info@isolpack.com Web site : www.isolpack.com
<b>Application field :</b> Cladding and roof	
<b>Product description :</b> Insulated panel	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : width up to 1000 mm; length upon request from continuous production process. Thicknesses: up to 200.</li> <li>• Durability (corrosion) : galvanised steel, galvanised prepainted or plastified steel; stainless steel. Protective treatments available upon request: polyester coating for outdoors, non toxic prepainting when food is involved, silicon polyester, PVDF, thermoplastic Class A, application of PVC plastic films or other films.</li> <li>• Thermal performance : by using following products :           <ul style="list-style-type: none"> <li>– Delta, Kappa and Sigma: Polyurethane self-extinguishing resins (PUR).</li> <li>– Lithos 5 : made through a special configuration insulating layer, produced in high density mineral fibre (80-100 Kg/m3 . <math>\lambda = 0.043</math> W/mK), perpendicularly placed at the sheet plane.</li> </ul> </li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

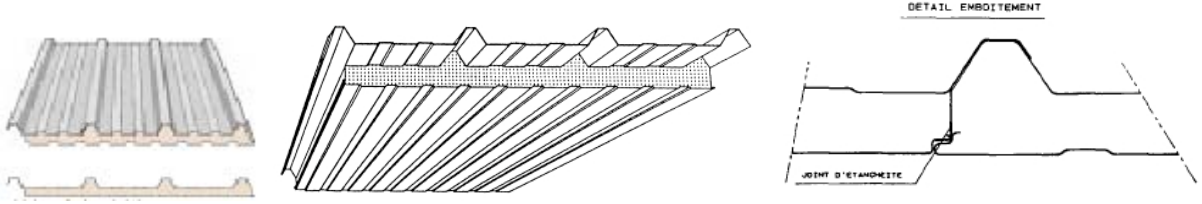
<b>System name:</b> <ul style="list-style-type: none"> <li>○ Penta</li> <li>○ Mono Penta</li> <li>○ Ter</li> <li>○ Mono Ter</li> </ul>	<b>Fabricator address:</b> ITALPANNELLI Strada Provinciale Bonifica Km 13.500 I-64010 ANCARANO (TE) Tel : 0861/72021 Fax : 0861/870078 Email : info@italpannelli.it Web site : www.italpannelli.it
<b>Application field :</b> Roof	
<b>Product description :</b> Monolithic insulated panels	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : length : 2 to 8 m, width : 1000 mm, thickness : 30 to 100 mm</li> <li>• Loading resistance : 60 to 700 Kg/m<sup>2</sup> . Weight of panels equipped with steel supports 0,50 mm : 5,60 to 12,45 Kg/m<sup>2</sup>. Dimensional stability : 0,5 - 1,0% (Uniplast Projekt 517) from -25 °C to +70 °C for 48 hours.</li> <li>• Fire resistance : Category 0 to 2 in conformity with Ministerial Decree of 26 June 1984. Panels can be supplied on demand with special foam, which can obtain a better fire resistance classification in conformity with the norms DIN 4102 (foam B2 - panel B1) or AFNOR (M1). Self-extinguishing polyurethane rigid foam density : 40 ± 4 kg/m<sup>3</sup></li> <li>• Thermal performances : conductivity coefficient : 0,19 to 0,59 W/m.K * (function of thickness)</li> <li>• Durability (corrosion) : different treatments :           <ul style="list-style-type: none"> <li>– Nominal thickness of galvanised and prepainted steel support : 0,50 mm (UNI – EN 10143)</li> <li>– Galvanised steel : SENDZIMIR system, in conformity with UNI - EN 10142 and UNI – EN 10147 norms.</li> <li>– Prepainted steel : SENDZIMIR system, with coating of polyester-silicone or PVDF based resins, as well as thermoplastication cat. A.</li> <li>– On demand, coating having special qualities of resistance to corrosion can be supplied.</li> </ul> </li> <li>• Certificates Iso 9002 BVQI</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order : on quotation only</li> <li>• Produced quantity : in France : 300 000 – 600 000 m<sup>2</sup></li> <li>• Market in progression over the last five years</li> <li>• Customer perception : quality, number of products</li> </ul>	
<b>Comments :</b>	

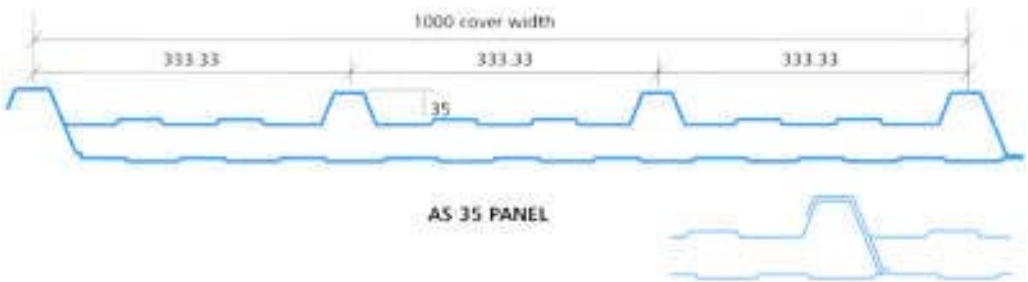


<b>System name:</b> <ul style="list-style-type: none"> <li>○ Ecopanel</li> <li>○ Sandwichpanel</li> </ul>	<b>Fabricator address:</b> NV JORIS IDE Hille 174 8750 Zwevezele, Belgique Tel : +32 51 61 07 77 Fax: +32 51 61 07 79 Email : verkoop.belgie@jorisode.be Web site : www.jorisode.be
<b>Application field :</b> Roof	
<b>Product description :</b> Sandwich panels	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions: length mini 2 m maxi 16 m,</li> <li>• Insulation: Rigid polyurethane foam (<math>45 \text{ kg/m}^3</math>), Thickness 40 mm ( <math>K=0,5</math>), 60 mm ( <math>K=0,34</math>), 80 mm ( <math>K=0,26</math>),</li> <li>• Durability (corrosion) : galvanised steel (<math>275\text{gr/m}^2</math>), 25<math>\mu</math> polyester layer or 200<math>\mu</math> plastisol layer</li> <li>• Combustibility class: A0 (rockwool), A1 (polystyrene) and B3 (PUR)</li> <li>• Certificates or standards : Veritas agreement for P35/207/1035 &amp; P25/25/267/1070.</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	


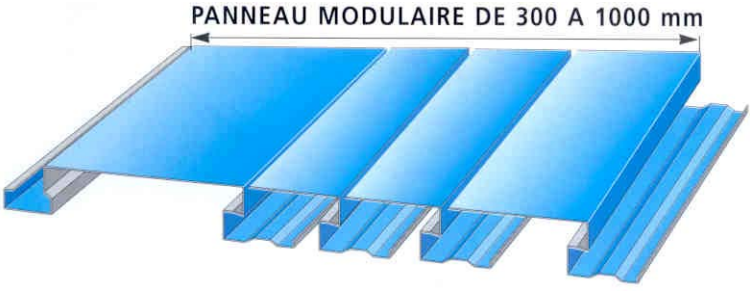
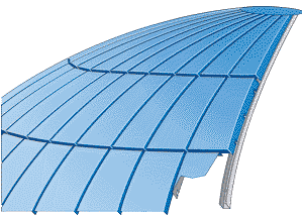
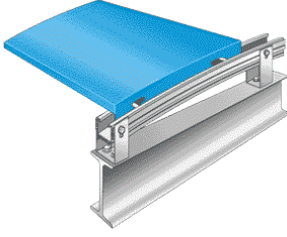
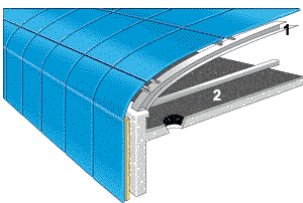
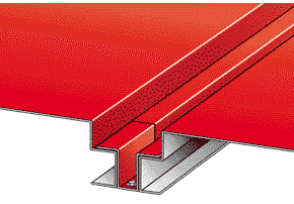
<b>System name:</b> <ul style="list-style-type: none"> <li>○ MONODECK</li> <li>○ SUPERDECK</li> </ul>	<b>Fabricator address:</b> MONOPANEL (Groupe Corus) Rue Géo Lufbery - BP 103 F-02301 CHAUNY CEDEX Tel : +33 (0)3 23 40 66 66 Fax : +33 (0)3 23 40 66 88 Email : bertille.lefevre@cbsfrance.com Web site : www.monopanel-sa.com
<b>Application field :</b> Roof	
<b>Product description :</b> Sandwich panels	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Monodeck</p> </div> <div style="text-align: center;">  <p>Superdeck</p> </div> </div>	
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> ONDATHERM 101	<b>Fabricator address:</b> PAB Est (Arcelor Group) 10, Rue du bassin de l'industrie - BP25 F-67017 STRASBOURG Tel : 00 33 (3) 88 41 48 75 Fax : 00 33 (3) 88 41 48 04 www.pab.tm.fr
<b>Application field:</b> Metal roofing ; offices, schools, commercial, sporting, industrial, ... buildings	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Metal roofing with sandwich panels "steel sheet - polyurethane foam - steel sheet" (ribbed steel sheets)</li> <li>• Some licensed undertaking set up the panels (ribs parallel to the line of maximum slope)</li> <li>• Spigot longitudinal joints</li> <li>• galvanized, with zinc-aluminum alloy or stainless steel sheets (min. thickness : 0,5mm), eventually prepainted.</li> <li>• Metal, wood or concrete framing.</li> </ul>	
<b>Pictures:</b> 	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Size : length 2m up to 17m ; effective width 1m ; thickness 30 to 100mm</li> <li>• burning behavior classification : M2 (M1 for some configurations of panel)</li> <li>• heat exchange coefficient Kc function of thickness (<math>K_c = 0,68</math> to <math>0,21 \text{ W/m}^2.\text{K}</math>)</li> <li>• min. slopes of roof : 7, 10 or 15% according to the geographical position of the building</li> <li>• surface density of panels : <math>11,7 \text{ kg/m}^2</math> to <math>15,6 \text{ kg/m}^2</math> (according to the thickness of the internal steel sheet and the insulation)</li> <li>• CSTB technical assessment 5/98-1361 and 5/98-1361*01add.</li> </ul>	
<b>Marketing information:</b> Reference of 1999 : 5.000.000m <sup>2</sup>	
<b>Comments:</b>	


