

STYRENICS

# ABS SPECIAL COMPOUNDS

TECHNICAL SHEETS

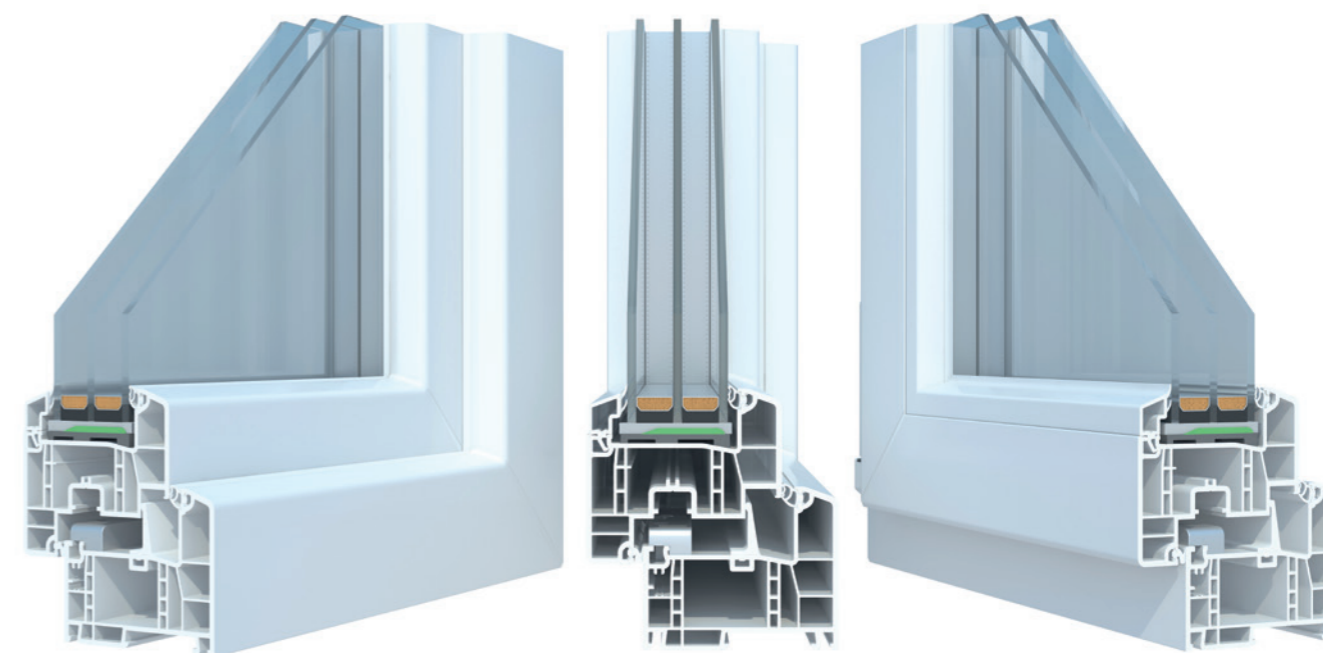


versalis

## Versalis ABS special compounds

Versalis, la società chimica di Eni, è uno dei principali produttori europei di polimeri stirenici. Versalis produce gli ABS Sinkral® utilizzando l'innovativa tecnologia di polimerizzazione in massa continua sviluppata dal suo R&D sfruttando le conoscenze acquisite nella sintesi degli altri materiali plastici stirenici (SAN, GPPS e HIPS). La combinazione tra il know-how Versalis nel campo delle formulazioni compound e la disponibilità di una base polimerica "clean" ha permesso la realizzazione di una nuova serie di gradi **ABS compound** in continua crescita, ciascuno con caratteristiche chiave richieste da mercati altamente specializzati.

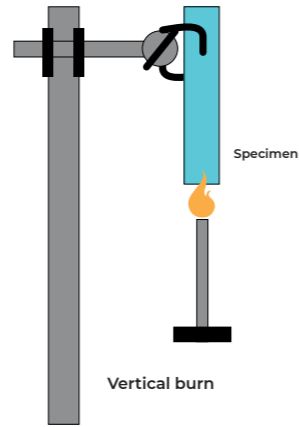
Versalis, the chemical company of Eni, is a leading European producer of styrenic polymers. Versalis produces Sinkral® ABS using its innovative continuous mass polymerisation technology, developed by its R&D team by exploiting knowledge gained in the synthesis of others styrenic polymers (SAN, GPPS & HIPS). The combination of Versalis know-how in the field of compound formulations and the availability of a "clean" polymeric base made it possible to realize a growing portfolio of **ABS special compounds**, each with key characteristics required by highly specialized market field.



**ABS**  
**SPECIAL COMPOUNDS**  
TECHNICAL SHEETS

# Sinkral® ABS a ritardata propagazione di fiamma

## Sinkral® Flame Retarded ABS



Sfruttando due degli aspetti principali dei suoi ABS, privi di contaminazioni e di contenuto minimo di volatili residui, Versalis ha quindi focalizzato l'attenzione sullo sviluppo dei gradi **Sinkral® SK 102** e **Sinkral® SK 112**, con performance di resistenza alla fiamma **UL 94 VO** su specifiche richieste dei clienti.

I materiali sono stati sviluppati per possedere alcune caratteristiche premianti:

- superamento test UL-94 V0 1,5 mm (all colors);
- materiali clean, cloro-free e con buone proprietà organolettiche (low-smell).

I gradi Sinkral® SK 102 e SK 112 possiedono un ottimo bilancio in termini di proprietà che li rendono idonei al mercato dell'estrusione e coestrusione:

- stabilità reologica in lavorazione (fig. 1);
- bilancio ottimale proprietà meccaniche/termiche/reologiche e prestazioni al fuoco;
- possibilità di sviluppare colorazioni specifiche.

