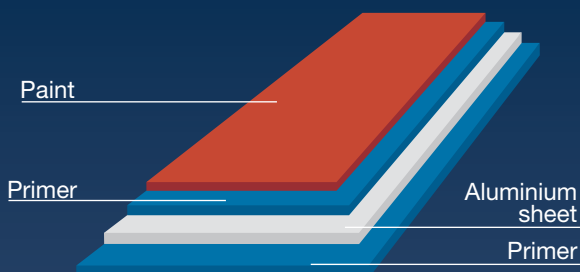


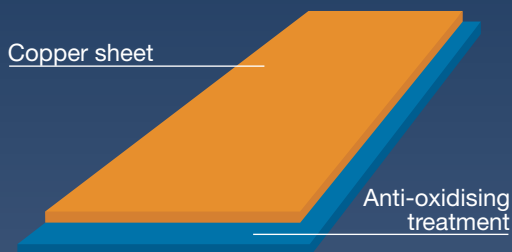
Sheet's composition

METAL FACINGS



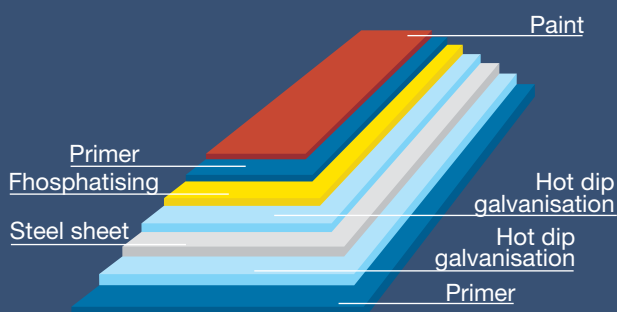
ALUMINIUM

- 1) ALUMINIUM ALLOY SHEET.
- 2) PAINTING CONSTITUTED BY A LAYER OF PRIMER AND BY A FILM OF ACRYLIC PAINT (OR PVDF) ON THE EXTERNAL SURFACE AND A LAYER OF PRIMER THAT FAVOURS THE ADHERENCE OF THE POLYURETHANE ON THE INTERNAL SURFACE.



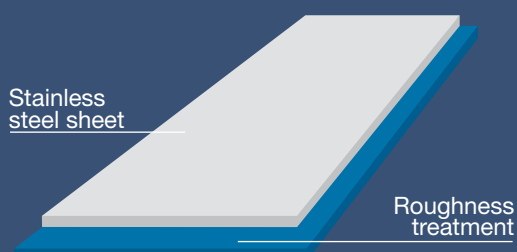
COPPER

- 1) COPPER SHEET.
- 2) ANTI-OXIDISING TREATMENT MECHANICALLY PERFORMED ON THE INTERNAL SURFACE TO INCREASE THE ADHERENCE OF THE POLYURETHANE.



STEEL

- 1) HOT DIP GALVANISED STEEL SHEET.
- 2) PHOSPHATION TREATMENT FOR A BETTER PROTECTION AGAINST OXIDATION.
- 3) PAINTING CONSTITUTED BY A LAYER OF PRIMER AND BY A FILM OF ACRYLIC PAINT (OR PVDF) ON THE EXTERNAL SURFACE AND A LAYER OF PRIMER THAT FAVOURS THE ADHERENCE OF THE POLYURETHANE ON THE INTERNAL SURFACE.



STAINLESS STEEL

- 1) AISI 304 OR 316 STAINLESS STEEL SHEET.
- 2) TREATMENT OF THE INTERNAL SURFACE WITH A SPECIAL MECHANICAL PROCEDURE WHICH FAVOURS THE ADHERENCE OF THE POLYURETHANE.

PREPAINTED STAINLESS STEEL

- 1) STAINLESS STEEL SHEET.
- 2) PAINTING CONSTITUTED BY A LAYER OF PRIMER AND BY A FILM OF ACRYLIC PAINT (OR PVDF) ON THE EXTERNAL SURFACE AND A LAYER OF PRIMER THAT FAVOURS THE ADHERENCE OF THE POLYURETHANE ON THE INTERNAL SURFACE.

EXPANDED POLYURETHANE FOAM (PUR)

THE TERM POLYURETHANE COVERS A WIDE FAMILY OF THERMOSETTING POLYMERS IN WHICH THE POLYMER CHAIN IS MADE OF URETHANE LINKAGES. POLYURETHANES ARE BASICALLY OBTAINED BY THE REACTION OF A DIISOCYANATE (AROMATIC OR ALIPHATIC) AND A POLYOL (TYPICALLY A POLYESTER OR POLYETHYLENE GLYCOL), TO WHICH IS ADDED A CATALYST TO IMPROVE THE REACTION YIELD AND OTHER ADDITIVES CONFERRING SPECIFIC CHARACTERISTICS TO THE MATERIAL TO OBTAIN, IN PARTICULAR: "SURFACTANTS" TO CHANGE THE SURFACE ASPECT, FLAME RETARDANTS, AND/OR BLOWING AGENTS (TO PRODUCE FOAMS).