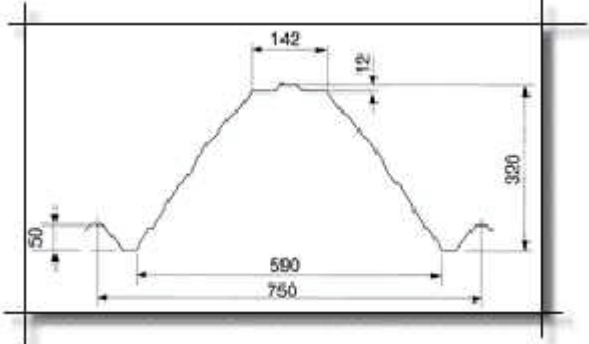
<b>System name:</b> ONDATHERM 201	<b>Fabricator address:</b> PAB Nord (Arcelor Group) 32, Rue Gambetta BP62 F- 59264 ONNAING Tel : 00 33 (3) 27 23 90 00 Fax : 00 33 (3) 27 23 90 99 www.pab.tm.fr
<b>Application field:</b> Metal roofing ; offices, schools, commercial, sporting, industrial, ... buildings	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Metal roofing with sandwich panels "steel sheet - polyurethane foam - steel sheet" (ribbed steel sheets)</li> <li>• Some licensed undertaking set up the panels (ribs parallel to the line of maximum slope)</li> <li>• Spigot longitudinal joints</li> <li>• galvanized, with zinc-aluminum alloy or stainless steel sheets (min. thickness : 0,5mm), eventually prepainted.</li> <li>• Metal, wood, concrete or masonry framing.</li> </ul>	
<b>Pictures:</b> <div style="display: flex; justify-content: space-around; align-items: center;">  </div>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Size : length 2m up to 15m ; effective width 1m ; thickness 30 to 100mm</li> <li>• burning behavior classification : M2 (M1 for some configurations of panel)</li> <li>• heat exchange coefficient Kc function of thickness (<math>K_c = 0,67</math> to <math>0,21 \text{ W/m}^2.K</math>)</li> <li>• min. slopes of roof : 7, 10 or 15% according to the geographical position of the building</li> <li>• CSTB technical assessment 5/98-1365 and 5/98-1365*01add</li> </ul>	
<b>Marketing information:</b> Reference of 1999 : 15.000m <sup>2</sup> of roofing	
<b>Comments:</b>	


<b>System name:</b> ○ AS35	<b>Fabricator address:</b> STEADMANS Ltd Warnell, Welton, Carlisle, Cumbria CA5 7HH UK Tel : +44 16974 78277 Fax : +44 16974 78530 Email : info@steadmans.co.uk Web site : www.steadmans.co.uk
<b>Application field :</b> Roof	
<b>Product description :</b> Sandwich panel	
<b>Pictures :</b>  <p>1000 cover width</p> <p>333.33 333.33 333.33</p> <p>35</p> <p>AS 35 PANEL</p>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : Available up to 12 m in length, manufactured to length as specified.</li> <li>• Choice of colors and finishes.</li> <li>• Durability (corrosion) : Strong, light, galvanised or coated metal corrugated sheet.</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	


#### 4.3.2. Corrugated steel sheets and insulated corrugated steel sheets

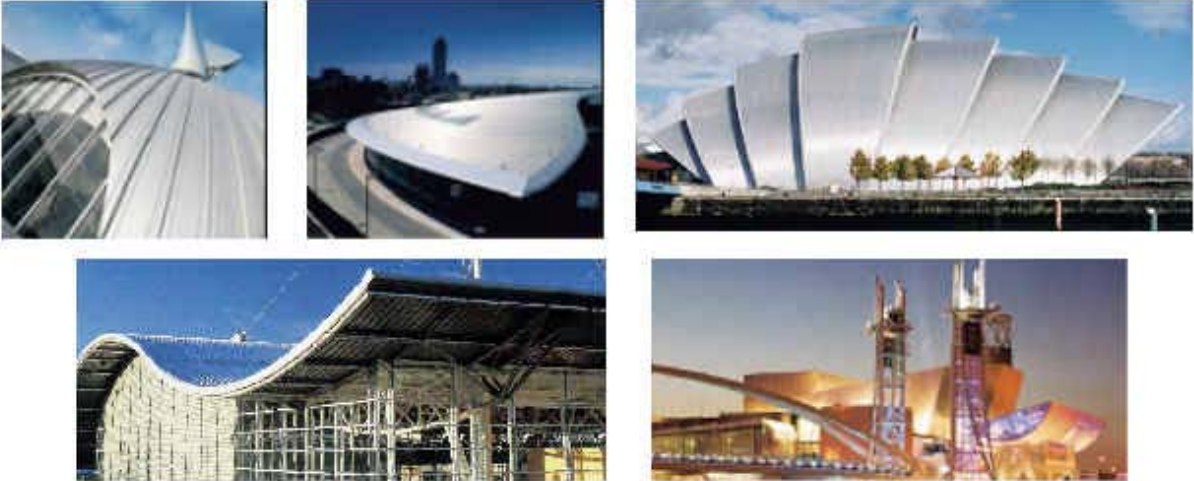
<b>System name:</b> <ul style="list-style-type: none"> <li>○ TS45</li> <li>○ Pacifica</li> <li>○ Indiana</li> </ul>	<b>Fabricator address:</b> AFCA 26, rue de l'étang BP 27 F-54110 LANEUVILLE-DEVANT-NANCY Tel : 03 83 26 18 30 Fax : 03 83 26 19 02 Email : <a href="mailto:info@afca-sa.fr">info@afca-sa.fr</a> Web site : <a href="http://www.afca-sa.fr">www.afca-sa.fr</a>
<b>Application field :</b> Roof	
<b>Product description :</b> Steel sheet Cassette. The roof surface can be plane or curved.	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: flex-start;">   </div> <p style="text-align: right; margin-right: 150px;">TS45</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;">     </div> <p style="text-align: center;">Pacifica<span style="margin-left: 200px;">Indiana</span></p>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : <ul style="list-style-type: none"> <li>– TS45 : length : 16 m max ; width : 300 to 1000 mm</li> <li>– Pacifica : length : up to 3,5 m ; width : up to 1,3 m</li> </ul> </li> <li>• Durability : galvanised steel Z275 &amp; Z350 or stainless steel</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order : on quotation only (1 week to get a quote)</li> <li>• Produced quantity by year : 1500 m2/year (very low volume for particular business)</li> </ul>	
<b>Comments :</b>	

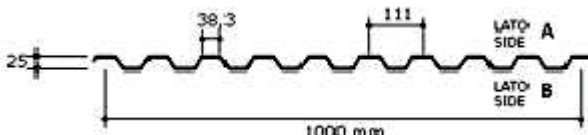




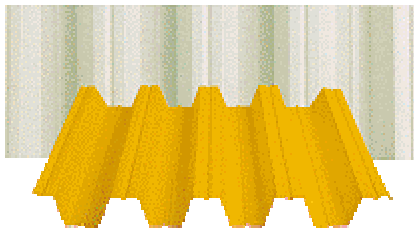
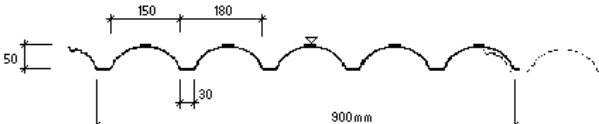
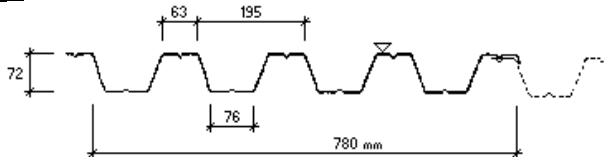
<b>System name:</b> ○ DELTABAC	<b>Fabricator address:</b> BATIROC Avenue Jean Monet - Z.I. F-54920 VILLERS- LA- MONTAGNE Tel : 03 82 44 04 08 Fax : 03 82 26 13 43 Email : <a href="mailto:batiroc@batiroc.fr">batiroc@batiroc.fr</a> Web site : <a href="http://www.batiroc.fr">www.batiroc.fr</a>
<b>Application field :</b> Roof	
<b>Product description :</b> Corrugated steel sheet	
<b>Pictures :</b> <div style="display: flex; align-items: center;">   </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>DELTABAC is a dry roofing element processed from a prelacquered of 125/100 mm or 10/10 mm galvanised steel sheet. Its weight is of 15,5 kg/m<sup>2</sup> (125/100) or of 12,40 kg/m<sup>2</sup> (10/10) and it spans up to 10 m according to snow loads.</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>Produced quantity: 5 000 – 10 000 m<sup>2</sup>/year</li> <li>Price order: on quotation only</li> </ul>	
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> ○ BATIBAC ○ BATIREGUL	<b>Fabricator address:</b> BATIROC Avenue Jean Monet - Z.I. F-54920 VILLERS- LA- MONTAGNE Tel : 03 82 44 04 08 Fax : 03 82 26 13 43 Email : <a href="mailto:batiroc@batiroc.fr">batiroc@batiroc.fr</a> Web site : <a href="http://www.batiroc.fr">www.batiroc.fr</a>
<b>Application field :</b> Roof and cladding	
<b>Product description :</b> Corrugated steel sheet	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions: length : 1 m, width : 25, 35 or 45 mm</li> <li>• Loading resistance : 2,5 – 3 m span</li> <li>• Fire resistance: M0</li> <li>• Durability (corrosion) : galvanised steel, lacquer. More optional layers</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Produced quantity: 1 000 000 m<sup>2</sup></li> <li>• Price order: on quotation only</li> </ul>	
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b>	


<b>System name:</b> BATITHERM	<b>Fabricator address:</b> BATIROC Avenue Jean Monet - Z.I. F-54920 VILLERS- LA- MONTAGNE Tel : 03 82 44 04 08 Fax : 03 82 26 13 43 Email : <a href="mailto:batiroc@batiroc.fr">batiroc@batiroc.fr</a> Web site : <a href="http://www.batiroc.fr">www.batiroc.fr</a>
<b>Application field :</b> Roof and cladding	
<b>Product description :</b> Insulated steel sheet	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : length : 1 m, width : 80 mm</li> <li>• Loading resistance : 2,5 – 3 m span</li> <li>• Fire resistance : M1</li> <li>• Durability (corrosion) : galvanised steel, lacquer. More optional layers</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Produced quantity: 50 000 m<sup>2</sup></li> <li>• Price order: on quotation only</li> </ul>	
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<p><b>System name:</b> Kalzip roofing systems</p>	<p><b>Fabricator addresses:</b> Corus Bausysteme GmbH August-Horch-Str. 20-22 D-56070 Koblenz T +49 (0) 2 61/8 91-0 F +49 (0) 2 61/8 20 38</p>
<p><b>Application field:</b> The Kalzip® structural decking and profiled steel product range offers a wide variety of roof profiles in clad aluminium and stainless steel, eliminating the need for structural purlins or sheeting rails, to give a clean uncluttered internal appearance.</p>	
<p><b>Product description:</b> Aluminium standing seam insulated system which has an aluminium liner sheet providing an attractive, functional interior finish to the roof. Kalzip® structural deck profile range can be used to provide large span characteristics, reducing the need for purlins. Concave and convex curvatures can be attained easily.</p>	
	
<p><b>Technical comments:</b></p> <ul style="list-style-type: none"> <li>• Outstanding durability Proven exceptionally long life highly corrosion-resistant alloy</li> <li>• Simple, fast installation by fully trained personnel</li> <li>• Full recyclability - environmentally friendly</li> <li>• No externally drilled holes for fasteners to control thermal movement and wind suction around the building perimeters.</li> <li>• Fully zipped seams irrespective of the shape of the building.</li> <li>• Kalzip® is very permeable, allowing the system to breathe, removing any moisture from the roof build-up as well as reducing the risk of condensation.</li> <li>• Proven design for integrated roof openings and lightning protection systems</li> <li>• Capable of withstanding the highest wind suction and wind pressures while maximising 'spannability.'</li> <li>• Surface plated for protection against acid rain and industrial emissions</li> <li>• A double skin of aluminium liner sheet with Kalzip® standing seam outer will provide rapid venting in the event of a fire. This can, on occasion, save the integrity of the structure, leaving only a local repair to the affected area necessary.</li> <li>• The introduction of high density moisture resistant boards, high density insulation layers or multiple density layers of insulation individually or in combination with each other, can achieve high levels of noise reduction.</li> </ul>	
<p><b>Marketing information:</b></p>	
<p><b>Comments:</b></p>	