Taking advantage of what is one of the main aspects of its plastic materials, being free from contaminations and significant volatile residuals, Versalis has therefore focused the attention on the development of **Sinkral® SK 102** and **Sinkral® SK 112**, ABS with **UL 94 VO** flame resistance to meet specific customer requests.

These materials were developed to have the following key characteristics:

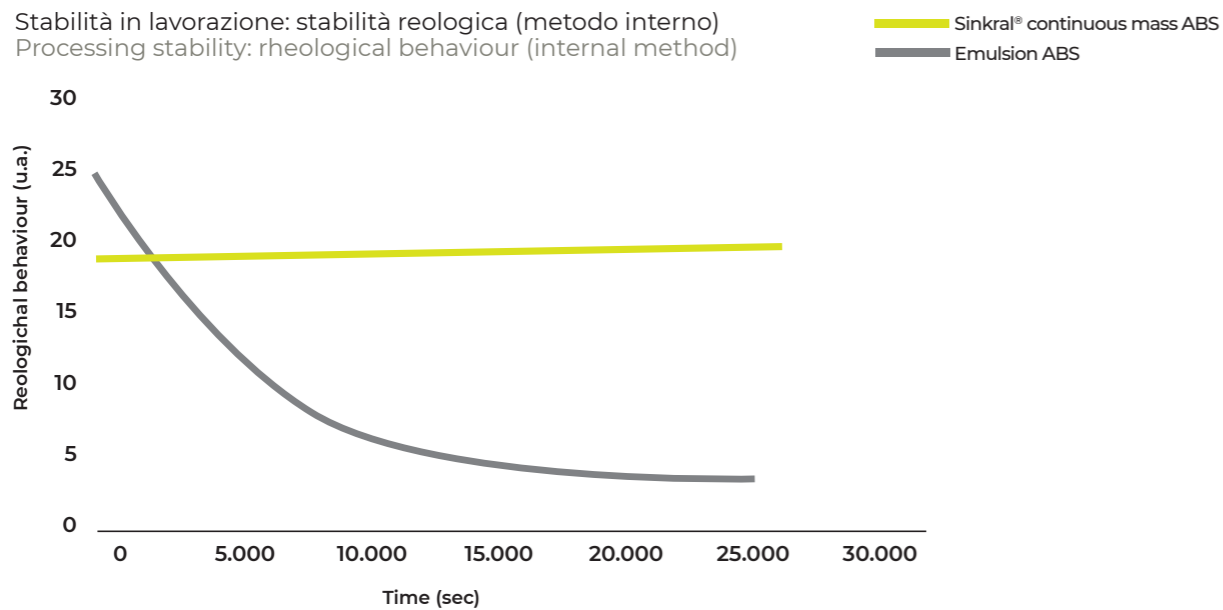
- pass UL-94 V0 1.5 mm (all colors);
- clean materials, chlorine free and with the advantage of very low odour.

Sinkral® SK 102 and SK 112 have an optimum balance of properties, making them ideal for the extrusion and coextrusion market:

- stable processing rheology (fig. 1);
- good balance of thermal/mechanical/rheological properties and fire resistance performances;
- possibility of developing custom colours.

Fig. 1

Stabilità in lavorazione: stabilità reologica (metodo interno)  
Processing stability: rheological behaviour (internal method)



Tutti e due nati per garantire le proprietà Flame Retarded e Low Smell, i due gradi Sinkral® SK 102 e SK 112 si differenziano ed al contempo si integrano per il raggiungimento delle proprietà estetiche (fig. 2):

- SK 112
- Buone proprietà meccaniche
  - Stabilità meccanica e reologica
  - Glossy

- SK 102
- Coestrusione
  - Matt

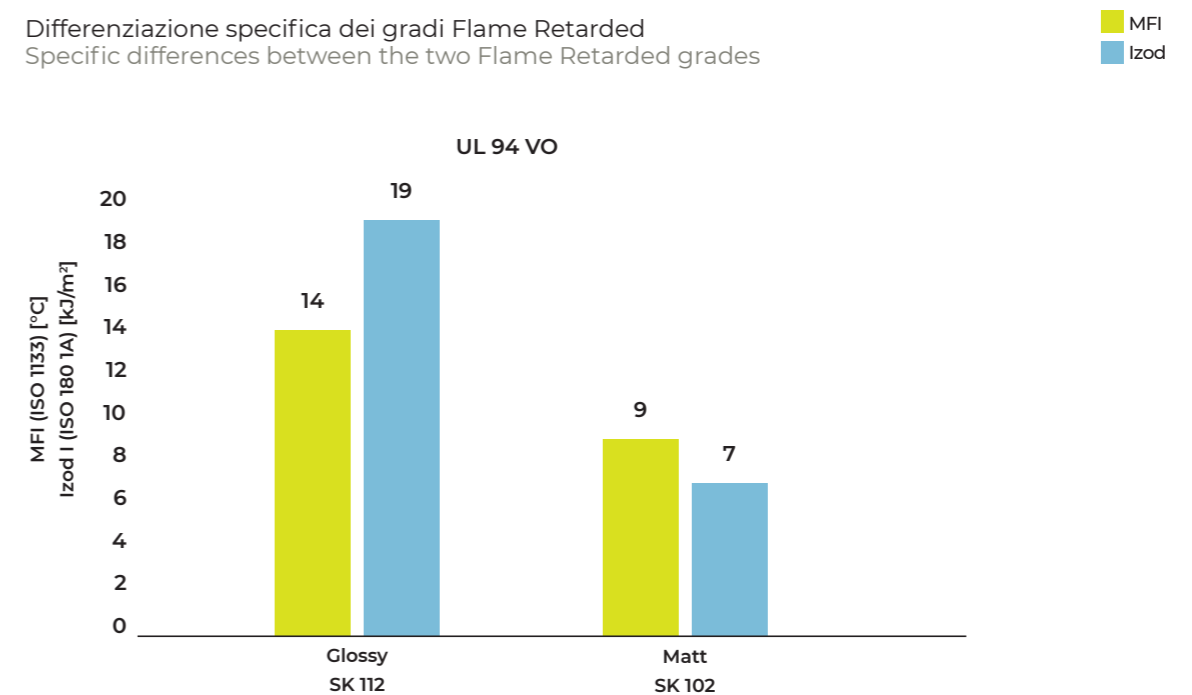
Whilst both were developed to have Flame Retarded properties and low odour, Sinkral® SK 102 e SK 112 offer different characteristics in order to achieve the required aesthetics (fig. 2):