THE RIGID POLYURETHANE FOAM IS A THERMOSETTING CROSS-LINKED POLYMER PRODUCED BY THE REACTION OF TWO MAIN COMPONENTS - POLYOLS AND POLYISOCYANATES - IN THE PRESENCE OF A BLOWING AGENT (TYPICALLY HYDROCARBONS, CO₂ OR OTHER MIXTURES) AND OTHER ADDITIVES SUCH AS CATALYSTS, SILICONES, FLAME RETARDANTS, ETC... THE REACTION IS EXOTHERMAL AND THE HEAT THAT IS GENERATED LEADS TO THE BOILING OF THE BLOWING AGENT THAT REMAINS ENCAPSULATED IN THE RESULTING CELL STRUCTURE. DURING THE REACTION LEADING THE RAW MATERIALS FROM THE LIQUID TO THE SOLID STATE OF THE FINAL POLYMER, THE FOAM SHOWS HIGH ADHERENCE PROPERTIES TO ALMOST ANY KIND OF SUPPORTS, A FEATURE THAT IS ESSENTIAL PRECISELY FOR THE DEVELOPMENT AND INDUSTRIALISATION OF THE INSULATING PANELS WITH FLEXIBLE COATINGS.

- POLYURETHANE FOAM (PUR) APPLIED CONTINUOUSLY.
- DENSITY "WITH SKIN": 40 KG/M³
- DENSITY "SKINLESS": 36-38 KG/M³
- WORKING THERMAL-CONDUCTIVITY: 0.023 W/MK.
- COMPRESSIVE STRENGTH AT 10% DEFORMATION: 1.2 KG/CM²
- VALUES OF ADHERENCE TO THE FACINGS: 1 KG/CM²

POLYISOCYANURATE (PIR)

THE POLYISOCYANURATE FOAMS HAVE A HIGHER CONCENTRATION OF METHYLENE DIPHENYL DIISOCYANATE COMPARED TO POLYURETHANE AND THEY THEREFORE HAVE A BETTER RESISTANCE AND GOOD PHYSICAL PROPERTIES AT HIGHER DENSITIES, PROVIDING THERMAL INSULATION, MECHANICAL STRENGTH AND THE TOTAL MONOLITHICITY OF THE PANEL.

ROCK WOOL

ROCK WOOL, ALSO KNOWN AS MINERAL WOOL, IS AN AMORPHOUS SILICATE OBTAINED BY FUSION OF ITS MINERAL COMPONENT (BASALT, A VOLCANIC ROCK COMPOSED OF PLAGIOCLASE, PYROXENE AND OLIVINE) AND THEIR RE-SOLIDIFICATION INTO FIBRES THAT ARE OFTEN MAINTAINED TOGETHER BY AN ASSOCIATED BINDER OF THERMOSETTING RESINS.

ROCK WOOL ACTS AS AN INSULATING CORE AND IS MADE OF MINERAL WOOL STRIPS BEING SET AT 90 DEGREES TO THE PLANE OF THE SUPPORTS.

- REACTION TO FIRE: INCOMBUSTIBILITY, THE ROCK WOOL PROVIDES AN EFFECTIVE PROTECTION AGAINST FIRE, WITH A MELTING POINT GREATER THAN

1.000 °C.

- SOUND INSULATION PROPERTIES: ROCK WOOL HAS THE ABILITY TO ABSORB AND REDUCE HIGH NOISE LEVELS.
- THERMAL INSULATION PROPERTIES: UP TO: 0.041 W/MK
- PERMEABILITY TO WATER VAPOUR: THANKS TO ITS FIBRE STRUCTURE, THE ROCK WOOL IS PERMEABLE TO WATER VAPOUR
- WATERTIGHTNESS: FIBRES HAVE A PERMANENT WATERTIGHTNESS
- NON HARMFUL TO HUMAN HEALTH AND ENVIRONMENT
- RESISTANCE TO MICROORGANISMS

THERMAL INSULATION

THAT REDUCE THE THERMAL FLUX EXCHANGED BETWEEN TWO ENVIRONMENTS WITH DIFFERENT TEMPERATURES. SPEAKING OF THERMAL INSULATION MEANS TO STUDY THE THERMAL CONDUCTIVITY OF A MATERIAL, GIVEN BY λ OR U AND GIVEN AS THE RATIO, IN STATIONARY CONDITIONS, BETWEEN THE OBSERVED THERMAL FLUX AND THE TEMPERATURE GRADIENT WHICH CAUSES THE PASSAGE OF HEAT. IN OTHER WORDS, THE THERMAL CONDUCTIVITY IS A MEASURE OF THE ATTITUDE OF A SUBSTANCE TO TRANSMIT HEAT AND IT DEPENDS ONLY ON THE NATURE OF THE MATERIAL, RATHER THAN ITS FORM.