<b>System name:</b> <ul style="list-style-type: none"> <li>○ Trapezoidal Sheets</li> <li>○ Trapezoidal curved Sheets</li> </ul>	<b>Fabricator address:</b> FRATELLI RE Via T.Tasso, 3/5 I-20030 BARLASSINA (MI) Tel :+39 0362 565251 Fax : +39 0362 564433 Email : info@refratelli.com Web site : www.refratelli.com
<b>Application field :</b> Roof and cladding	
<b>Product description :</b> For the realisation of Roofs Coverings, Walls, False Ceiling, Alloy-Cement and No-Alloy-Cement Slabs, obtained through coils profiling in: <ul style="list-style-type: none"> <li>• Sendzimir galvanised Steel in accordance with UNI EN 10147</li> <li>• Prepainted galvanised Steel in Coil Coating with a basis of polyester resin, silicon polyester, PVDF, high thickness Multilayer</li> </ul>	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Trapezoidal sheet RGL 25/9</p> </div> <div style="text-align: center;">  <p>Trapezoidal curved sheet RGL 39/4 C</p> </div> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : <ul style="list-style-type: none"> <li>– Trapezoidal Sheets : length : 836 to 1000 mm ; width : 18 to 100 mm</li> <li>– Trapezoidal curved Sheets : length : 780 to 1000 mm ; width : 25 to 55 mm</li> </ul> </li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> GA profiles	<b>Fabricator address:</b> GASELL PROFIL AB Box 7 SE-231 08 ANDERSLÖV, Sweden Tel : +46 410 214 00 Fax : +46 410 216 30 Email : <a href="mailto:export@gasell.com">export@gasell.com</a> Web site : <a href="http://www.gasell.co.uk">www.gasell.co.uk</a>
<b>Application field :</b> Roof	
<b>Product description :</b> Corrugated steel sheet. The 12 different types of profiles available with a height from 18 to 118 mm	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: flex-start;">   </div> <div style="display: flex; justify-content: space-around; align-items: flex-end;">   </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions :           <ul style="list-style-type: none"> <li>– maximum sheet length : 5 to 18,5 m,</li> <li>– width : 615 to 1000 mm,</li> <li>– nominal thickness : 0,4 to 0,75 mm,</li> <li>– weight : 0,04 to 0,09 kN/m<sup>2</sup></li> </ul> </li> <li>• Loading resistance :           <ul style="list-style-type: none"> <li>– yield point : 250 to 350 N/mm<sup>2</sup>,</li> <li>– support reaction (width of support 30 mm) : 2,96 to 37,59 kN/m.</li> <li>– Bending moment (narrow – wide flange in compression) : 0,31-0,31 to 13,85-12,12 kNm/m.</li> <li>– Moment of inertia (narrow – wide flange in compression) : 1,0-1,0 to 272,0-271,0 .10<sup>4</sup>.mm<sup>4</sup>/m.</li> <li>– Usual maximum loads (support width = 30 mm) : 17,55 kN/m<sup>2</sup> with two supports 43,87 with three supports.</li> </ul> </li> <li>• Certificates and standards : Sheet material is structural steel hot-dip zinc coated, Z275 according to European Standard EN 10147. Standard approval certificate issued by the National Board of Housing Building and Planning, Sweden.</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order : GA50-150 : 7,5 to 9,4 €/m<sup>2</sup> depending on layer (polyester or PVF Kynar)</li> </ul>	
<b>Comments :</b>	



<b>System name:</b> EGB2000® S R S	<b>Fabricator address:</b> GRUPPO MARCEGAGLIA Marcegaglia S.p.A. via Bresciani, 16 I-46040 GAZOLDO IPPOLITI MANTOVA Tel : +39 . 0376 685 1 Fax : +39 . 0376 685 600 Email : info@gruppomarcegaglia.com Web site : www.gruppomarcegaglia.com
<b>Application field :</b> Roof	
<b>Product description :</b> The Brollo division of Marcegaglia S.p.A. developed a system of curved roofing with chain made with curved sheets EGB2000® S R S, to build self supporting roofs.	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : <ul style="list-style-type: none"> <li>– thickness min. 0.6 - max. 15</li> <li>– length min. 500 - max. 12000</li> <li>– width min. 450 max. 1000,</li> </ul> </li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> UltraSHEET®	<b>Fabricator address:</b> HADLEY GROUP PO Box 92 Downing Street Smethwick West Midlands B66 2PA UK Tel : +44 121 555 1300 Fax : +44 121 555 1301 Email : <a href="mailto:info@hadleygroup.co.uk">info@hadleygroup.co.uk</a> Web site : <a href="http://www.hadleygroup.co.uk">www.hadleygroup.co.uk</a>
<b>Application field :</b> Roof and cladding	
<b>Product description :</b> Corrugated coated steel sheet	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around;">   </div>	
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b>	

**System name:**

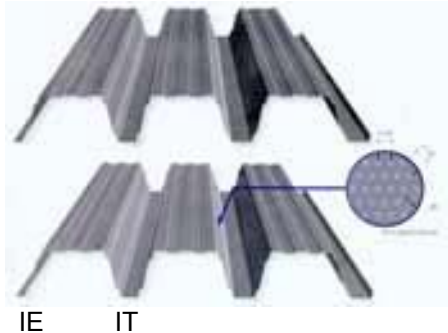
- IE steeldeck
- IT steeldeck

**Fabricator address:**

ISOCAB  
 Treurnietstraat 10  
 B-8531 Harelbeke – Bavikhove  
 Tel : +32 (0)56 73 43 11  
 Fax : +32 (0)56 73 43 22  
 Email : Isocab@Isocab.be  
 Web site : www.isocab.be

**Application field :** Roof

**Product description :** The Isocab profiles are suitable for all kind of constructions for industry, shops or workplaces.

**Pictures :****Technical comments :**

- Dimensions : the profiles can be delivered per 1 from 2 to 18 m. See table below for details

	Height (mm)	Module (mm)	Profiles	With R	With M	Option P
IE 39.1000/4M	39	1100	4x180	-	x	x
IE 40.915/5	40	915	5x119	-	-	x
IE 42.1000/4R	42	1000	4x180	x	-	x
IE 57.910/4R	57	910	4x158	x	-	x
IE 106.750/3M	106	750	3x140	-	x	x

R = brace

M = micro-ribbed

P = perforated ø 5mm

	Height (mm)	Module (mm)	Profiles	With R	Without R
IT 24.1100/5R	24	1100	5x140	x	-
IT 31.1035/5	31	1035	5x118	-	x
IT 35.1000/5	35	1000	5x118	x	-
IT 39.1000/4(R)	39	1000	4x180	x	x
IT 40.915/5(R)	40	915	5x119	x	x

R = brace

- Durability (corrosion) : the basic material is always galvanised steel Z 275. As finishing the customer can make a choice between : polyester 15 micron, polyester 25 micron, plastisol 100 micron, plastisol 200 micron, PVDF 25 micron different thickness and colours (optional).
- Loading resistance : 0 to 4 m span
- Fire resistance : M0
- Certificates or standards : conform to DTU specifications (Veritas agreement).

**Marketing information :**

- Produced quantity by year : 2 production factories / success story : Toyota Valenciennes with 60 000 m<sup>2</sup>
- Price : on quotation
- Market : 2002 was better than 2003. Bad prevision for 2004. Bad results due to global situation of construction
- Society position : market parts in progression in France and for the export.

**Comments :**

<b>System name:</b> <ul style="list-style-type: none"> <li>○ CT/C 200</li> <li>○ R/W 1000</li> <li>○ S/C 2000</li> <li>○ R/C 400</li> <li>○ AMPEX</li> </ul>	<b>Fabricator address:</b> ISOLPACK SpA C.so Vittorio Emanuele, 99 10128 TORINO (ITALIA) Tel : ++39 011 56075.11 Fax : ++39 011 5611713 Email : info@isolpack.com Web site : www.isolpack.com
<b>Application field :</b> Cladding and roof, Large roof	
<b>Product description :</b> Corrugated steel sheet	
<b>Pictures :</b>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions :           <ul style="list-style-type: none"> <li>– width up to 1045 mm,</li> <li>– length upon request from continuous production process.</li> <li>– Thickness: from 0,6 up to 1.5 mm</li> </ul> </li> <li>• Steel according to EN 10147 type Fe E 250 G Norm.</li> <li>• Durability (corrosion) : simple hot galvanised through “sendzimir” process, galvanised prepainted or plastified steel; stainless steel. Protective treatments available upon request: polyester coating for outdoors, non toxic prepainting when food is involved, silicon polyester, PVDF, thermoplastic Class A, application of PVC plastic films or other films.</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

**System name:**

Profil 1000x37

Polystyrène insulated panels:

- ISOSTEEL,
- FIBROSTEEL & RENOSTEEL,

Rockwool insulated panels :

- VULCASTEEL,
- VULCASTEEL ALPHA,

**Fabricator address:**

ISOMETALL S.A.

Z.I. de la Baraque Fraiture

route de La Roche

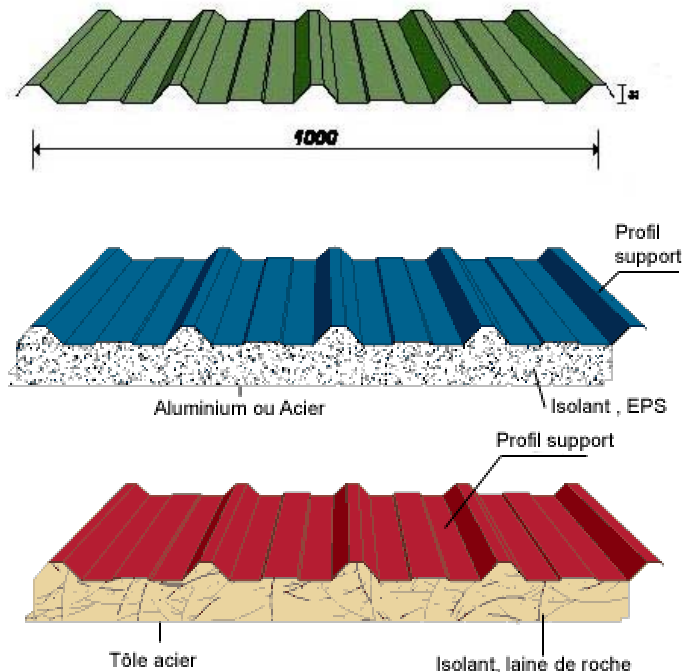
B-6960 MANHAY

Tel : 0032 (0) 80 41 81 60 0032

Fax : (0) 80 41 81 61

Email : [info@isometall.com](mailto:info@isometall.com)Web site : [www.isometall.be](http://www.isometall.be)**Application field :** Roof

**Product description :** Sandwich panel. The profiled sheets proposed are made out of sheet steel galvanised base on standard NF EN 10147, class Fe E 320 G.