- SK 112
- High Mechanicals
  - Balance rheological/mechanical properties
  - Glossy

- SK 102
- Coextrusion
  - Matt

Fig. 2

Differenziazione specifica dei gradi Flame Retarded  
Specific differences between the two Flame Retarded grades



Di seguito si riportano le proprietà tipiche del materiale (dati da intendersi come indicativi).  
In the table below the typical material properties are reported (indicative data only).

Tab. 1

Riassunto proprietà tipiche dei due gradi SK  
Summary of typical properties of both SK grades

PROPERTY	TEST CONDITION	UNIT	STANDARD	SK 112	SK 102
Flame Behaviour	Thickness 1.5 mm	class	UL 94	V0	V0
Glow Wire Test	Thickness 2 mm	°C	IEC 60695-2-10	960	960
Glow Wire Test	Thickness 3 mm	°C	IEC 60695-2-10	960	-
MFI	220°C - 10 kg	g/10min	ISO 1133	14	9
Izod, notched	C.i. 80x10x4mm	kJ/m <sup>2</sup>	ISO 180/1A	19	7
VICAT	5 kg - 50°C/h	°C	ISO 306	99	100
Density	Internal test	g/cm <sup>3</sup>	Internal test	1.2	1.2
Tensile Modulus	1 mm/min	MPa	ISO 527-1	2300	2100
Aesthetics			Internal test	Glossy	Matt

Il **Sinkral® SK 112** è disponibile, oltre che in versione naturale, anche nella tonalità bianca UV stabilizzata (codice interno /U 31240).

Sinkral® SK 112 is available in the natural version and in white UV stabilized shade (internal code /U 31240).

Gli **ABS Sinkral® SK 112** e **SK 102** possono essere lavorati con le macchine utilizzate per l'ABS standard. Per i materiali Flame Retarded si consiglia di settare la finestra produttiva a temperature di 200-230°C. Seguire le indicazioni riportate sulla SDS.

Sinkral® SK 112 and SK 102 can be processed using standard ABS processing equipment. However, as with all Flame Retarded polymers, Versalis recommends a thermal processing window between 200-230°C. Indications given in the SDS shall be followed.



# Sinkral® ABS ad elevata resistenza termica

## Sinkral® High Heat ABS polymers

Versalis ha sviluppato due gradi ad elevata resistenza termica col fine di rispondere alle richieste specifiche di settori all'avanguardia dove siano richieste **prestazioni di resistenza termica** elevate quali automotive e trasporti, Sinkral® SH 109 e Sinkral® SH 113.

- Caratteristiche principali:
- elevata resistenza termica, Vicat & HDT (fig. 3 e 4);
  - ampia finestra di lavorabilità (fig. 5).

Versalis has developed two grades with high thermal resistance to satisfy the specific requests of state-of-the-art sectors where **high thermal resistance** performance is required such as automotive and transport, Sinkral® SH 109 and Sinkral® SH 113.

- Main properties:
- High Heat properties, Vicat & HDT (fig. 3 and 4);
  - wide processing window (fig. 5).

