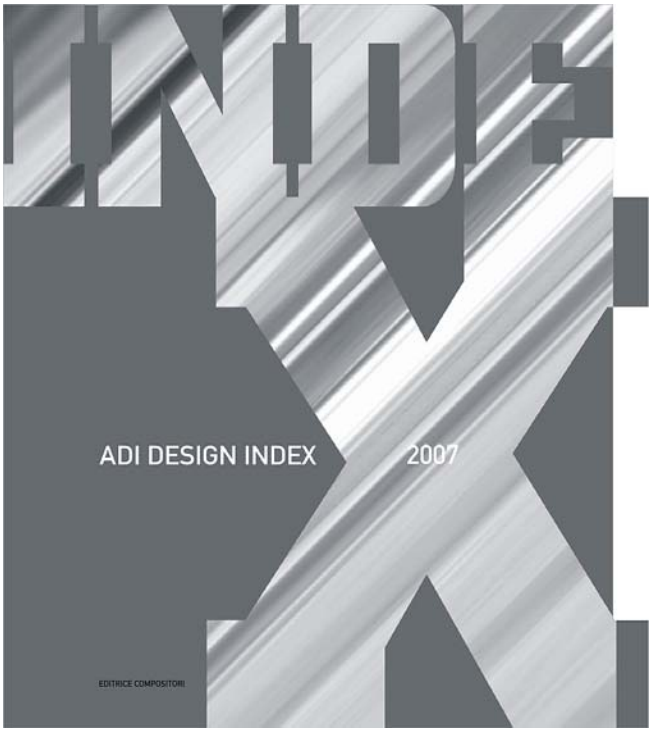


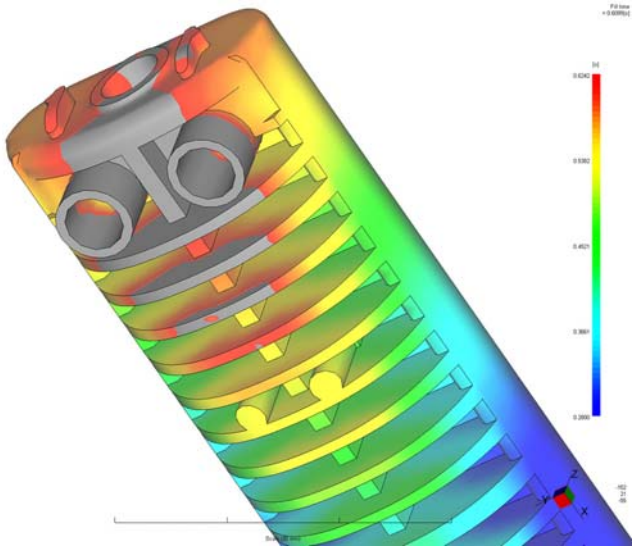
DESIGN AND THERMAL CONDUCTIVITY

Award and publication for **LATICONTHER™** compounds.
Conductive materials by Lati S.p.A. are rewarded with the selection for the prize "Compasso d'Oro" through the Association of the Industrial Design (ADI).



Set up in 1954, the prize "**Compasso d'Oro**" **ADI** is the most authoritative European prize in the design sector. The famous Italian designer Gio Ponti gave birth to this reward in order to set an high value on the quality of the Italian design. From 1964 the Association of the Industrial Design ADI manages the prize.

So the thermally conductive engineering thermoplastics developed by Lati and named **LATICONTHER™**, compounds with special conductive fillers and additives, is rewarded with the publication on the XXI edition of the volume **ADI Design Index (2007)**. The book represents the selection of the most important prize of the Italian design.
The material produced by Lati was chosen by the national commission of the permanent "Observatory of the Design" and then published in the section "**Design for the environment**".
LATICONTHER™ compounds come up by the side of important names of the Italian design like: Ferrari-Pininfarina, Iveco-Giugiaro, Piaggio, all shown in the same section.



The permanent Observatory of the Design ADI is formed by a group of experts (reviewers, historians, designers, specialized reporters) distributed along the national territory and aimed at picking up information, evaluating and selecting the best products of the sector Industry and Design born during the calendar year.
The selected products are published in the yearbook ADI Design Index, now available worldwide.

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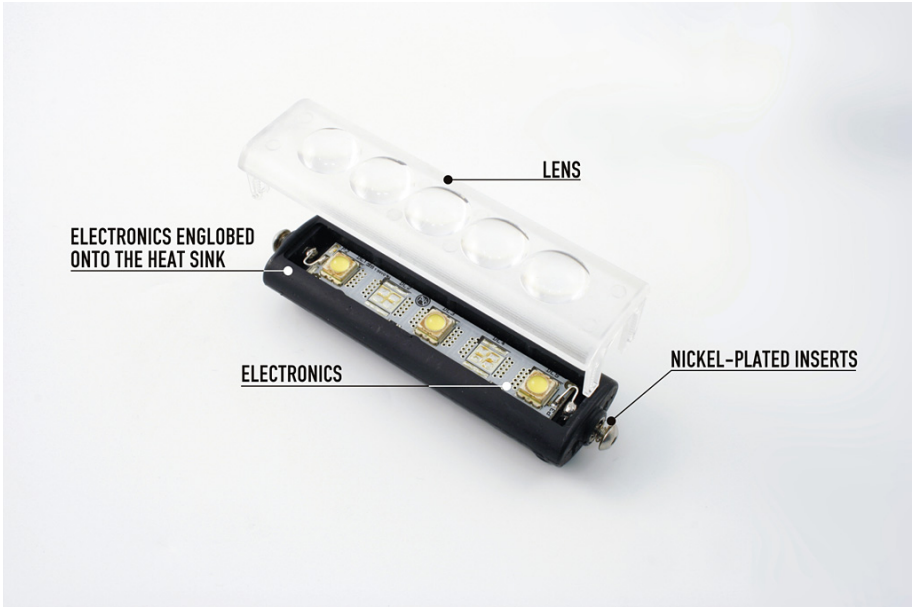
VALUATION METHODS