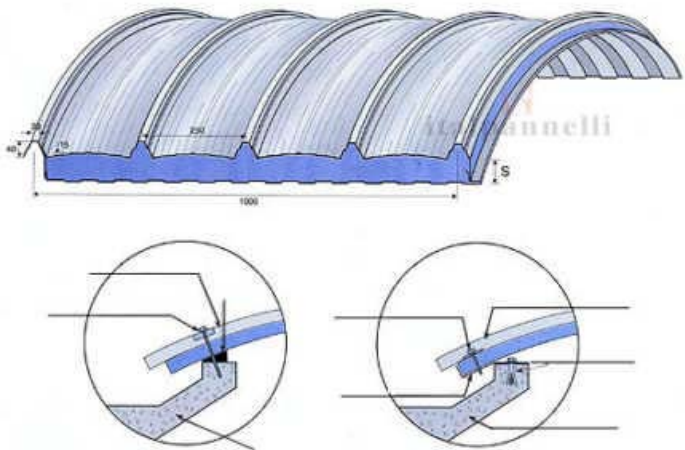
**Pictures :****Technical comments :**

- Dimensions: width : 1 m ; length: from 1,6 m to 14 m
- Loading resistance: data depending of the product available on the internet site.
- Fire resistance : M0 (CSTB test : 3 hours fire resistant in 80 mm)
- Acoustic performances: high / very high (often sold for acoustic performances)
- Durability / corrosion : corrosion treatment by lacquer
- Certificates or standard: ISO 9000 quality system

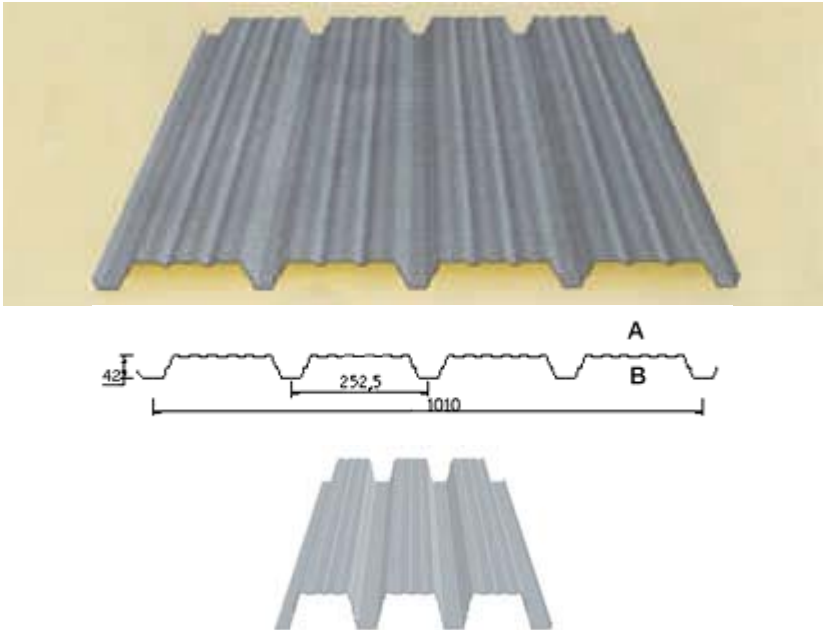
**Marketing information :**


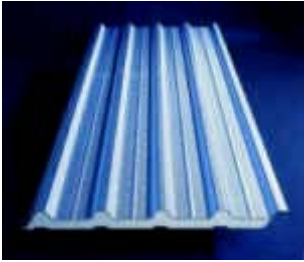
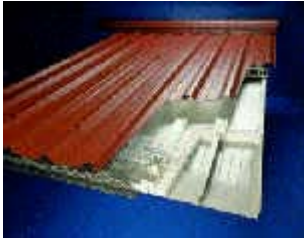

- Produced quantity: 90 000 m<sup>2</sup>/year
- Price order : on quotation only
- Construction cost : same costs as a traditional sandwich panel
- Demolition costs / recycling costs : 100% recyclable ; using specialised societies for recycling
- Market information: in constant progression, high impact of legislation on this progression.
- Customer perception: appreciated products, especially for security (fire resistance) and acoustic performances.

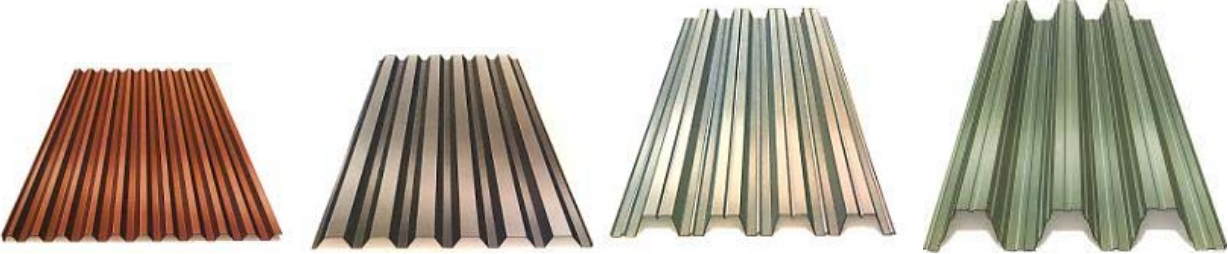
**Comments :**



<b>System name:</b> R6	<b>Fabricator address:</b> ITALPANNELLI Strada Provinciale Bonifica Km 13.500 I-64010 ANCARANO (TE) Tel : 0861/72021 Fax : 0861/870078 Email : info@italpannelli.it Web site : www.italpannelli.it
<b>Application field :</b> Roof	
<b>Product description :</b> Curved monolithic insulated panels	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : maximum producible length : 4,50 m, useful width : 1000 mm, thickness : 40, 50 or 60 mm</li> <li>• Loading resistance : 75 to 590 Kg/m<sup>2</sup> . Weight of panels equipped with steel supports 0,50 mm : 10,05 to 10,85 Kg/m<sup>2</sup> . Bending radius : 6,00 m. Dimensional stability : 0,5 - 1,0% (Uniplast Projekt 517) from -25 °C to +70 °C for 48 hours.</li> <li>• Fire resistance : Category 0 to 2 in conformity with Ministrial Decree of 26 June 1984. Panels can be supplied on demand with special foam, which can obtain a better fire resistance classification in conformity with the norms DIN 4102 (foam B2 - panel B1) or AFNOR (M1). Self-extinguishing polyurethane rigid foam density : 40 ± 4 kg/m<sup>3</sup></li> <li>• Thermal performances: conductivity coefficient : 0,32 to 0,45 W/m.K (function of thickness, ...)</li> <li>• Durability (corrosion) : different treatments : <ul style="list-style-type: none"> <li>– Nominal thickness of galvanised and prepainted steel support : 0,50 mm (UNI – EN 10143)</li> <li>– Galvanised steel : SENDZIMIR system, in conformity with UNI - EN 10142 and UNI – EN 10147 norms.</li> <li>– Prepainted steel : SENDZIMIR system, with coating of polyester-silicone or PVDF based resins, as well as thermoplastication cat. A.</li> <li>– On demand, coating having special qualities of resistance to corrosion can be supplied.</li> </ul> </li> <li>• Certificates Iso 9002 BVQI</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order : on quotation only</li> <li>• Produced quantity : in France : 300 000 – 600 000 m<sup>2</sup></li> <li>• Market in progression over the last five years</li> <li>• Customer perception : quality, number of products</li> </ul>	
<b>Comments :</b>	

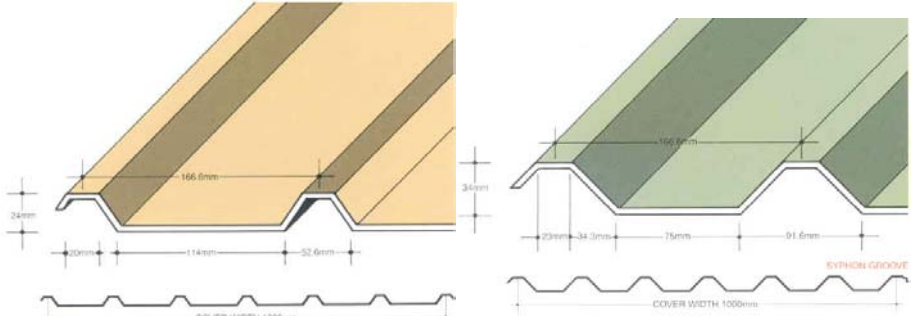


<b>System name:</b> <ul style="list-style-type: none"> <li>○ P42.252.1010</li> <li>○ P45.33.1000</li> <li>○ P106.250.750</li> </ul>	<b>Fabricator address:</b> NV JORIS IDE Hille 174 8750 Zwevezele, Belgique Tel : +32 51 61 07 77 Fax: +32 51 61 07 79 Email : verkoop.belgie@jorisode.be Web site : www.jorisode.be
<b>Application field :</b> Roof	
<b>Product description :</b> Corrugated steel sheet	
<b>Pictures :</b> <div style="text-align: center;">  </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions:           <ul style="list-style-type: none"> <li>– length from 1 up to 13 meters,</li> <li>– steel thickness from 0,5 to 0,75 mm</li> </ul> </li> <li>• Durability (corrosion) : galvanised steel (275gr/m<sup>2</sup>), 25μ polyester layer or 200μ plastisol layer</li> <li>• Certificates or standards : Veritas agreement for P35/207/1035 &amp; P25/25/267/1070.</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

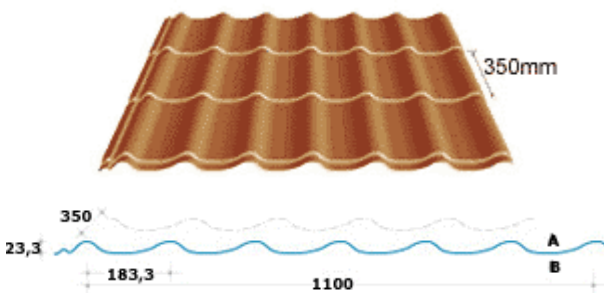
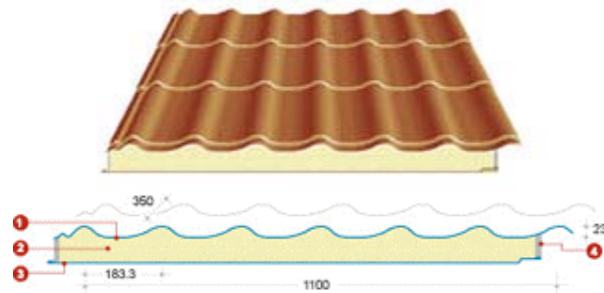
<b>System name:</b> <ul style="list-style-type: none"> <li>○ OndulitCoverib</li> <li>○ Coverpan</li> <li>○ Coverclima</li> <li>○ Ventilcover</li> </ul>	<b>Fabricator address:</b> ONDULIT ITALIANA 95/E Via Portuense I - 00153 Roma Tel : 06.58330880 French agency : 01 44 43 54 23 Fax : 06.5812977 Email : info@ondulit.it Web site : www.ondulit.it
<b>Application field :</b> Roof	
<b>Product description :</b> All the systems below take advantage of multilayer protection of the steel sheets. This protecting system assures high performances and great reliability.	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>OndulitCoverib</p> </div> <div style="text-align: center;">  <p>Coverpan</p> </div> <div style="text-align: center;">  <p>Coverclima</p> </div> <div style="text-align: center;">  <p>Ventilcover</p> </div> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Loading performances</li> <li>• Durability (corrosion) : The protecting system includes a series of stratification protect against aggressive agents and assures advanced performances and great reliability in the time also in strictest atmospheres corrosive (marine, industrial, city).</li> <li>• Acoustic performances : the Ondulit systems introduce one anti-noise layer. This protecting stratification absorbs the impact of the precipitation and avoids the vibration of the sheet, cause of the effect boom. The cover turns out aphonic in such a way and can calmly be employed on buildings with any destination of use.</li> <li>• Thermal performances : the metallic covers are normally heated strongly under the action of the sun ("effect grill"). The system multilayer Ondulit use the reflecting power of the superficial covering in natural aluminium (beyond 90% of the thermal cargo) and the thermal inertia of the thick layers:</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	