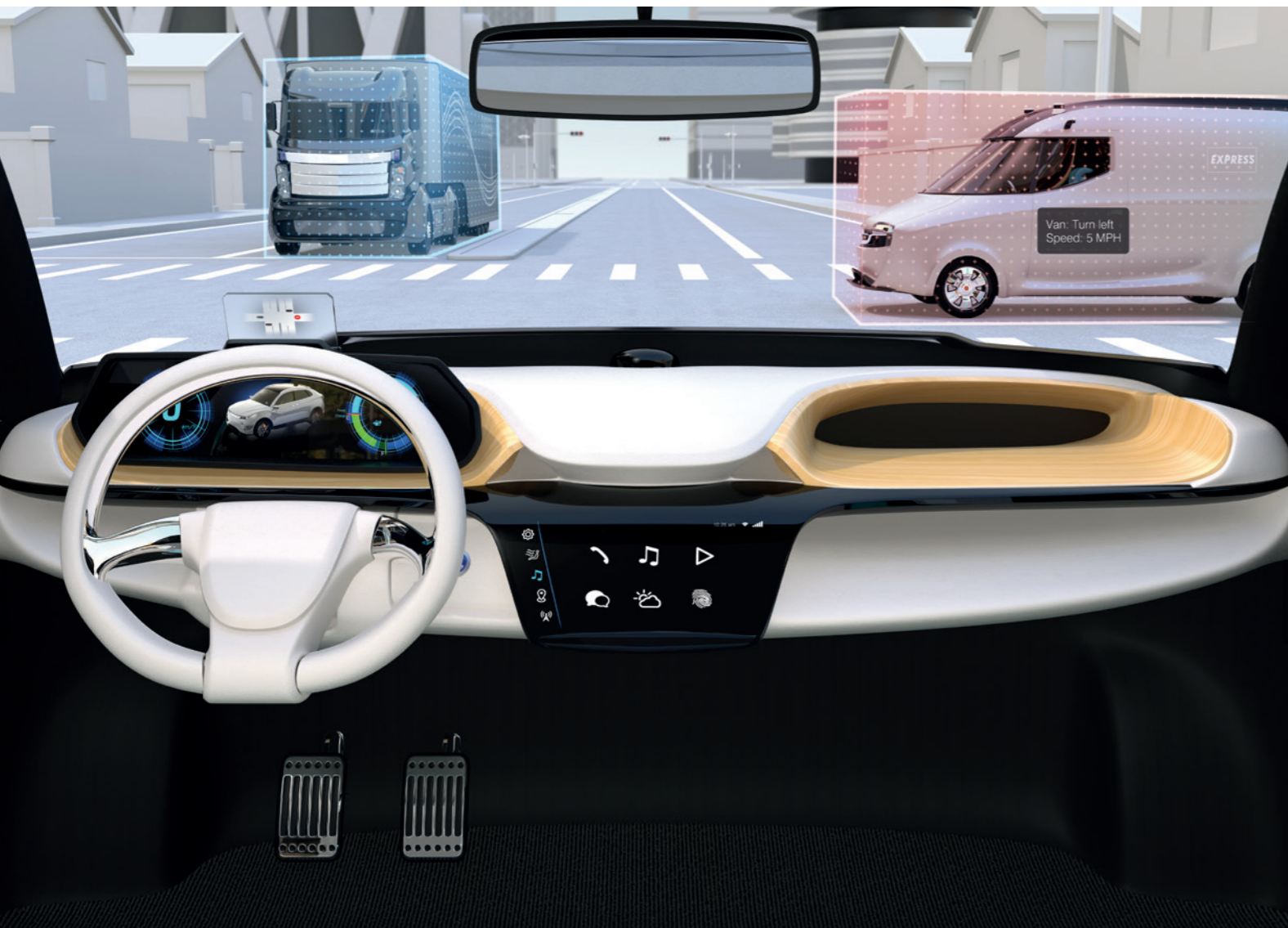


Fig. 3

ABS: temperatura di rammollimento Vicat a confronto (ISO 306 B 50)  
ABS: Vicat softening temperature in comparison (ISO 306 B 50)

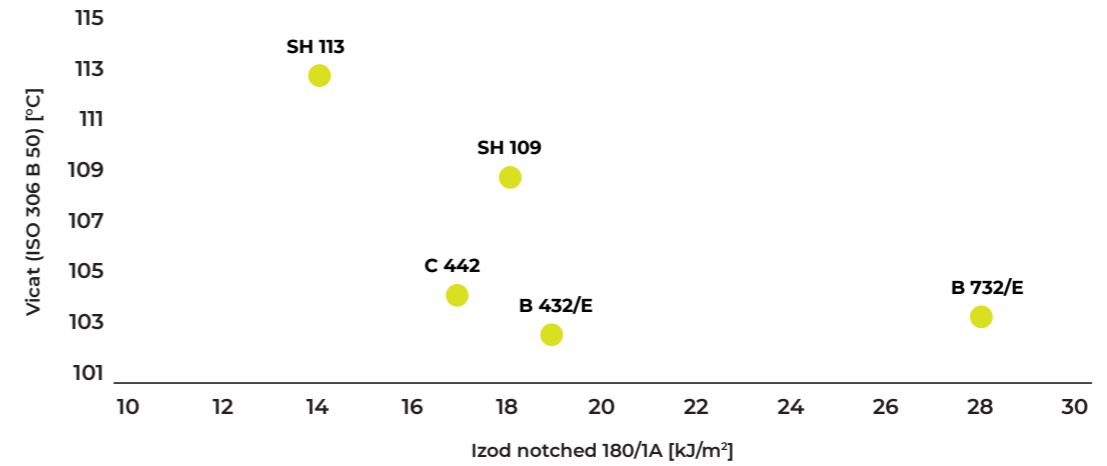


Fig. 4

ABS Sinkral®: temperatura di distorsione sotto carico HDT a confronto (ISO 75-2 A; B)  
ABS Sinkral®: deflection temperature under load HDT in comparison (ISO 75-2 A; B)

