

+Bio-Nox[®]

ADAPTA COLOR, S.L

www.adaptacolor.com/en/smart



MATERIAL FEATURES AND COMPOSITION

Photocatalytic powder coating that purifies the surrounding air by absorbing nitrogen oxides (NOx) from the environment and transforming them into harmless nitrates that are washed away from the surface by rain.

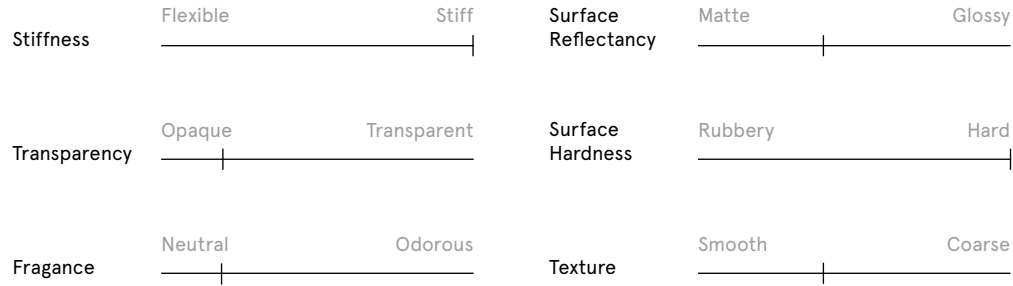
AVAILABILITY

TRL 9 - Actual system proven in operational environment
Commercially available in large amount

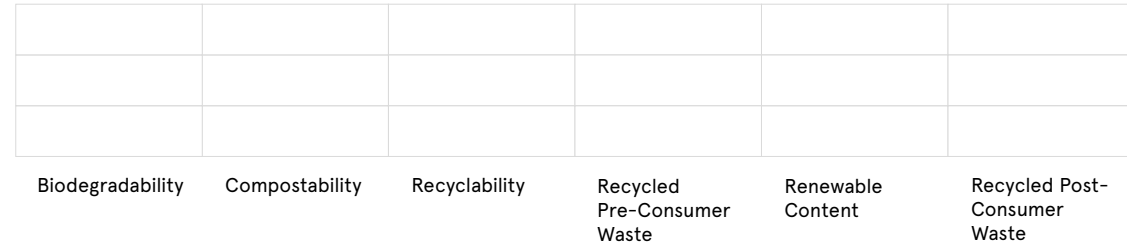
A decorative bar chart at the bottom of the page consisting of several white bars of increasing height from left to right, set against a dark teal background.

TRL9

PHYSICAL QUALITIES

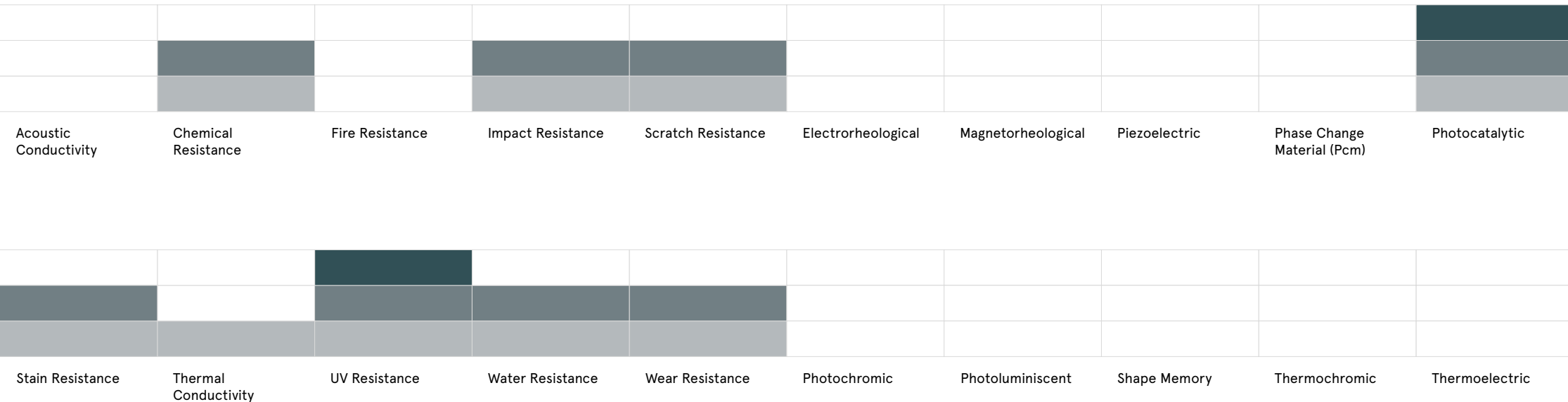


SUSTAINABILITY PROPERTIES*



PERFORMANCE PROPERTIES

SMART PROPERTIES*



UNDERSTANDING

*Please see the Glossary at the end of this booklet for more explanation on the terminology.

CERTIFICATES & TESTS

Institute of Chemical Technology: Report N°:28-04-2011 - Universität Erlangen - Nürnberg: Report N°: 15/11/2011
 Comparative lifecycle analysis between +bio-Nox® and non-photocatalytic coating, using the Eco-gauge 99 methodology, shows a largely positive environmental balance for NOx removal.
 All information has been provided by the companies and/or material suppliers that delivered the EM&Ts samples.

SUPPLY

Raw Material

Processed Material

System / Product

SHAPE



Powder

MANUFACTURING PROCESSES

Applied by spray coating and subsequent oven curing.