<b>System name:</b> <ul style="list-style-type: none"> <li>○ PS 20</li> <li>○ PS 45</li> <li>○ PS 70</li> <li>○ PS 111</li> </ul>	<b>Fabricator address:</b> PLANNJA AB 69 High Street, Maidenhead, Berkshire SL6 1JX UK Tel : +44 (0)1628 637313 Fax : +44 (0)1628 674940 Email : <a href="mailto:enquire@plannja.co.uk">enquire@plannja.co.uk</a> Web site : <a href="http://www.plannja.com">www.plannja.com</a> <a href="http://www.plannja.co.uk">www.plannja.co.uk</a>
<b>Application field :</b> Roof	
<b>Product description :</b> The Plannja roofing sheeting profiles is 15 different profiles with various coatings, colours and designs. The product range includes profiles designed for roof constructions with or without insulation at an angle down to 3.6 degrees.	
<b>Pictures :</b> <div style="text-align: center; margin-top: 20px;">  <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <span>PS 20</span> <span>PS 45</span> <span>PS 70</span> <span>PS 111</span> </div> </div>	
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> RANNILA Classic Roofing : <ul style="list-style-type: none"> <li>○ Rannila Classic S</li> <li>○ Rannila Classic W</li> </ul>	<b>Fabricator address:</b> RANNILA STEEL OY Kalkkimäentie 1 FI-62800 VIMPELI Tel : +358 20 477 17 Fax : +358 20 477 7700 Email : timo.koivisto@rannila.com Web site : www.rannila.com
<b>Application field :</b> Roof	
<b>Product description :</b> Steel sheet	
<b>Pictures :</b> <div style="text-align: center;">  <p>Rannila Classic S</p>  <p>Rannila Classic W</p> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : <ul style="list-style-type: none"> <li>– length : from 0,8 m to 12 m ;</li> <li>– width : 475 mm</li> </ul> </li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b> The Rannilla roofing package include all necessary parts from roofing sheets to ladders and rainwater removal products.	

<b>System name:</b> <ul style="list-style-type: none"> <li>○ AS20</li> <li>○ AS24</li> <li>○ AS24 Vented Sheet</li> <li>○ AS34</li> </ul>	<b>Fabricator address:</b> STEADMANS Ltd Warnell, Welton, Carlisle, Cumbria CA5 7HH UK Tel : +44 16974 78277 Fax : +44 16974 78530 Email : info@steadmans.co.uk Web site : www.steadmans.co.uk
<b>Application field :</b> Roof	
<b>Product description :</b> Corrugated steel sheet	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : Available up to 12 m in length, manufactured to length as specified.</li> <li>• AS24 Vented Wall Cladding Sheet has been developed to meet the agricultural industry's need for really effective ventilation. With louvres on both sides of the sheet, the airflow has been increased to generate an even greater movement of fresh air.</li> <li>• Choice of colors and finishes.</li> <li>• Durability (corrosion) : Strong, light, galvanised or coated metal corrugated sheet.</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

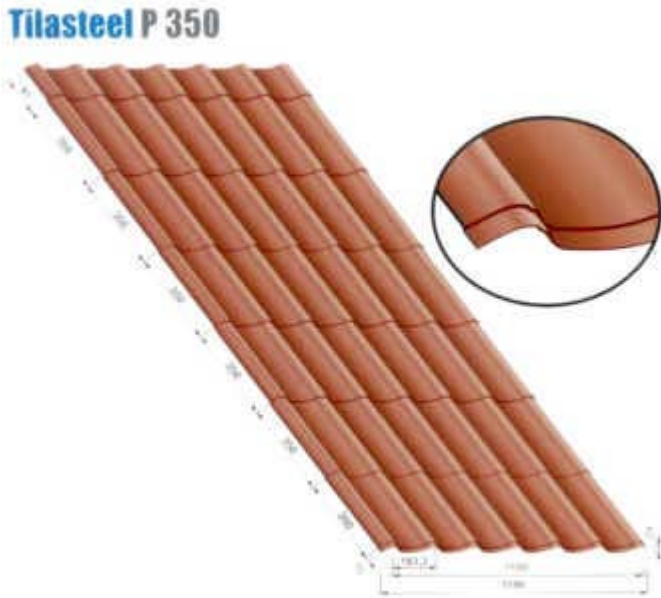
#### 4.3.3. Steel tile panels

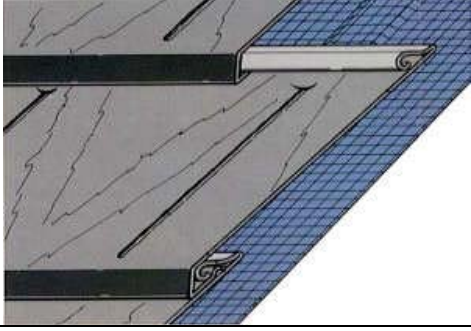
<b>System name:</b> <ul style="list-style-type: none"> <li>Roof-tile panels</li> <li>Permapan</li> </ul>	<b>Fabricator address:</b> NV JORIS IDE Hille 174 B-8750 Zwevezele Tel : +32 51 61 07 77 Fax: +32 51 61 07 79 Email : verkoop.belgie@jorisode.be Web site : www.jorisode.be
<b>Application field :</b> Roof	
<b>Product description :</b> Steel tiles, with or without insulation	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <p>Roof-tile</p> </div> <div style="text-align: center;">  <p>Permapan</p> </div> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>Dimensions:                         <ul style="list-style-type: none"> <li>Length : from 1,05 to 8,4 meters,</li> <li>width: 1,10 m</li> </ul> </li> <li>Certificates or standards : ATG 5102-1644</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>Price order : with insulation: 26,4 to 30,4 euros/m<sup>2</sup> ; without insulation: 7,15 to 7,85 euros/m<sup>2</sup></li> </ul>	
<b>Comments :</b> No maintenance costs, self-cleaning, not of formation of foam. All the parts of completion necessary are available.	




<b>System name:</b> <ul style="list-style-type: none"> <li>○ Rapide</li> <li>○ Royale</li> <li>○ Scanroof</li> </ul>	<b>Fabricator address:</b> PLANNJA AB 69 High Street, Maidenhead, Berkshire SL6 1JX UK Tel : +44 (0)1628 637313 Fax : +44 (0)1628 674940 Email : <a href="mailto:enquire@plannja.co.uk">enquire@plannja.co.uk</a> Web site : <a href="http://www.plannja.com">www.plannja.com</a> <a href="http://www.plannja.co.uk">www.plannja.co.uk</a>
<b>Application field :</b> Roof	
<b>Product description :</b> Steel Tiles panels	
<b>Pictures :</b> <div style="text-align: center;">  <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span>Rapide</span> <span>Royale</span> <span>Scanroof</span> </div> </div>	
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b>	



<b>System name:</b> POLYTUIL	<b>Fabricator address:</b> POLYTUIL S.A. Parc industriel des Hauts-Sarts Rue de Hermée 186 B-4040 Herstal Tel : 00 32 (4) 240 51 51 Fax : 00 32 (4) 240 51 99 <a href="http://www.polytuil.com">http://www.polytuil.com</a>
<b>Application field:</b> Light roofing system; residential, offices, schools, ... buildings	
<b>Product description:</b> <ul style="list-style-type: none"> <li>• Robust roofing system designed to withstand the heaviest storms, the lashing rains, hail, frost, gales and fire.</li> <li>• This lightweight system perfectly sticks to the traditional features of the tiles</li> <li>• The roofing element is a <math>\pm 1/2</math> m<sup>2</sup> panel that is made of a galvanised (2) steel (1) base, which is coated on both sides with an epoxy primer (3). Its weather surface is coated with an acrylic resin (4) to which a finishing layer of natural stone granules (5) protected by a clear overglaze binder, is added (6).</li> </ul>	
<b>Pictures:</b>  <p>The composite image includes a cross-section diagram of a tile with layers labeled 1 to 6. It also shows three rows of tiles in different colors: dark grey (Stratos), reddish-brown (Decra), and dark brown (Oberon). To the right are two photographs of buildings with roofs covered in Polytuil tiles.</p>	
<b>Technical comments:</b> <ul style="list-style-type: none"> <li>• Size : according the type of Polytuil choosen (see figure above)</li> <li>• Density of Polytuil : 6,8 kg/m<sup>2</sup></li> <li>• Good acoustic attenuation – no metal noise thanks to the coating</li> <li>• Good mechanical resistance (stress of weather)</li> <li>• Slope : 21% up to vertical. The weight/slope asset of the Polytuil system proves still more valuable for large-sized roofs. In such case, a low pitch is adopted to reduce the roofing surface and to ease the fixing works. Savings on the framework may be significant.</li> <li>• Re-roofing over an old roof in schools or residential buildings can be realized in record time and without interrupting the usual activities. This product is particularly well suited to the flat-to-pitch roof conversion.</li> <li>• The Polytuil finishing accessories allow the roofer to provide a faultless finish, perfect weather tightness and reliable roof ventilation.</li> <li>• The Decra® Stratos® and Oberon® systems have obtained the technical Agrément certificate that confirms their performances.</li> <li>• All type of frame (steel, wood, ...) can be used with Polytuil.</li> <li>• shatter-proof → no problem of transport, ...</li> <li>• Guarantee : 30 years.</li> </ul>	
<b>Marketing information:</b> <p><b>Comments:</b> The technology involved and the components of their products comply with the most demanding ecological standards (the scraps are recyclable through the usual channels).</p>	

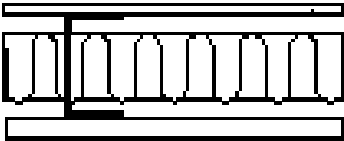
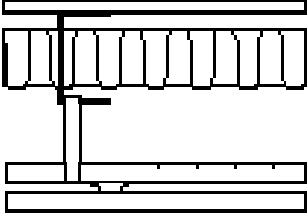
<b>System name:</b>  <b>Tilasteel P350</b>	<b>Fabricator address:</b> TECTONIA (Groupe Corus) 22, avenue Jean de Beco F-59720 LOUVROIL Tel : 03.27.53.05.20 Fax : 03.27.53.05.21 (M. Laurent) Web site : <a href="http://www.tectonia.com">www.tectonia.com</a>  ISOMETALL S.A. Z.I. de la Baraque Fraiture route de La Roche B-6960 MANHAY Tel : 0032 (0) 80 41 81 60 0032 Fax : (0) 80 41 81 61 Email : <a href="mailto:info@isometall.com">info@isometall.com</a> Web site : <a href="http://www.isometall.be">www.isometall.be</a>
<b>Application field :</b> Roof	
<b>Product description :</b> Steel tile panel and insulated panel	
<b>Pictures :</b>  	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions: length : from 2550 to 6050, height : 24 mm, width : 1100 mm. Steel thickness : 5/10</li> <li>• Durability (corrosion) : galvanised steel (DX 51 class), painted</li> <li>• EPS insulation possibilities. (ISOMETAL)</li> <li>• Certificates or standards : ISO 9002, "Avis technique" in progress</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order: on quotation ; jobbing only</li> <li>• Market in progression</li> </ul>	
<b>Comments :</b>	