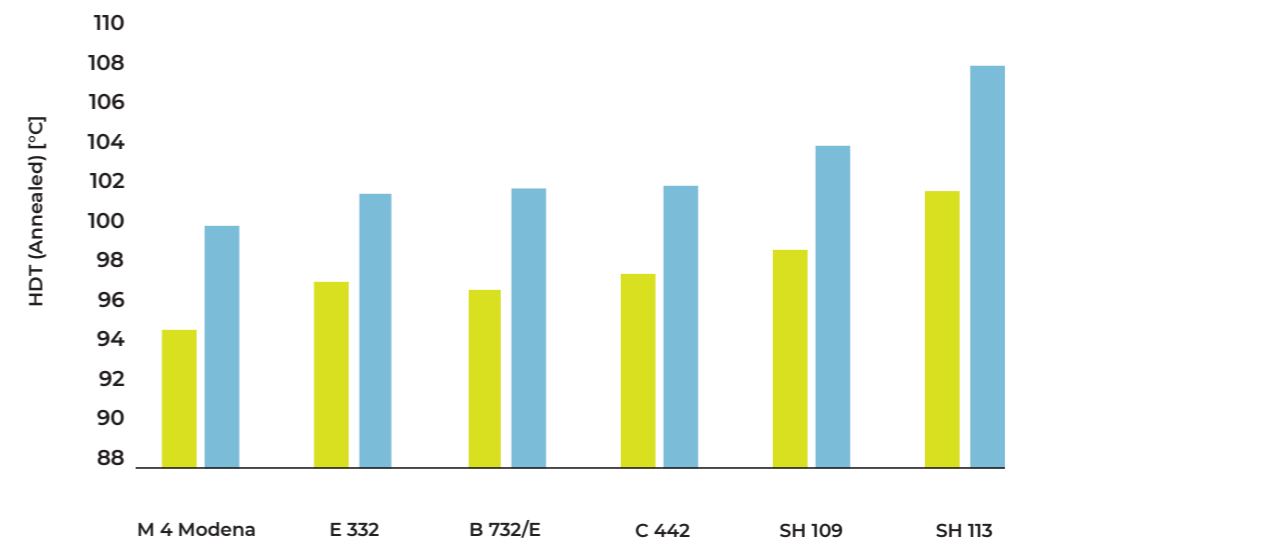
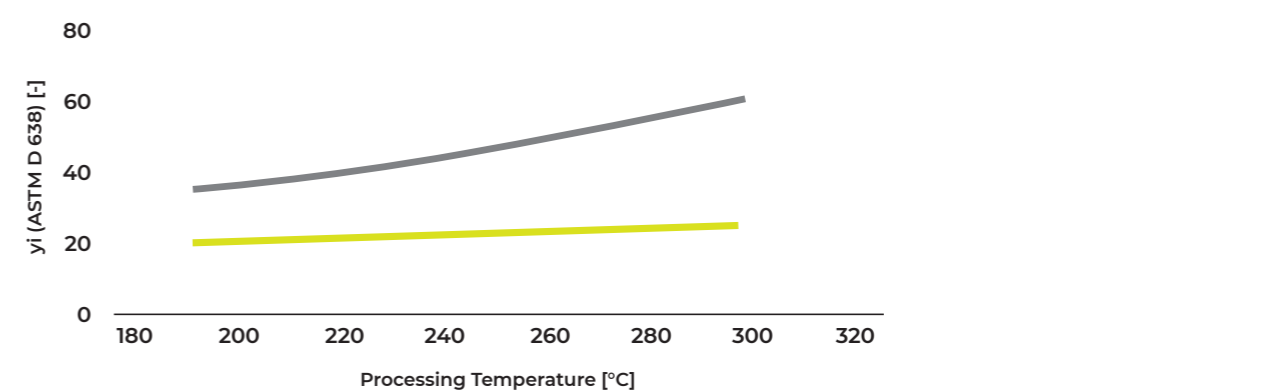


Fig. 5

ABS: Costanza colore in fase di lavorazione a confronto  
ABS: Colour constancy during processing in comparison



L'ottimo bilancio di proprietà meccaniche, termiche e reologiche, rendono i due **Sinkral® SH 109** e **SH 113** ideali sia per il settore dell'estrusione che per quello dello stampaggio a iniezione anche per mercati molto esigenti come quello dell'Automotive.

Altre caratteristiche premianti sono:

- stabilità in lavorazione (fig. 6);
- elevata stabilità dimensionale dei pezzi finiti;
- bilancio ottimale proprietà meccaniche/termiche/reologiche (fig. 7 e 8);
- materiale "pulito" con contenuto minimo di impurità e composti organici volatili totali TVOC.

Both **Sinkral® SH 109** and **SH 113** grades have an excellent balance of properties, mechanical, thermal and rheological, that allow them to be used either in extrusion or injection, including, for example, demanding Automotive applications.

Other notable characteristics are:

- processing stability (fig. 6);
- excellent dimensional stability of finished items;
- optimal balance between mechanical/thermal/rheological (fig. 7 and 8);
- "clean" product in terms of low impurities content and Total Volatile Organic Components TVOC.

Fig. 6

ABS: stabilità reologica in lavorazione a confronto (metodo interno)  
ABS: Rheological Processing Stability in comparison (internal method)

Sinkral® continuous mass ABS  
Emulsion ABS

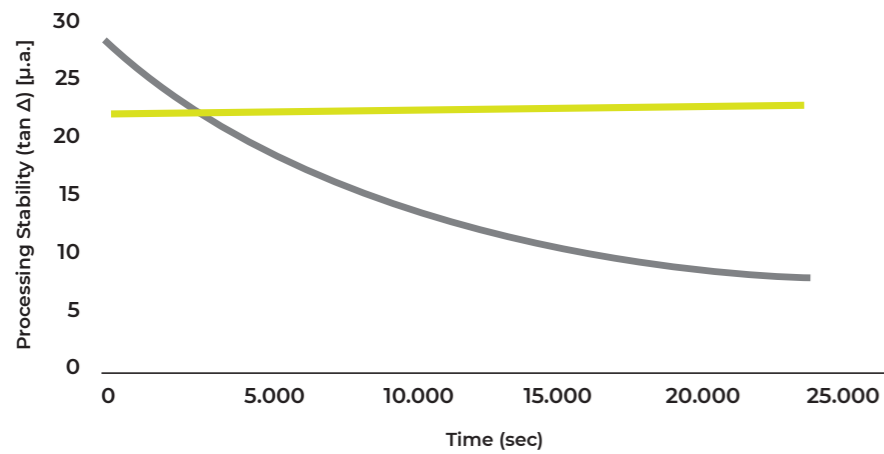


Fig. 7

ABS Sinkral®: proprietà termiche e impatto a confronto  
ABS Sinkral®: Thermal and Impact properties in comparison