TRANSFORMATION PROCESSES



Additive
Manufacturing



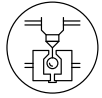
Die Cutting



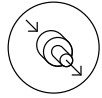
Lamination



Textile
Processing



Blow Molding



Extrusion



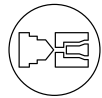
Metal Working Tools



Thermoforming
Compression Molding



Casting



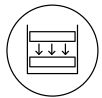
Injection Molding



Printing



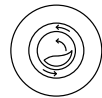
Welding



Cold Pressing /
Deep Drawing



Lab Growing



Rotomolding



Wood Working Tools



SHAPING

APPLICATION FIELDS

Facades, buildings, tunnels, and galleries, urban elements and furniture, metal parts for architecture (metal mesh, perforated sheets and screens), ceramic elements and brick facades.



CASE STUDY

Not developed

COMPARISON & INNOVATION

Similar to other photocatalytic coatings, +bio-Nox is focused on a highly reactive group of gases (NOx) turning them into harmless substances: NOx are about 300 times more harmful than CO2 for global warming. Moreover, the nitrates obtained after the photocatalytic reaction are easily washed away by the rain.



APPLYING

SUSTAINABILITY PROPERTIES

Biodegradability

Ability to be broken down into carbon dioxide, water, and biomass by the natural action of microorganisms (aerobic and/or anaerobic). It is misleading to merely claim biodegradability without any standard specification. If a material or product is advertised to be biodegradable, further information about the timeframe, the level of biodegradation, and the required surrounding conditions should be provided, too.

Composting

Ability to go through the process by which materials biodegrade through the action of naturally occurring microorganisms and do so to a large extent within a specified timeframe. The associated biological processes will yield CO₂, water, inorganic compounds, and biomass which leaves no visible contaminants or toxic residues. The products can be classified in "Home compostable" or "Industrial compostable", having each of them specific temperatures, conditions and timeframes defined by international regulations.

Recyclability

The capacity of a product to be reduced all the way back to its basic materials, reprocessing those materials, and using them to make new products, components or materials. Recycling refers to materials that are processed in practice (as opposed to materials for which recycling is technically feasible), this varies from one region to the other invoking the regulations and technologies of each country.

Recycled pre-consumer waste

Pre-consumer waste refers to waste produced by manufacturers or industries before released for consumer use. Pre-consumer waste refers also to the reintroduction of manufacturing discards back into the manufacturing process, in this case it is often not considered "recycling" in the traditional sense. Pre-consumer waste is produced in large quantities, while this is easier to collect and sort, high amounts of pre-consumer waste are non-recovered.

Renewable content

Materials that are replenished at a rate equal to or greater than the rate of depletion and must be produced using regenerative practices or, in a transition phase, using sustainable practices.

Recycled post-consumer waste

Post-consumer waste is the waste produced at the end of a consumer-product lifecycle. Post-consumer waste has served its intended purpose, passed through the hands of a final consumer, and has been discarded for disposal or recovery. It usually refers to the household waste we generate every day, and does not include manufacturing or converting wastes. Depending on the type of waste, governmental legislation and the action taken by the consumer, post-consumer waste is recycled, sent to landfill or incinerated.

SMART PROPERTIES

Electrorheological

Change in the rheological properties (viscosity and viscoelasticity) of a material caused by an electrical stimulus.

Magnetorheological

Change in rheological properties (viscosity and viscoelasticity) of a material caused by a magnetic field.

Piezoelectric

Phenomenon exhibited by certain materials, which when applying mechanical stress, generate electrical energy. The effect can also be inverse, that is, they can present small deformations when an electrical current is applied.

Phase Change Material (PCM)

Materials considered latent heat storage units: They are capable of absorbing or releasing a large amount of thermal energy when they undergo a phase change (from solid to liquid, from liquid to gas, or vice versa).

GLOSSARY

Photocatalytic

A substance that increases the speed of a chemical reaction by the effect of light or other forms of radiant energy.

Photochromic

Reversible color change induced by the indication of sunlight or UV. The color disappears when the fountain ceases.

Photoluminiscent

Is the emission of cold light caused by the absorption of electromagnetic radiation (visible light, UV, X and cathode rays). There are two types of luminescence: fluorescence (emits light only during absorption of radiation) and phosphorescence (stores absorbed radiation, so that it continues to emit light for a time after the stimulus subsides).

Shape Memory

The material with this property recovers its initial shape after being permanently deformed (plastically) when heated above a characteristic transition temperature of the material. In addition, while regaining its form, in some cases it is able to perform work. The characteristics of these materials, depending on the temperature, contemplate superelasticity (which grants large elastic deformations in a specific range of temperatures), simple shape memory effect (in which the material

remembers a single shape, when heated) and which can be educated to achieve a double shape memory effect (in which the material memorises two shapes in a hot and cold state).

Thermochromic

Reversible or irreversible color change induced by temperature changes.

Thermoelectric

Property that supposes a change of voltage in response to a variation of temperature and vice versa.

DATEMATS project (Knowledge & Technology Transfer of Emerging Materials & Technologies through a Design-Driven Approach Agreement Number: 600777-EPP-1-2018-1-IT-EPPKA2-KA) is co-funded by the Erasmus+ programme of the European Union.



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NANOMATERIALS EM&TS

Entirely carbon-based materials, nano-scaled structures or composite blends whose properties are altered by surface and/or substrate doping thereof. NANO TECH: Matter controlled at molecular level, which is smaller than a micrometres, normally on scales of 1 to 100 nanometres.

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