<b>System name:</b> ○ AS2000	<b>Fabricator address:</b> STEADMANS Ltd Warnell, Welton, Carlisle, Cumbria CA5 7HH UK Tel : +44 16974 78277 Fax : +44 16974 78530 Email : info@steadmans.co.uk Web site : www.steadmans.co.uk
<b>Application field :</b> Roof	
<b>Product description :</b> Steel tiles. Designed to imitate natural roof slate, this unique lightweight metal roof cladding system provides a fast, effective and economical solution to a wide range of applications.	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Manufactured in modular lengths</li> <li>• Weight 6Kg/m<sup>2</sup></li> <li>• Matt polyester paint surface</li> <li>• Other colours and finishes are available to special order - subject to quantity and coil availability.</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> <ul style="list-style-type: none"> <li>o tuile romane</li> <li>o tuile biberschwanz</li> <li>o tuile ardoise</li> </ul>	<b>Fabricator address:</b> SUD TUILES SA Zone Industrielle de l'Habitarelle F-30110 LES SALLES DU GARDON Tel : 00 33 (0)4 66 54 25 25 Fax : 00 33 (0)4 66 54 25 26 Email : <a href="mailto:contact@sudtuiles.com">contact@sudtuiles.com</a> Web site : <a href="http://www.sudtuiles.com">www.sudtuiles.com</a>
<b>Application field :</b> Roof	
<b>Product description :</b> Steel Tiles in panels covered with Mineral Granulate. The mineral granulate preserves aesthetic aspect by simulating traditional tile.	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: center;">    </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 5px;"> <span>tuile romane</span> <span>tuile biberschwanz</span> <span>tuile ardoise</span> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : <ul style="list-style-type: none"> <li>– Roman tile : 1 050 * 388 mm ; 2,45 tiles / m<sup>2</sup> ; color : red, anthracite, green or coffee</li> <li>– Biberschwanz tile : 1 130 * 510 mm ; 1,7 tiles / m<sup>2</sup> ; color : red, anthracite, green or coffee</li> <li>– State tile : 1.250 * 369 mm ; 2,17 tiles / m<sup>2</sup> ; color : red, anthracite, green or coffee</li> </ul> </li> <li>• Mineral Granulate offers a better heat resistance and diminish acoustic level by "breaking" the raindrop.</li> <li>• Realised in high quality galvanised steel, varnished, covered with mineral granulate</li> <li>• Tiles offer a long-life and water-tightness guarantee</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	






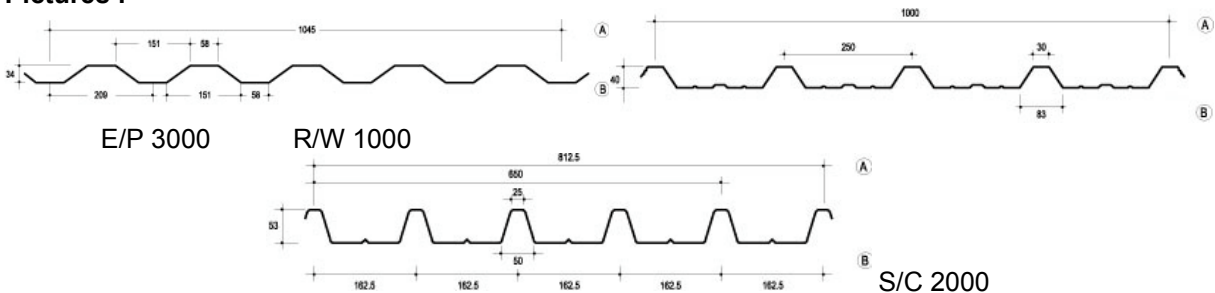
#### 4.4. Ceiling systems

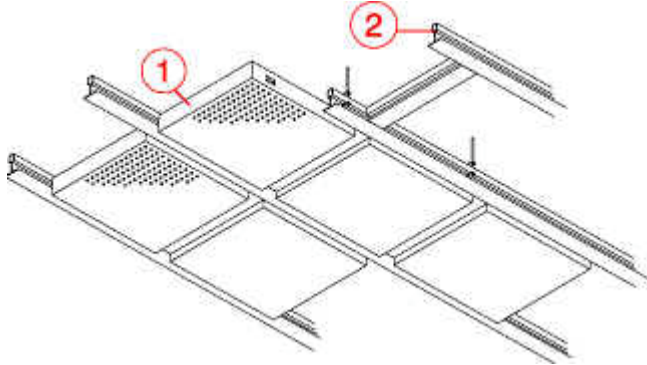
<b>System name:</b> Freeframe Ceiling: FFC01, FFC02	<b>Fabricator address:</b> BANRO SECTIONS Ltd Manor Works, Pleck Road, Walsall, West Midlands, WS2 9ES Tel : +44 1922 724789 Fax : +44 1922 644460 Email : jle@banro.co.uk Web site : www.banro.co.uk
<b>Application field :</b> Ceiling	
<b>Product description :</b>	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p style="text-align: center;">FFC01 FFC02</p>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>FFC01: Frame: 73mm steel channel 1.2 mm gauge (CH7312), Internal Lining: One layer 15mm Lafarge Megadeco plasterboard, External Lining: One layer 9mm Minerit, Insulation: 50mm mineral wool density 33kg/m<sup>3</sup> <ul style="list-style-type: none"> <li>Weight 25 Kg/m<sup>2</sup>, Fire resistance 30, Sound insulation 45-76 dB, Thermal transmittance 0.45</li> </ul> </li> <li>FFC02 Frame: 73mm steel channel 1.2 mm gauge (CH7312), External Lining: One layer 9mm Minerit, Internal Lining: One layer 15mm Lafarge Megadeco plasterboard fixed to metal furring, suspended ceiling system, Insulation: 50mm mineral wool density 33kg/m<sup>3</sup> <ul style="list-style-type: none"> <li>Weight 29 Kg/m<sup>2</sup>, Fire resistance 60, Sound insulation 50- dB, Thermal transmittance 0,40</li> </ul> </li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> Synops I Synops H	<b>Fabricator address:</b> CLESTRA HAUSERMAN 56 rue Jean Giraudoux F-67035 STRASBOURG CEDEX Tél : 03 88 27 68 00 Fax : 03 88 27 68 01 Email : f.legrand@clestra.com Web site : <a href="http://www.clestra.com/_multimed/accueil_htmhell.htm">www.clestra.com/_multimed/accueil_htmhell.htm</a>
<b>Application field :</b> Ceiling	
<b>Product description :</b> micro-perforated electro-galvanised steel panel	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : Panel thickness : 45 mm ; steel thickness : 1 mm (Synops H) &amp; 0,8 mm (Synops I). Maximum Size : 1500 * 2400 mm</li> <li>• Fire resistance: M0</li> <li>• Acoustic performances with rock-wool 40 kg/m<sup>2</sup> panel (for Synops I) :                         <ul style="list-style-type: none"> <li>– (F) D<sub>n,c(rose)</sub> : 41 to 45 dB</li> <li>– (D, DK) D<sub>n,cw</sub> : 42 to 46 dB</li> </ul> </li> <li>• Durability (corrosion) : phosphatation treatment and acrylic paint</li> <li>• Certificates or standards : (CH) SIA 256 (DE) TAIM (FR) DTU 58,1 (UK) BS 8290 (USA) ASTM C635 91 ; C636 92</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price order : 190 euros m<sup>2</sup></li> <li>• Quantity produced by year : 50 000 – 70 000 m<sup>2</sup></li> </ul>	
<b>Comments :</b>	



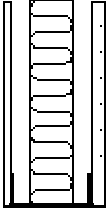
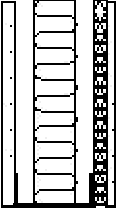
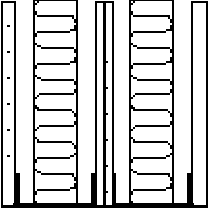
<b>System name:</b> <ul style="list-style-type: none"> <li>○ Flairline</li> <li>○ Xtraspan Cover-Fast</li> <li>○ Furring System</li> <li>○ Grid System</li> </ul>	<b>Fabricator address:</b> HADLEY GROUP PO Box 92 Downing Street Smethwick West Midlands B66 2PA, UK Tel : +44 121 555 1300 Fax : +44 121 555 1301 Email : info@hadleygroup.co.uk Web site : www.hadleygroup.co.uk
<b>Application field :</b> Ceiling	
<b>Product description :</b> These systems can be used to create ceilings which original aesthetic pleasing.	
<b>Pictures :</b>	
 <p style="text-align: center;">Flairline</p>	 <p style="text-align: center;">Xtraspan</p>  <p style="text-align: center;">Furring System</p>
<b>Technical comments :</b>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> <ul style="list-style-type: none"> <li>○ E/P 3000</li> <li>○ R/W 1000</li> <li>○ S/C 2000</li> </ul>	<b>Fabricator address:</b> ISOLPACK SpA C.so Vittorio Emanuele, 99 10128 TORINO (ITALIA) Tel : ++39 011 56075.11 Fax : ++39 011 5611713 Email : info@isolpack.com Web site : www.isolpack.com
<b>Application field :</b> Ceiling	
<b>Product description :</b> Corrugated steel sheet	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : width up to 1045 mm, length upon request from continuous production process. Thickness: from 0,6 up to 1.5 mm</li> <li>• Steel according to EN 10147 type Fe E 250 G Norm.</li> <li>• Durability (corrosion) : simple hot galvanised through “sendzimir” process, galvanised prepainted or plastified steel; stainless steel. Protective treatments available upon request: polyester coating for outdoors, non toxic prepainting when food is involved, silicon polyester, PVDF, thermoplastic Class A, application of PVC plastic films or other films.</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	


<b>System name:</b> Plafonds évolutifs	<b>Fabricator address:</b> TOLARTOIS Parc d'activités Washington Avenue de la ferme du roy BP 213 F-62404 BÉTHUNE CEDEX Tel : 33 (0) 3 21 64 75 75 Fax : 33 (0) 3 21 64 75 76 Email : <a href="mailto:contact@tolmega.com">contact@tolmega.com</a> Web site : <a href="http://www.tole-perforee.com">www.tole-perforee.com</a>
<b>Application field :</b> Ceiling	
<b>Product description :</b> Suspended ceiling for service sector, municipal buildings, shopping centres  Horizontal or vertical ribs made to specific Size, from galvanised steel, pre-coated steel or stainless steel. Certain models even have perforations or vanes between the ribs.	
<b>Pictures :</b>    1 : perforated metal trays 2 : bearers, spacers	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : modular metal trays : 600 * 600 mm (and other Size). Perforations : many possibilities. Fixation : 4 different types : hidden or visible framework</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price : on quotation only</li> <li>• Produced quantity by year : 20 000 m2</li> <li>• Speed erection : easy and rapid to install (no specific installation costs)</li> <li>• customer perception : large choice of products, good adaptability to customer needs (colors and Size).</li> </ul>	
<b>Comments :</b>	