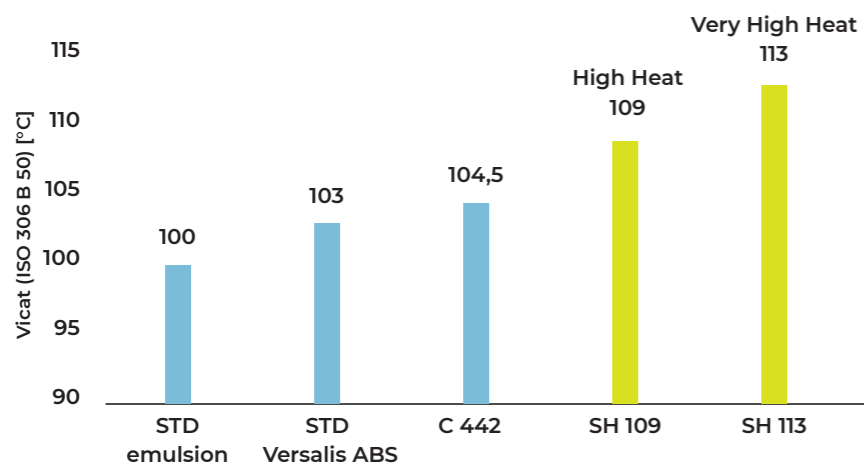
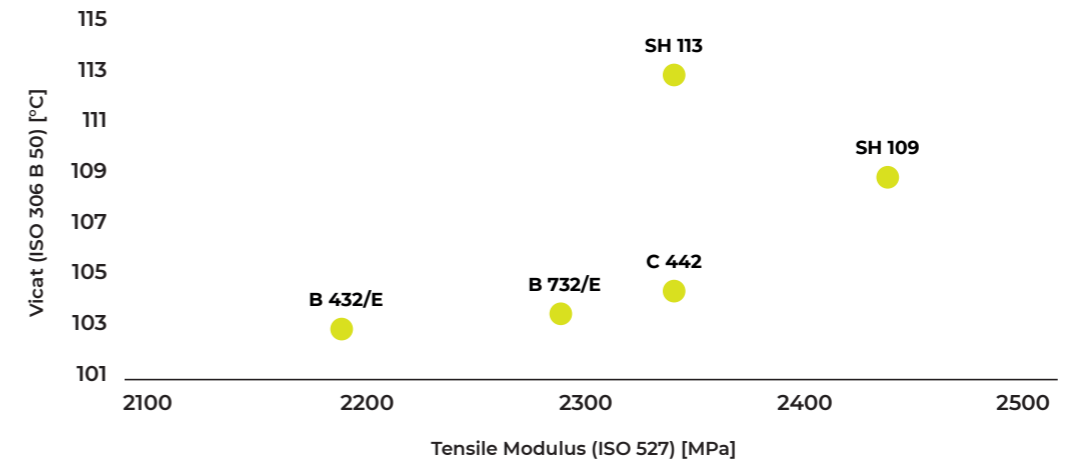


Fig. 8

ABS Sinkral®: proprietà termiche e modulo elastico a confronto  
ABS Sinkral®: Thermal properties and Elastic Modulus in comparison



Di seguito si riportano le proprietà tipiche del materiale (Tabella 2).  
Typical material properties are shown in table 2 below.

Tab. 2

Riassunto proprietà tipiche dei due gradi SH 109 e SH 113  
Summary of typical properties of both SH 109 and SH 113 grades

PROPERTY	TEST CONDITION	UNIT	STANDARD	SH 109	SH 113
MFI	220°C / 10 Kg	g/10min	ISO 1133	5	4.5
Izod	23°C	kJ/m <sup>2</sup>	ISO 180 C.i. 80x10x4mm	18	14
VICAT	5 Kg - 50°C/h	°C	ISO 306	109	113
HDT	0.45 MPa (annealed)	°C	ISO 75 B	104	108
Density	Internal test	g/cm <sup>3</sup>	Internal test	1.04	1.05
Tensile Modulus	1 mm/min	MPa	ISO 527-1	2450	2350

Certificazioni specifiche per il settore Automotive sono disponibili su richiesta.

Specific certifications for the Automotive sector are available upon request.

## Lega Policarbonato-ABS per l'Automotive Koblend® PCA 638

### Polycarbonate - ABS alloy for automotive Koblend® PCA 638

Il portafoglio prodotti di Versalis è stato recentemente ampliato con una **lega** speciale tra **ABS** e **Policarbonato**. Il **Koblend® PCA 638** mostra la più alta resistenza termica combinata con una resistenza agli urti estremamente aumentata.