The selection for the publication on the ADI Design Index is addressed to all the products that show relevant aspects of originality and innovation. The innovation features must be exhibited through functional and typological contents, production process techniques and utilized materials.

Particular attention is paid to those products that show a **high respect for the environment**. This is the main reason of the prize given to LATICONTHER™ compounds: flexibility in the design and eco-compatibility thanks to the usage of materials easily disposable or recyclable.



LATICONTHER™ heatsink for a LED electronics

THE SUCCESS OF THE PRODUCT

The presence of thermally conductive and electrically insulating ceramic fillers raises the thermal conductivity of the thermoplastic compound till **efficiency 10 times higher (about 2 W/mK) than traditional plastics**. Therefore the LATICONTHER™ grades become a very interesting option in the metal-replacement projects of the industrial production, with lower environmental impact and a cheap waste management, considering the lower weight. From a design point of view, a thermoplastic compound is also higher flexible thanks to injection molding technique that allows avoiding the machining of a metal part.

The material is today used in many solutions of the industrial sector, lighting engineering, electronics and automotive industry.

A NEW PERFORMANCE - THERMAL CONDUCTIVITY FURTHER IMPROVED

During 2008 the LATICONTHER™ compounds have reached new interesting results thanks to the constant research and development subsequently carried out in order to improve their performances.

Today LATI is able to offer thermally conductive materials with **enhanced conductivity values of 10-15 W/mK**.

The new products, already marketed, are extruded with special inorganic fillers, electrically insulating or conductive, able to further raise the conductivity values.

LATICONTHER™ compounds with high graphite content, so even electrically conductive, are today based on Polypropylene (PP), Polyphenylene Sulphide (PPS), Polyamide (PA), Polyurethane (PUR) and marketed as in the following table.

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THERMAL CONDUCTIVITY OF LATICONTHER™ GRADES - with electrically conductive features		
Grade	**Base**	**Thermal Cond. (W/mK)**
LATICONTHER 52 GR/70	PP	15
LATICONTHER 62 GR/70	PA6	15
LATICONTHER 80 GR/50	PPS	10
LATICONTHER 92 GR/65	PUR	10
Comparison		
PA6	PA6	0,2
PA6 30% FV	PA6	0,35
PPS	PPS	0,15

The thermally conductive grades can be divided into two sub-families: those with **electrically conductive properties** and those with **electrical insulating properties**.

These materials achieve a longitudinal thermal conductivity (**in plane**) of **15 W/mK.** The transversal thermal conductivity (**through plane**) is strongly dependent on thickness and shear occurring during the molding phase, but it was measured an average value of **7 W/mK.**

In the already wide range of **LATICONTHER™** grades with electrical insulating properties, today Lati can offer two new materials filled with special ceramic fillers showing high thermal conductivity:

- **LATICONTHER 52 CP1/50 (PP based)**
- **LATICONTHER 82 CP1/800 (PA12 based)**

For these compounds the thermal conductivity can reach in plane values of **7 and 9.5 W/mK** respectively.

THERMAL CONDUCTIVITY OF LATICONTHER™ GRADES - with electrically insulating features		
Grade	**Base**	**Thermal Cond. (W/mK)**
LATICONTHER 48/9900 CP/80	EVA	1,7
LATICONTHER 62 CPG/750	PA6	1,2
LATICONTHER 62 CEG/500 - V0HF	PA6	1,2
LATICONTHER 80 GCE/650	PPS	0,9
LATICONTHER 80 CPG/700	PPS	1,4
LATICONTHER 83 CP/85	PA12	2,1
LATICONTHER 83 CP/80	PA12	2,1
LATICONTHER 52 CP1/50	**PP**	**7**
LATICONTHER 82 CP1/800	**PA12**	**9,5**
Comparison		
PA6	PA6	0,2
PA6 30% FV	PA6	0,35
PPS	PPS	0,15

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So, the new grades can today reach interesting results in the most severe applications maintaining the flexibility and the advantages of the injection molding technique that allows designs with complex geometries.

A good use of the new grades is well represented by the solution (above in the picture) offered by the Italian company Fanton S.p.A. that has recently introduced on the market a lamp using LED technology and named “FreeLED”. This is a portable lamp (provided with battery charger) that makes use of three high power LEDs white light source providing 500 lux brightness.

The power LEDs produce heat that is taken away by the black finned exchanger housed on the back of the electronics and made with the thermally conductive engineering compound named **LATICONTHER 52 GR/70.**

Portable FreeLED lamp of Fanton/FME
Heat sink made with LATICONTHER 52 GR/70 (LATI S.p.A.)

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