<b>System name:</b> Gamme Outremer : <ul style="list-style-type: none"><li>o Neptune</li><li>o Ulysse</li><li>o Poséïdon</li><li>o Triton</li><li>o Martinique</li><li>o Caraïbes</li></ul>	<b>Fabricator address:</b> TOLARTOIS Parc d'activités Washington Avenue de la ferme du roy BP 213 F-62404 BÉTHUNE CEDEX Tel : 33 (0) 3 21 64 75 75 Fax : 33 (0) 3 21 64 75 76 Email : contact@tolmega.com Web site : www.tole-perforee.com																																																								
<b>Application field :</b> Wall facing, wall cladding (interior and exterior), ceiling cladding																																																									
<b>Product description :</b> Horizontal or vertical ribs made to specific size, from galvanised steel, pre-painted steel or stainless steel. Several models even have perforations or vanes between the ribs.																																																									
<b>Pictures :</b> <div><ul style="list-style-type: none"><li>• Sirène</li><li>• Neptune</li><li>• Ulysse</li><li>• Poséïdon</li><li>• Triton</li><li>• Martinique</li><li>• Caraïbe</li></ul></div>																																																									
<b>Technical comments :</b> <ul style="list-style-type: none"><li>• Dimensions : length : up to 6 m. For detail, see table below :</li></ul>																																																									
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<b>Marketing information :</b> <ul style="list-style-type: none"><li>• Price : on quotation only</li><li>• Produced quantity : 20 000 m2 by year</li><li>• Speed erection : easy to install (5 to 10 % more time to install than traditional cladding). Easier to install with 1m/1m size.</li><li>• customer perception : large choice of products, good adaptability to customer needs (colors and Size).</li></ul>																																																									
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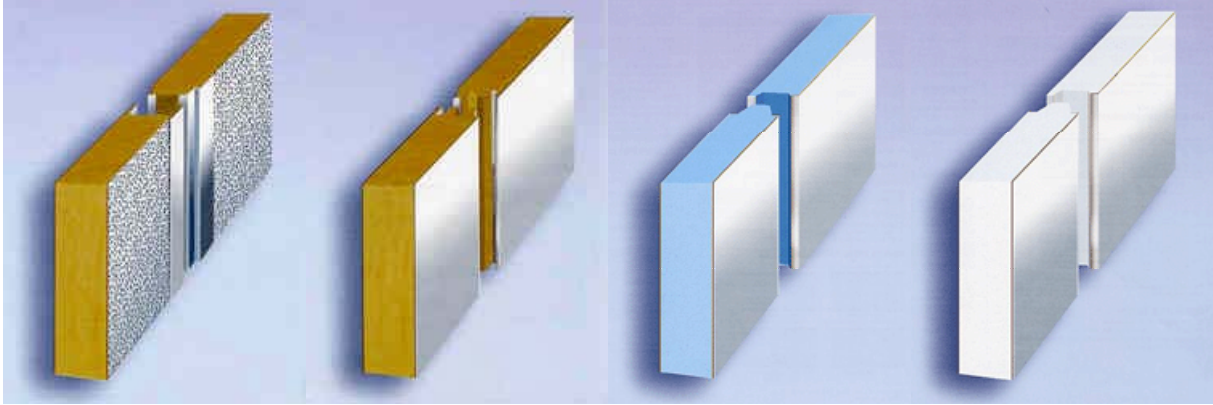
## 4.5. Partitions systems

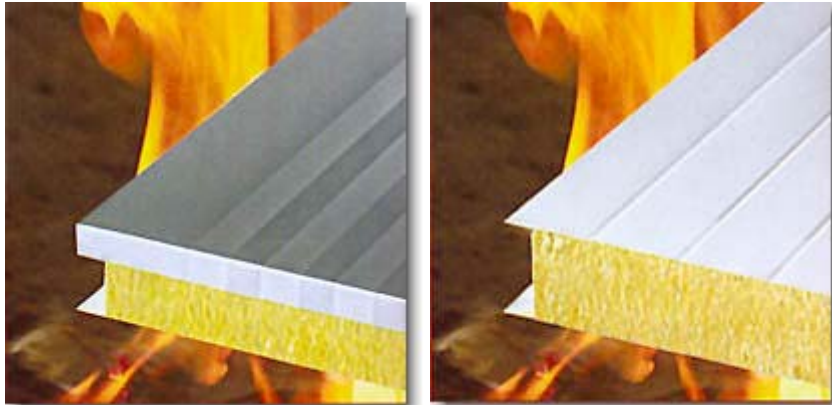
<b>System name:</b> Freeframe Wall: <ul style="list-style-type: none"> <li>○ FFW01</li> <li>○ FFW02</li> <li>○ FFW03</li> </ul>	<b>Fabricator address:</b> BANRO SECTIONS Ltd Manor Works, Pleck Road, Walsall, West Midlands, WS2 9ES UK Tel : +44 1922 724789 Fax : +44 1922 644460 Email : jle@banro.co.uk Web site : www.banro.co.uk
<b>Application field :</b> Partitions	
<b>Product description :</b> dry lining	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: center; text-align: center;"> <div data-bbox="448 629 555 835">  </div> <div data-bbox="767 629 882 835">  </div> <div data-bbox="1062 629 1270 835">  </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span>FFW01</span> <span>FFC02</span> <span>FFW03</span> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• <b>FFW01</b> Frame: 93mm steel channel 1.2mm gauge (CH9312). Internal lining: One layer 15mm Lafarge Megadeco plasterboard. Insulation: 50mm mineral wool density 33kg/m<sup>3</sup> <ul style="list-style-type: none"> <li>– Weight 26 Kg/m<sup>2</sup>, Fire resistance 30, Sound insulation 45-n.a dB, Thermal transmittance n.a</li> </ul> </li> <li>• <b>FFW02</b> Frame: 93mm steel channel 1.2mm gauge (CH9312). Internal lining: One layer 15mm Lafarge Vapourcheck Megadeco plasterboard. External Lining: One layer 22mm Thermal Minerit. Insulation: 50mm mineral wool density 33kg/m<sup>3</sup> <ul style="list-style-type: none"> <li>– Weight 27 Kg/m<sup>2</sup>, Fire resistance 60, Sound insulation 48-n.a dB, Thermal transmittance 0,35</li> </ul> </li> <li>• <b>FFW03</b> Two <b>FFW01</b> back-to-back. Internal Lining: One layer 15mm Lafarge Megadeco plasterboard. Sandwich lining: Two layers 9mm Minerit.           <ul style="list-style-type: none"> <li>– Weight 52 Kg/m<sup>2</sup>, Fire resistance 120, Sound insulation 55-n.a dB, Thermal transmittance n.a</li> </ul> </li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> <ul style="list-style-type: none"> <li>○ Synchronne</li> <li>○ Synops I</li> <li>○ Synops H</li> </ul>	<b>Fabricator address:</b> CLESTRA HAUSERMAN 56 rue Jean Giraudoux F-67035 STRASBOURG CEDEX Tél : 03 88 27 68 00 Fax : 03 88 27 68 01 Email : f.legrand@clestra.com Web site : <a href="http://www.clestra.com/_multimed/accueil_htmhell.htm">www.clestra.com/_multimed/accueil_htmhell.htm</a>
<b>Application field :</b> Partition	
<b>Product description :</b> electro-galvanised steel panel	
<b>Pictures :</b> <div data-bbox="256 613 1262 1099">  </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions :. Panel thickness : 83 mm ; steel thickness : up to 1 mm. Width : up to 1600 mm, height : up to 4200 mm. For Synchronne : modulated Size.</li> <li>• Durability (corrosion) : phosphatation treatment and acrylic paint</li> <li>• Fire resistance class M0, panel CF60, glass panel CF60, with door PF30</li> <li>• Acoustic performances: panel 45 dB, glass panel 42 dB, with door 42 dB</li> <li>• Interaction with the light work : chutes for the passage of the cables</li> <li>• Certificates or standards : (CH) SIA 256 (DE) TAIM (FR) DTU 58,1 (UK) BS 8290 (USA) ASTM C635 91 ; C636 92</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price : 400 Euros linear meter with doors included (1 door for 7 linear meter). For fire-wall 600 Euros.</li> <li>• Quantity produced by year : 150 000 linear meters a year</li> </ul>	

















<b>System name:</b> <ul style="list-style-type: none"> <li>○ Sandwich Panel P</li> <li>○ Sandwich Panel W</li> </ul>	<b>Fabricator address:</b> GASELL PROFIL AB Box 7 SE-231 08 ANDERSLÖV, Sweden Tel : +46 410 214 00 Fax : +46 410 216 30 Email : <a href="mailto:export@gasell.com">export@gasell.com</a> Web site : <a href="http://www.gasell.com">www.gasell.com</a> and <a href="http://www.gasell.co.uk">www.gasell.co.uk</a>
<b>Application field :</b> Partition	
<b>Product description :</b> The Gasell composite panels are of unique design and have a variety of surface shapes to meet the designer's choice. The lightweight panels combine strength and stability having excellent spanning properties and a high insulation value provided by its' CFC free polyurethane core. The high performance panel is fitted with sealant materials at joints to improve air and weather tightness can also be secret fixed to provide an attractive facade. The panels are supplied with the edge turned down for cleaner joints.	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : overall width : 915 mm standard; length : up to 10 m, panel thickness : 35 to 120 mm</li> <li>• Thermal performances : K-Values : 0,64 to 0,20 W/m²K</li> <li>• Fire resistance : comply with DIN 4102 and ÖNORM 3800, and are classified in building materials category B1</li> <li>• Durability (corrosion) : CFC free polyurethane foam core, exterior and interior skin : standard 0.60mm galvanised steel as per DIN 17162 with quality class Z275 (275g/m² total to both sides). Other thickness available on request. Exterior Surface : PVF2 Kynar 500 25 micron. Interior Surface : polyester coating 15 micron and protective film 150 micron</li> <li>• Certificates or standards : FM Approved: Subject to the conditions of Approval as a Class 1 insulated wall panel when installed as described in the current edition of the FMRC Approval Guide and FMRC Report J.1.2V0A1.AM.</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