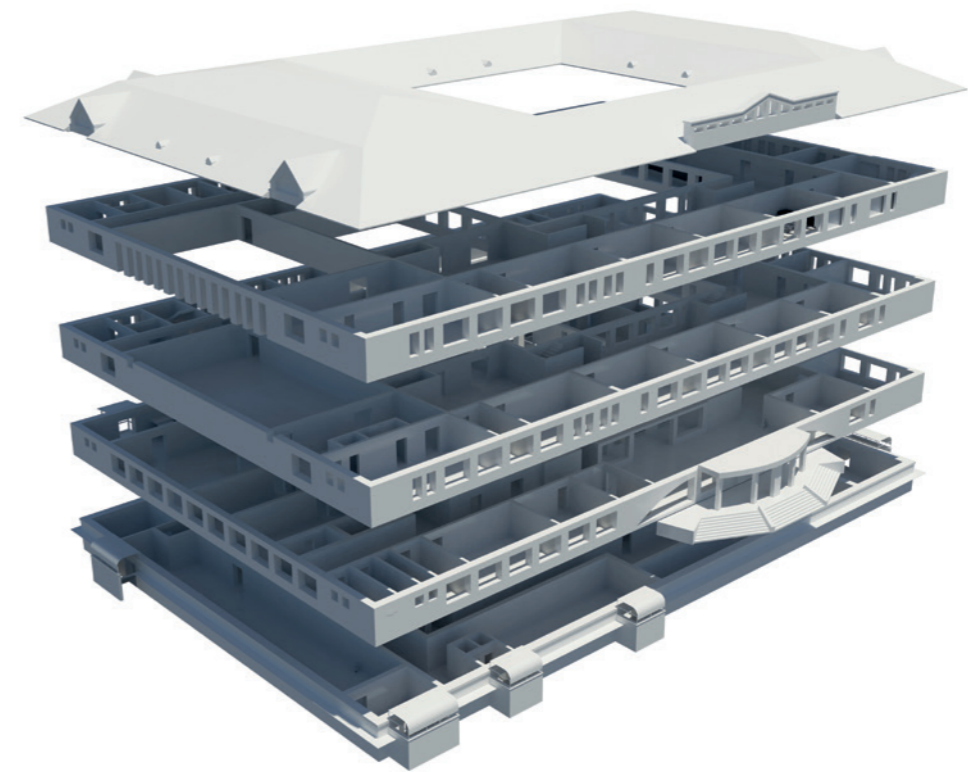
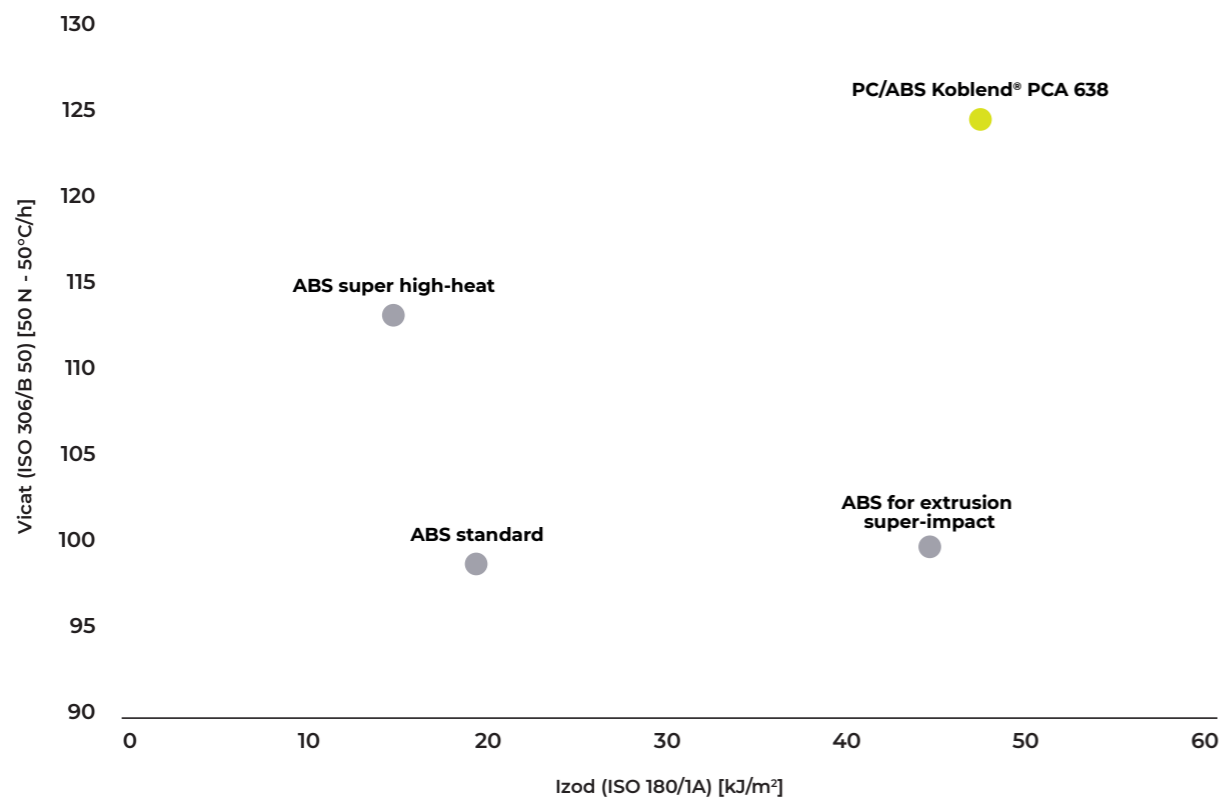
Koblend® PCA 638 è disponibile, oltre che nella versione naturale, anche in versione colorata nera (codice interno 39064).

Versalis portfolio has been recently widened with a special **alloy** between **ABS** and **Polycarbonate** polymer. The **Koblend® PCA 638** exhibits the highest thermal resistance combined with an extremely increased impact resistance.

Koblend® PCA 638 is available in natural version and in black shade (internal code 39064).

Fig. 9

Confronto tra PC/ABS Koblend® PCA 638 e diversi tipi di ABS: impatto e proprietà termiche  
Comparison between PC/ABS Koblend® PCA 638 and different types of ABS: Impact and Thermal properties

