

IZADI-NANO2INDUSTRY
(GA-686165)

ESTCRATCH Pilot
Application for the Automotive Sector.
Improved Scratch Resistance and
Non-Conventional Aesthetics
based on
Nanotechnologies

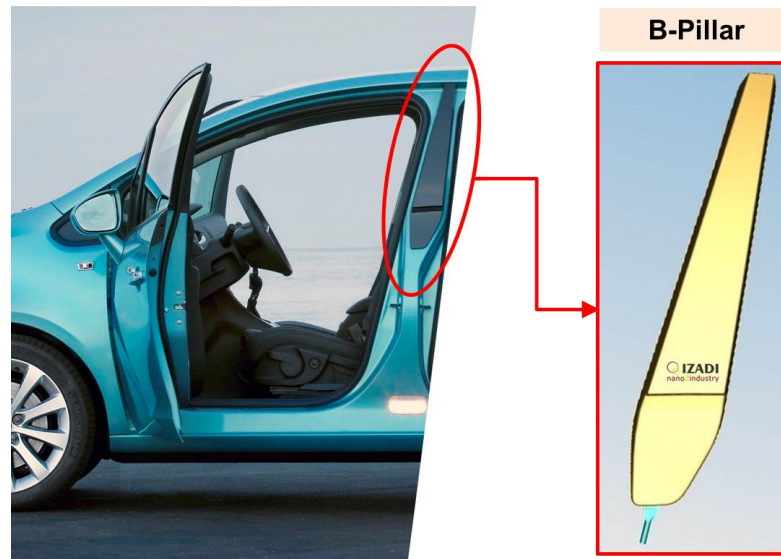
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Industrial Forum
IMAGINE NANO
Bilbao March, 14 - 2018

Objectives

IZADI-NANO2INDUSTRY Grant Agreement Number 686165

- ❑ Implementation of nanocompounds and nanostructured patterns to manufacture automotive components (B-Pillar) at industrial production plant (ESTCRATCH Pilot).
- ❑ Development of inherently safe production methods.
- ❑ New market opportunities for European Automotive sector offering new added-value products.



ESTCRATCH Partners

TECNALIA Research & Innovation	Spain
Danmarks Tekniske Universitet	Denmark
NIL Technology APS	Denmark
MAIER S. Coop.	Spain
SEMATEC SA	Spain
ICECHIM	Romania
SISTEPLANT SL	Spain
CEMECON Scandinavia AS	Denmark
Michael Lundbech	Denmark

tecnalia Inspiring Business

DTU Technical University of Denmark

NIL
NIL TECHNOLOGY

MAIER
sematec

ICECHIM

sisteplant
smart solutions

CEMECON

MICHAEL LUNDBECH
INTELLIGENT TOOLING

Activities

Design and fabrication of the equipments

- ☐ **Extrusion of PMMA nanobatch and nanocompound**
- ☐ **Injection of nanotextured plastic parts**

Fabrication of mould inserts with nanopatterns (IZADI Logo)