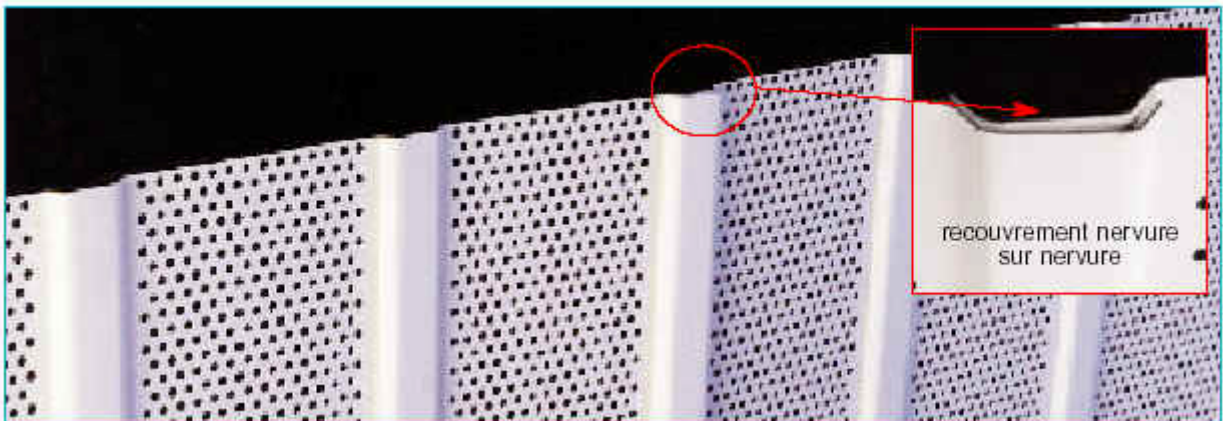


<b>System name:</b> <ul style="list-style-type: none"> <li>○ lebson</li> <li>○ lecfeu</li> <li>○ lectol</li> <li>○ lecpol</li> </ul>	<b>Fabricator address:</b> ISOCOMPOSITES ZI de la Chevalerie 864, rue Jules Vallès F-50008 SAINT-LO Cedex Tel : (33) 02.33.72.72.00 - Fax : (33) 02.33.72.72.01 Email : joel.bocher@isocomposites.fr Web site : www.isocomposites.fr
<b>Application field :</b> Sandwich panels	
<b>Product description :</b> Manufacture of sandwich panels of big length until 12m and width 1198. Insulators are extruded polystyrene, expanded polystyrene, and rockwool.	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around; align-items: center;">  </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <span>lebson</span> <span>lecfeu</span> <span>lectol</span> <span>lecpol</span> </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions :           <ul style="list-style-type: none"> <li>– Lecson : width : 1180 mm, insulator thickness : 60, 80, 100, 120 mm. Length : up to 6 m. Phonic isolation especially.</li> <li>– Lecfeu : width : 1180 mm, insulator thickness : 60, 80, 100, 120, 150 mm. Length : up to 6 m. Fire resistance, especially.</li> <li>– Lectol : width : 1180 mm, insulator thickness : 60, 80, 100, 120 mm. Length : up to 12 m</li> <li>– Lecpol : width : 1180 mm, insulator thickness : 60, 80, 100, 120 mm. Length : up to 12 m</li> </ul> </li> <li>• Loading resistance :           <ul style="list-style-type: none"> <li>– Lecson : thickness : 2 to 2,5 m</li> <li>– Lecfeu : thickness : 2,5 to 4 m</li> <li>– Lectol : thickness : 2 to 4 m</li> <li>– Lecpol : thickness : 2 to 4 m</li> </ul> </li> <li>• Durability (corrosion) : galvanised steel and painted</li> <li>• Fire resistance : Lecson : M0 (rock wool), Lecfeu : M0 (rock wool), Lectol (EPS): M1, Lecpol (PS): M1</li> <li>• Thermal performances :           <ul style="list-style-type: none"> <li>– Lecson : up to <math>K = 0,34</math>, Lecfeu : up to <math>K = 0,27</math></li> <li>– Lectol : up to <math>K = 0,26</math>, Lecpol : up to <math>K = 0,26</math></li> </ul> </li> <li>• Certificates or standards : DTU 45.1, "avis technique CSTB 2/99-717 &amp; CSTB 2/99-716"</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Quantity produced by year : 150-200 000 m<sup>2</sup>/an for the four products (lebson, lecfeu, lectol, lecpol)</li> <li>• Price order : (60 mm thickness insulator) (decreasing on volume)           <ul style="list-style-type: none"> <li>– Lecfeu : 28 to 32,5 €/m<sup>2</sup> , Lectol : 23, 7 to 25,85 €/m<sup>2</sup></li> <li>– Lecson : 33,50 to 39,60 €/m<sup>2</sup> , Lecpol : 54,75 to 57,3 €/m<sup>2</sup></li> </ul>           Exact quotation in one hour         </li> <li>• Market : business in regular progression for Isocomposites.</li> </ul>	
<b>Comments :</b>	

<b>System name:</b> Fireproof panel	<b>Fabricator address:</b> PFLAUM & SÖHNE GESMBH Ganglgutstr. 89 A-4050 Traun Email : office@pflaum.co.at Web site : www.pflaum.co.at
<b>Application field :</b> Partition The outstanding characteristics enable a great range of application. It ranges from external and internal wall construction to the construction of ventilation plants, office containers, roofs, ceilings enamelling chambers and drying installations.	
<b>Product description :</b> The alternative to concrete in F30, F60, F90 and <b>F180</b> . The insulation core of the panel is non combustible acc. fire resistance class A1. An element thickness of 70 mm responds to F30 & W60, a thickness of 100 mm responds to F60 & W90. An element thickness of 120 mm achieves F90. The panels are available with different profile designs and thickness.	
<b>Pictures :</b> <div style="display: flex; justify-content: space-around;">  </div>	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions : width :915 mm or 1100 mm. Special construction widths : between 500 mm and 1200 mm. length : standard length at most 10 m. Thickness : 35, 40, 50, 60, 70, 80, 100, 120, 140, 160, 180, 200 mm. At panels of series L and V, 2 mm must be added to the standard thickness because of the profile design.</li> <li>• Fire resistance : behaviour to fire : (thickness/class) 70mm/F30    80mm/F60    120mm/F90    100mm/F180</li> <li>• Acoustic performances : sound insulation : 35 to 60 mm : 34dB, 70 to 200mm : 35dB</li> <li>• Thermal value : K-values :    35 mm                    1,19 W/m²K     200 mm                0,24 W/m²K</li> <li>• Durability (corrosion) : resistance class K III / DIN 55 928 part 8. Outer and inner plate: 0,55 mm - 0,75 mm sendzimir galvanised steel acc. DIN 17162, polyester or PVDF coated. Insulation: Mineral fibre plates in a web form, non combustible acc. fire resistance class A1. Sealant: For tongue- and groove joint acc. demands of the fire resistance class. Higher steel thickness upon request. Polyester coating 25 µm, PVDF 80/20, Kynar 500 appr. 25 µm. Colours in stock: RAL 9002, RAL 9006, RAL 9010. Further colours acc. Pflaum-Colour-Spektrum (available upon request). Surface protection : The panels are supplied with a protection foil.</li> </ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> SISTEMA POLIDOMUS	<b>Fabricator address:</b> POLISTAMP PRATOVECCHIO(Arezzo) -Loc Sala 52015, 8/A Tel : 0575/5081 Fax : 0575/583667 Email : polistamp@polistamp.com Web site : www.polistamp.it
<b>Application field :</b> Panels designed for interior walls and partitions, for box constructions, modular monoblocs and prefabricated houses.	
<b>Product description :</b> The system comprises integrated components and accessories, and can answer to the market 's increasing functional requirements. Thanks to the updated technology of POLISTAMP, cable holder tubes and special mouldings can be put inside the panel. Thus, granting an installation method which meets with other accessories such as angles, joints and mouldings, all co-ordinated with the same external finishing of the panels, the customers' needs. These finishing can be prevarnished, plasficed, plain, goffered and microribbed.	
<b>Pictures :</b> <div><div><div>Acciaio, alluminio, rame, legno, cemento, marmo, granito, marmo, trass, forme (N.F.D.L.) e colori. Steel, aluminium, copper, wood, cement, marble, granite, travertine, trass, forms (N.F.D.L.) and colours. Acier, aluminium, cuivre, bois, ciment, marbre, granit, travertine, de formes (N.F.D.L.) et couleurs. Stahl, Aluminium, Kupfer, Holz, Zement, Marmor, Granit, Travertin, Trass, Formen (N.F.D.L.) und Farben.</div><div><div>SUPPORTI / SUPPORTS / SUPPORTS / STAENDER</div><div><div>METALLICI / METALLIC / METALLIQUES / METALLSTAENDER</div><div>NONMETALLICI / NONMETALLIC / NONMETALLIQUES / NICHTMETALL</div></div><div><div><div>.. / N</div><div>.. / F</div><div>.. / D</div><div>.. / L</div></div><div><div>PE / FF</div><div>PE / DD</div></div></div><div><div>INCASSI / GROOVES / ENBOITEMENTS / EINSCHREIBUNGEN</div><div><div>Mod. PE</div><div>Mod. PA</div><div>Mod. PB</div><div>Mod. PS</div><div>Mod. PD</div><div>Mod. PC</div><div>Mod. PL</div></div><div><div>↑ 20-100 ↓</div><div>↑ 35-40 ↓</div><div>↑ 35-40 ↓</div><div>↑ 40-100 ↓</div><div>↑ 40-100 ↓</div><div>↑ 40-100 ↓</div><div>↑ 25-100 ↓</div></div><div><div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div></div></div></div></div></div></div>	
<b>Technical comments :</b> <ul style="list-style-type: none"><li>• Dimensions : max length : 13 m Width : 100 to 1200 mm. Offers monolithic panels with a maximum surface of 2400x4000 mm. Average density : 40 ± 2 Kg/m²</li><li>• Fire resistance : M3 \ B2 \ M1</li><li>• Thermal performance : 0,020 W/m.K</li></ul>	
<b>Marketing information :</b>	
<b>Comments :</b>	

<b>System name:</b> Gamme Outremer : <ul style="list-style-type: none"><li>o Neptune</li><li>o Ulysse</li><li>o Poséïdon</li><li>o Triton</li><li>o Martinique</li><li>o Caraïbes</li></ul>	<b>Fabricator address:</b> TOLARTOIS Parc d'activités Washington Avenue de la ferme du roy BP 213 F-62404 BÉTHUNE CEDEX Tel : 33 (0) 3 21 64 75 75 Fax : 33 (0) 3 21 64 75 76 Email : <a href="mailto:contact@tolmega.com">contact@tolmega.com</a> Web site : <a href="http://www.tole-perforee.com">www.tole-perforee.com</a>																																																								
<b>Application field :</b> Wall facing, wall cladding (interior and exterior), ceiling cladding																																																									
<b>Product description :</b> Horizontal or vertical ribs made to specific size, from galvanised steel, pre-painted steel or stainless steel. Several models even have perforations or vanes between the ribs.																																																									
<b>Pictures :</b> <div><ul style="list-style-type: none"><li>• Sirène </li><li>• Neptune </li><li>• Ulysse </li><li>• Poséïdon </li><li>• Triton </li><li>• Martinique </li><li>• Caraïbe </li></ul></div>																																																									
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Rib	Sirène	Martinique	Triton	Ulysse	Neptune	Poseidon	Caraïbe																																																		
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Horizontal or vertical rib	yes	yes	yes	yes	yes	yes	vertical																																																		
<b>Marketing information :</b> <ul style="list-style-type: none"><li>• Price : on quotation only</li><li>• Produced quantity : 20 000 m2 by year</li><li>• Speed erection : easy to install (5 to 10 % more time to install than traditional cladding). Easier to install with 1m/1m size.</li><li>• customer perception : large choice of products, good adaptability to customer needs (colors and Size).</li></ul>																																																									
<b>Comments :</b> Example: Polyester for exterior 1 or 2 surfaces according to RAL. Pre-painted steel on DX 51D galvanised base: RAL 9010, other RAL colours on request																																																									

<b>System name:</b> Isotol	<b>Fabricator address:</b> TOLARTOIS Parc d'activités Washington Avenue de la ferme du roy BP 213 F-62404 BÉTHUNE CEDEX Tel : 33 (0) 3 21 64 75 75 Fax : 33 (0) 3 21 64 75 76 Email : contact@tolmega.com Web site : www.tole-perforee.com
<b>Application field :</b> Partitions	
<b>Product description :</b> Pre-coated galvanised white steel, RAL 9010	
<b>Pictures :</b> 	
<b>Technical comments :</b> <ul style="list-style-type: none"> <li>• Dimensions :           <ul style="list-style-type: none"> <li>– thickness 0.75 mm</li> <li>– length 3000 to 6000 mm</li> <li>– width 958 mm.</li> </ul> </li> <li>• Perforations : open area 23 to 25 %</li> </ul>	
<b>Marketing information :</b> <ul style="list-style-type: none"> <li>• Price : on quotation only</li> <li>• Produced quantity : 300 products 2002 / 600 products 2001</li> <li>• Speed erection : easy to install (5 to 10 % more time to install than traditional cladding). Easier to install with 1m/1m Size.</li> <li>• customer perception : large choice of products, good adaptability to customer needs (colors and Size).</li> </ul>	
<b>Comments :</b>	

## 5. Conclusions

This survey points out how much steel is used and suitable for standardised systems in low-rise buildings.

All these products attest that steel solutions can lead to economical buildings with excellent performances in:

- Corrosion
- Aesthetic
- Durability
- Sustainability
- Thermal behaviour
- acoustic behaviour
- vibration
- fire resistance
- Interaction with the other building corporations

This survey will be presented to professional groups composed of architects, engineers, contractors, developers, etc in order to

1. Inform them about the possible systems
2. Get their views about these existing systems
3. Start the discussions concerning the drivers and brakes for the steel construction.