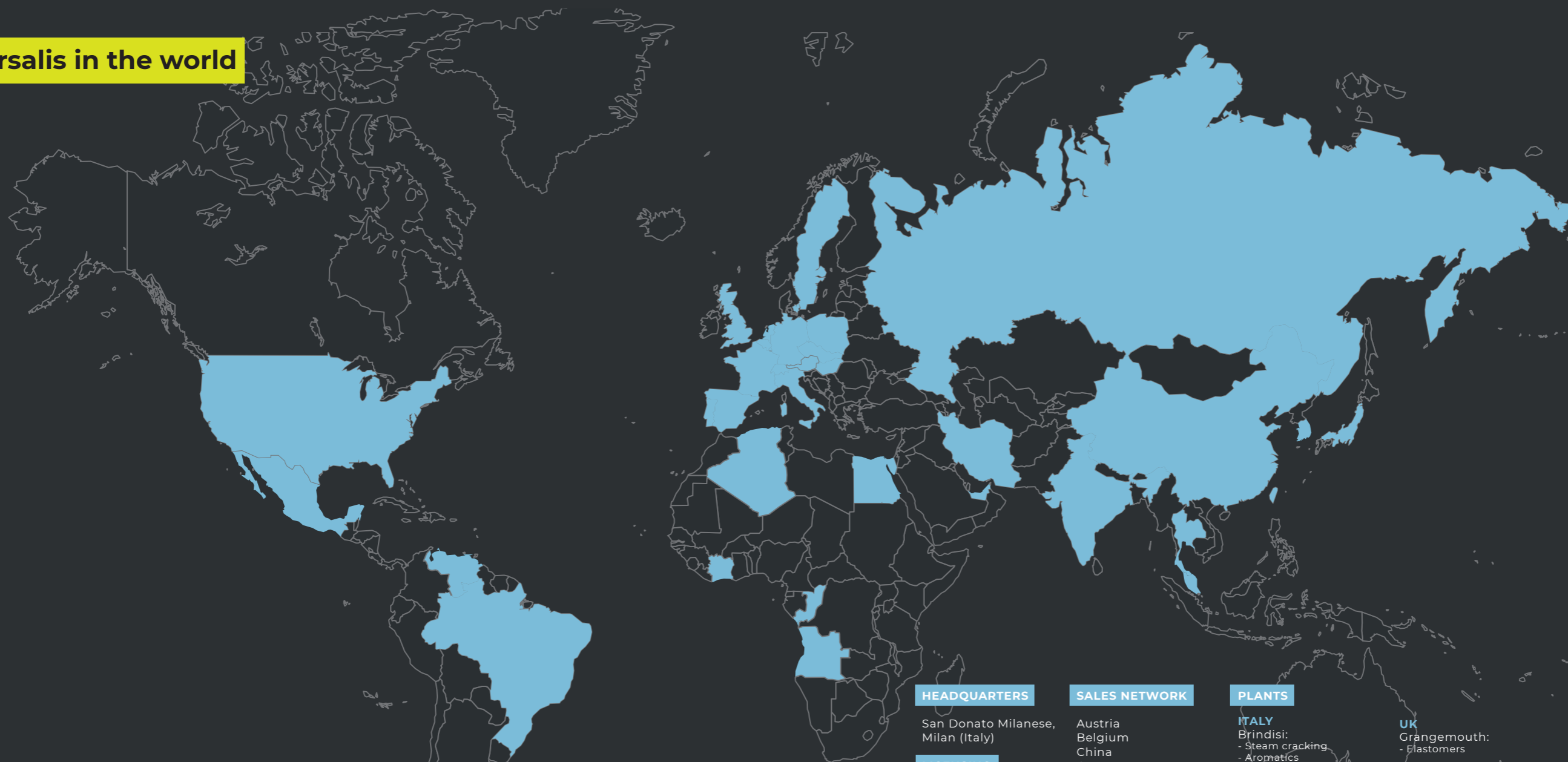


Tab. 3

Nella tabella sottostante sono riportate le proprietà tipiche di Koblend® PCA 638 (solo dati indicativi).  
In the table below the typical material properties of Koblend® PCA 638 are reported (indicative data only).

PROPERTY	TEST CONDITION	UNIT	STANDARD	PC/ABS KOBLEND® PCA 638
MFI	260°C - 5 kg	g/10'	ISO 1133	15
Izod, notched	+23°C - 4 mm	kJ/m²	ISO 180/1A	47
Vicat	50 N - 120°C/h	°C	ISO 306/B 120	125
HDT	0,45 MPa - 120°C/h	°C	ISO 75 B	119
HDT	1,82 MPa - 120°C/h	°C	ISO 75 A	102
Density	-	g/cm³	ISO 1183	1,13
Tensile Modulus	1 mm/min	MPa	ISO 527	2450

## Versalis in the world



### HEADQUARTERS

San Donato Milanese,  
Milan (Italy)

### LICENSING

Algeria  
Brazil  
China  
Egypt  
India  
Iran  
Japan  
Malaysia  
Portugal  
Qatar  
Romania  
Russian Federation  
Slovak Republic  
South Korea  
Spain  
Taiwan  
USA  
Venezuela

### R&D

**ITALY**  
Ferrara  
Mantua  
Novara  
Porto Torres  
Ravenna  
Rivalta Scrivia

### SALES NETWORK

Austria  
Belgium  
China  
Congo  
Czech Republic  
Denmark  
France  
Germany  
Ghana  
Greece  
Hungary  
India  
Italy  
Mexico  
Poland  
Portugal  
Romania  
Russian Federation  
Singapore  
Slovak Republic  
South Korea  
Spain  
Switzerland  
Sweden  
Turkey  
United Arab Emirates  
(VPM, a joint venture  
with Petrochem/Mazrui  
Energy Services)  
UK  
USA

### PLANTS

#### ITALY

Brindisi:  
- Steam cracking  
- Aromatics  
- Polyethylene

Crescentino:  
- Bio-ethanol

Ferrara:  
- Elastomers  
- Polyethylene

Mantua:  
- Intermediates  
- Styrene  
- Styrenics

Porto Marghera:  
- Recycled polymers

Porto Torres:  
- Elastomers  
- Renewable chemistry

Priolo:  
- Steam cracking  
- Aromatics

Ragusa:  
- Polyethylene EVA  
- Butadiene

Ravenna:  
- Elastomers

#### UK

Grangemouth:  
- Elastomers

#### FRANCE

Dunkerque:  
- Steam cracking  
- Polyethylene EVA

#### GERMANY

Oberhausen:  
- Polyethylene EVA

#### HUNGARY

Százhalombatta:  
- Styrenics

#### SOUTH KOREA

Yeosu (LVE, a joint  
venture with Lotte  
Chemical):  
- Elastomers

Versalis is focused on establishing itself as a solution provider, offering a range of increasingly market-oriented products at an international level. The company is present in the APAC region through its Shanghai-based subsidiary, Versalis Pacific Trading; in Mumbai, India; in Singapore; and in South Korea through LVE, a joint venture with Lotte Chemical.

Versalis can also count on subsidiaries Versalis Americas – with offices in Houston, Texas – and Versalis Mexico. Furthermore, Versalis serves the oil and gas industry with offices in Ghana and in Congo, with its portfolio of oilfield chemicals. Thanks to a widespread sales network, distributors and sales agents, Versalis can serve all markets worldwide.





**versalis**

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