SOUND INSULATION

THE SOUND INSULATION OF A MATERIAL IS GIVEN BY ITS ABILITY TO REDUCE THE PASSAGE OF SOUND ENERGY BETWEEN TWO ENVIRONMENTS. IN THE FIELD OF SOUND INSULATION IN CONSTRUCTION, WE APPLY THE LAW OF MASS THAT EXPRESSED THAT THE COEFFICIENT OF TRANSMISSION OF THE SOUND POWER INCREASES WITH THE DECREASING OF THE MASS OF THE WALL PER AREA UNIT AND THE SOUND FREQUENCY.

THE SOUND ABSORPTION, THAT IS TO SAY THE MATERIAL ABILITY TO ABSORB THE SOUND ENERGY, ASSUMES DIFFERENT MECHANISMS THAT DEPEND ON THE POROSITY, THE RESISTANCE OF THE FLOW AND OF THE MATERIAL ABILITY TO ABSORB THE AIR VIBRATION (ACOUSTIC TRANSPARENCY). A SOUND ABSORBING MATERIAL SHOULD HAVE BOTH A HIGH ACOUSTIC TRANSPARENCY (IE LOW FLOW RESISTANCE) AND A GOOD ENERGY DISSIPATION PENETRATED (I.E. A HIGH RESISTANCE TO FLOW): CONTRASTING PROPERTIES. A GOOD ACOUSTIC PANEL, THEREFORE, IS TYPICALLY FORMED OF A SURFACE AT HIGH ACOUSTIC TRANSPARENCY AND FILLED WITH PORES ARRANGED IN A DIFFERENT DIRECTION FROM THE FLUX.

STATIC PROPERTIES

THE STATIC PROPERTIES IN THIS CATALOGUE ARE ONLY INDICATIVE FOR THE CLIENT.

TO VERIFY THE STATIC PROPERTIES OF EACH INDIVIDUAL PROJECT, THE APPLICABLE LEGISLATION PROVIDES THAT YOU CONTACT A QUALIFIED TECHNICIAN.

FIRE CHARACTERISTICS

REACTION TO FIRE IS THE DEGREE OF PARTICIPATION OF A MATERIAL AT THE COMBUSTION. COMPARED WITH THIS ATTITUDE, AT THE MATERIALS IT ASSIGNS AN EUROCLASS (FROM A TO F), WHICH INCREASES WITH THE DEGREE OF PARTICIPATION IN THE COMBUSTION.

FIRE RESISTANCE IS THE ATTITUDE OF A BUILDING ELEMENT TO MAINTAIN ITS MECHANICAL STABILITY, NOT TO SPREAD THE FLAME AND KEEP THE

THERMAL INSULATION FOR A WHILE.

FIRE RESISTANCE IS EXPRESSED IN MINUTES, START FROM HEATING PERIOD UNTIL THE TEST COMPONENT CEASES TO MEET THE CRITERIA THAT IT MUST COMPLY WITH.

TYPICAL PARAMETERS FOR FIRE REACTION

THE REACTION TO FIRE OF A MATERIAL IS A VERY COMPLEX PHENOMENON THAT DEPENDS ON VARIOUS PARAMETERS, THE MAIN ARE:

- FLAMMABILITY: CONSIDERED AS A MATERIAL ABILITY TO ENTER AND REMAIN IN A STATE OF COMBUSTION, WITH EMISSION OF FLAME AND / OR

DURING EXPOSURE TO HEAT.

- SPEED OF PROPAGATION OF THE FLAME: UNDERSTOOD AS SPEED WITH WHICH THE FLAME FRONT PROPAGATES IN A MATERIAL.

- DRIP: UNDERSTANDING AS THE CAPACITY OF A MATERIAL TO EMIT DROPLETS OF MOLTEN MATERIAL FROM AND / OR DURING EXPOSURE TO HEAT.

- POST-INCANDESCENT: PRESENCE OF INCANDESCENT AREAS AFTER THE EXTINCTION OF THE FLAME (COALS) THAT COULD START A FIRE AGAIN WITH

DEVELOPMENT OF HEAT AFTER SOME TIME: UNDERSTOOD AS THE AMOUNT OF HEAT EMITTED BY UNIT OF TIME BY A MATERIAL CAPABLE OF BURNING.