- ☐ **Diffraction Effect**
- ☐ **Plasmonic Effect**

Pilot validation

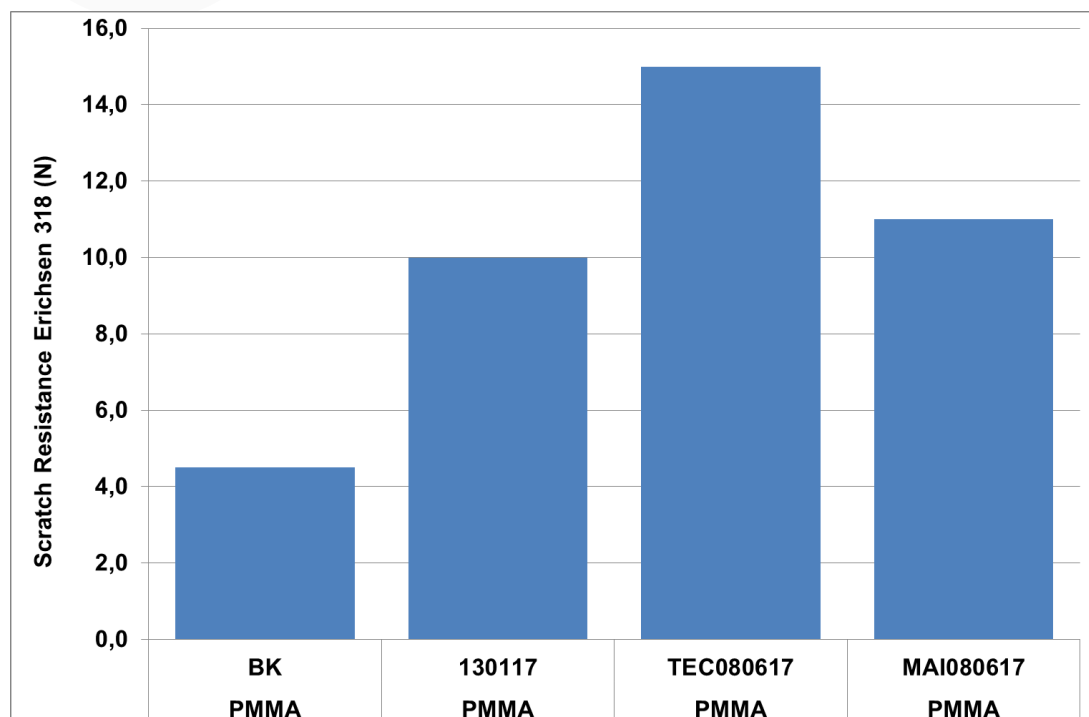
- ☐ **Mixing step (PMMA Nanobatch, PMMA Nanocompound)**
- ☐ **Optimization of the injection moulding process**
- ☐ **Production of sample parts (ongoing)**
- ☐ **Evaluation of parts according to automotive specifications (ongoing)**
- ☐ **Economic evaluation of the process (ongoing)**

PMMA Izadi Nanocompound

- ☐ Best possible light transmission (92 % at clear grades).
- ☐ Good chemical resistance.
- ☐ 100% recyclable - environmentally friendly.
- ☐ Polishable to remove small surface scratches.
- ☐ High mechanical strength, surface hardness and abrasion resistance.
- ☐ Very good weather resistance.
- ☐ Optimum mechanical properties.
- ☐ High heat deflection temperature.
- ☐ Good flow / melt viscosity.
- ☐ Class-A Surface (without painting).
- ☐ Economic production.
- ☐ Less weight.
- ☐ Freedom of design.

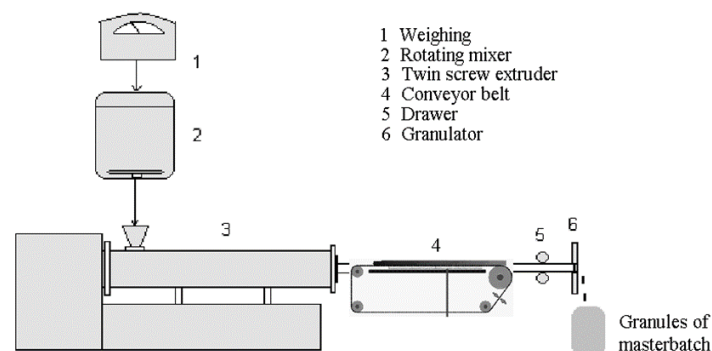
PMMA Izadi Nanocompounds

- ❑ Compounding process by extrusion
- ❑ PMMA modified with Polysiloxane and Nanosilica (Patent pending)
- ❑ High gloss and deep black colour
- ❑ Improved Scratch Resistance (Erichsen 318)



PMMA BK
PMMA 130117
PMMA TEC80617
PMMA MAI080617

Commercial Grade
Preliminary Formulation
Nanocompound
Nanobatch



Nanotextured insert



Sub-Insert IZ9-002M2
IZADI Logo
Diffraction Effect

Injection Moulding Process



Validation Tests (Ongoing)