- PRODUCTION OF SMOKE: UNDERSTOOD AS THE ABILITY OF A MATERIAL TO EMIT A SET OF SOLID PARTICLES VISIBLE AND / OR LIQUID SUSPENDED IN

THE AIR, RESULTING FROM INCOMPLETE COMBUSTION UNDER DEFINED CONDITIONS AND PRODUCTION OF HARMFUL SUBSTANCES: UNDERSTOOD AS THE ABILITY TO EMIT GASES AND / OR FUMES UNDER DEFINED COMBUSTION CONDITIONS.

REFERENCE STANDARD: UNI EN 13501-1:2009

THE EUROPEAN STANDARD UNI EN 13501-1 REGULATES THE FIRE CLASSIFICATION OF BUILDING PRODUCTS AND BUILDING COMPONENTS. EVEN WITH THE EUROPEAN CLASSIFICATION, IN ITALY THE NATIONAL REGISTRATION IS REQUIRED, EXCEPT FOR PRODUCTS FOR WHICH THERE IS A EUROPEAN STANDARD, SO WITH THE REQUIREMENT OF CE MARKING. IN THIS CASE, MATERIALS ARE CLASSIFIED ACCORDING TO THE EUROCLASSES A1.

A2, B, ..., F. THE MATERIALS CLASSIFIED A1 AND A2 ARE INCOMBUSTIBLE AND THOSE CERTIFIED BY B TO F BURN IN ASCENDING ORDER.

HOWEVER, THE MINISTERIAL DECREE OF THE 15 MARCH 2005 INTRODUCED A CHART THAT COMPARES THE ITALIAN CLASSES WITH THOSE IN EUROPE, IN ORDER TO ENFORCE LAWS REQUIRING SPECIFIC REACTION TO FIRE.

THE EUROPEAN CLASSIFICATION ALSO PROVIDES FOR THE CLASSIFICATION OF SMOKES AND DRIPPING. EXAMPLE: B-S1. D0. WHERE "S" INDICATES "SMOKE" AND "D" INDICATES "DROPS". THE CLASSIFICATION RANGES FROM 0 (ABSENT) TO 3 (HIGH).

CHARACTERISTICS PARAMETERS OF FIRE RESISTANCE

FIRE RESISTANCE IS THE ABILITY OF A BUILDING, PART OF IT OR PART OF THE CONSTRUCTION TO KEEP FOR A PRESET TIME:

- THE RESISTANCE R: ATTITUDE TO MAINTAIN THE MECHANICAL STRENGTH UNDER THE ACTION OF FIRE;

- THE TIGHTNESS E: ATTITUDE TO LET NOT PASS, OR PRODUCE, IF SUBJECTED TO THE ACTION OF FIRE ON ONE SIDE, FLAMES, STEAM OR HOT GASES

ON THE UNEXPOSED SIDE;

- THE THERMAL INSULATION I: ATTITUDE TO REDUCE THE TRANSMISSION OF HEAT.

GIVEN THE ABOVE:

BY THE SYMBOL REI (FOLLOWED BY A "N" NUMBER) WE IDENTIFY A STRUCTURAL ELEMENT THAT MUST BE KEPT FOR A SPECIFIED PERIOD "N" MECHANICAL STRENGTH, TIGHTNESS FLAMES AND HOT GASES, THERMAL INSULATION. THE NUMBER "N" INDICATES THE CLASS OF FIRE RESISTANCE. FOR THE CLASSIFICATION OF NON-SUPPORTING ELEMENTS, THE CRITERION R IS AUTOMATICALLY SATISFIED WHEN E AND I CRITERIA ARE MET. FOR SUPPORTING ELEMENTS, THE VERIFICATION OF FIRE IS CONDUCTED BY CONTROLLING THAT THE MECHANICAL STRENGTH IS MAINTAINED DURING THE PERIOD CORRESPONDING TO THE CLASS OF FIRE RESISTANCE OF THE STRUCTURE WITH REFERENCE TO THE NOMINAL CURVE OF FIRE. THE CERTIFICATES OBTAINED BY THE OLD RULES ARE VALID IF OBTAINED 5 YEARS AFTER 1995 AND THEY REMAIN VALID ONLY IN ITALY. CURRENTLY, UNDER THE MINISTERIAL DECREE OF 16 FEBRUARY 2007. THE NEW PRODUCTS AND BUILDING ELEMENTS MUST BE CERTIFIED UNDER THE NEW RULES THAT REFER TO UNI EN 13501. THE NEW EUROPEAN CLASSIFICATION, WHICH APPLIES TO NON-LOAD BEARING ELEMENTS OF CLOSURE, PROVIDES FOR THE ELIMINATION OF THE LETTER R AND THE ADDITION OF A NEW PARAMETER: W ON THE ISSUE OF ENERGY. A FIRE-RESISTANT ELEMENT CAN BE CLASSIFIED: E - EW - EI