- ☐ Chemical Resistance
- ☐ Colour (Light Cabin) ISO 3664
- ☐ Colour Fastness to Rubbing (Crockmeter) ISO 105 F09
- ☐ Resistance to immersion in water (Ford Tank)
- ☐ Heat Resistance (1h/90°C)
- ☐ Impact Resistance (500g/50cm/23°C)
- ☐ Aesthetics
- ☐ Weight (g/part)

4833 IZ9-002M2
IZ033 PMMA BK
Light Cabin
ISO 3664

Light Source
TL84



Light Source
CWF



Preliminary Results

Code	Material	Finish	Logo	Aesthetic (Gloss)	Scratch Resistance	Impact Resistance
#1	ASA	Mass Coloured	Tampoprinted	Not Good	Not Good	OK
#2	ABS	Painted	Tampoprinted	OK	OK	OK
#3	PMMA	Mass Coloured	Tampoprinted	OK	Not Good	Not Good
#4	PMMA / ABS-GF	Mass Coloured	Tampoprinted	OK	Not Good	OK
#5	PMMA / ABS-GF	Mass Coloured	Diffraction	OK	OK	OK

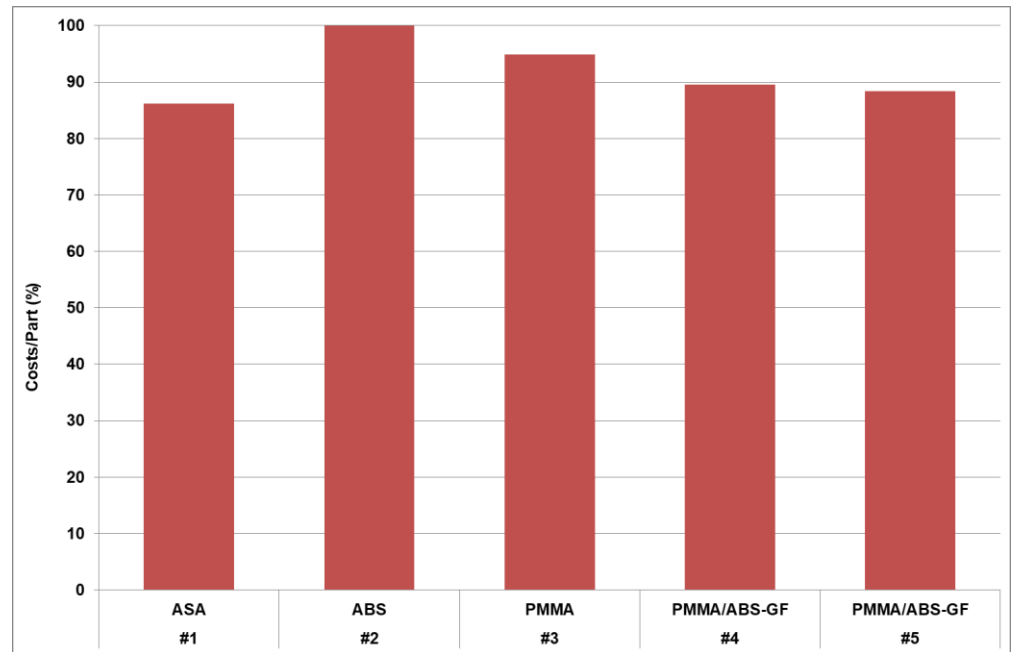
Version #5

2K Injection process

PMMA Nanocompound on Top Side

ABS-GF on Back Side

IZADI Logo Diffraction Effect



Technical Advantages

PMMA Nanocompounds

- ☐ Better scratch resistance than commercial grades in the market.
- ☐ High gloss.
- ☐ Addition of nanofillers:
 - NanoCompound Extrusion compounding
 - NanoBatch Dilution “in situ” at injection facilities

New Aesthetics

- ☐ Injection moulds with nanotextured inserts.
- ☐ Diffractive / Plasmonic finishes on the surface of the injected plastic parts.
- ☐ Aesthetic finishes without post-processing:
 - High Gloss
 - In-Mass Color
 - Diffractive / Plasmonic Patterns