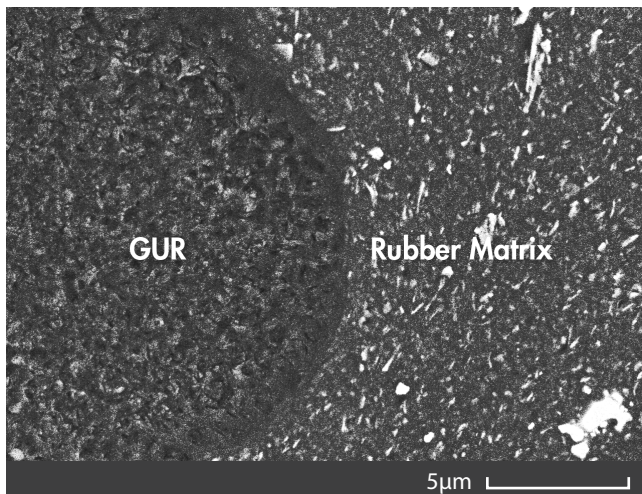


Specialty Products
GUR® Products as Rubber Additives
GUR® UHMW-PE

Product Information

GUR[®] UHMW-PE



Specialty Products

GUR[®] Products as Rubber Additives

塞拉尼斯很高興推出新一代 GUR[®] PE-UHMW 粉末，可用作改善橡膠性能的添加劑。當用作 NBR 和 SBR 的添加劑時，GUR[®] 產品可提高耐磨性、橡膠的摩擦係數並減少裂縫的擴展。

塞拉尼斯提供特殊設計的 GUR[®]，可在動態應用中降低噪音。

Some of the rubber property improvements are as follows:

- + 使用壽命更長
- + 顯著提高耐磨性
- + 摩擦係數顯著降低
- + 具有特殊形態的高能量阻尼勢
- + 低裂紋擴展
- + 高耐化學性

適用於橡膠應用的 GUR® 產品線
包括許多具有針對各種應用專門定義的屬性的牌號，如下所示。

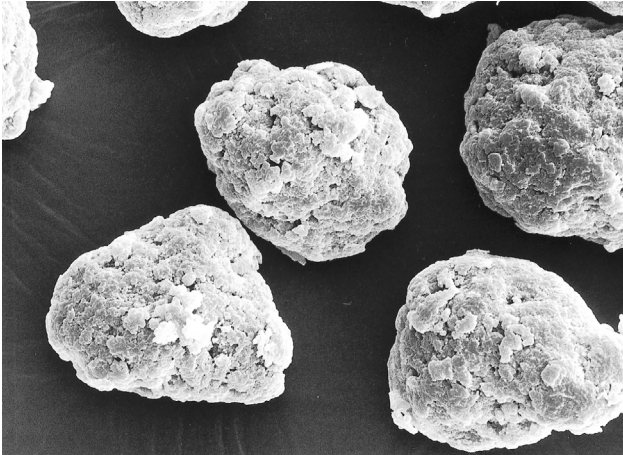


Fig. 1: GUR® regular morphology

我們提供的產品平均粒徑為 20 至 300 μm ，平均分子量為 390 至 1,050 萬g/mol。

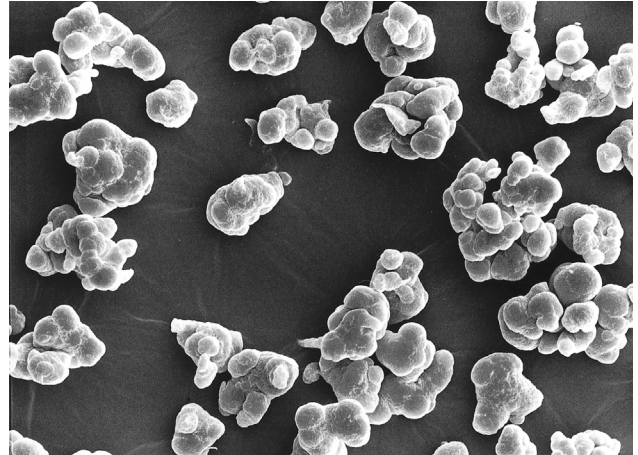


Fig. 2: GUR® special morphology

Processibility

對於 SBR 和 NBR，即使添加了廣泛的 GUR® 濃度範圍，也無需進行加工調整。門尼黏度在加工過程中不會發生顯著變化。

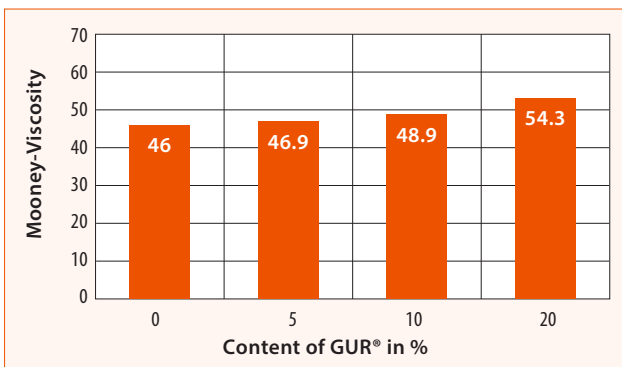


Fig. 3: GUR® special morphology, 0-20% Mooney viscosity vs. GUR® concentration

Compatibility

GUR® 是一種具有極高熔體黏度的惰性材料。GUR® 與橡膠的混合物形成具有非常強黏合力的兩相混合物。GUR® 和橡膠之間的黏合是透過物理/機械相互滲透發生。這種鍵非常牢固，即使是低溫斷裂 GUR®/橡膠共混物不會破壞互穿黏合相。此外，這樣的斷裂總是發生在橡膠相。

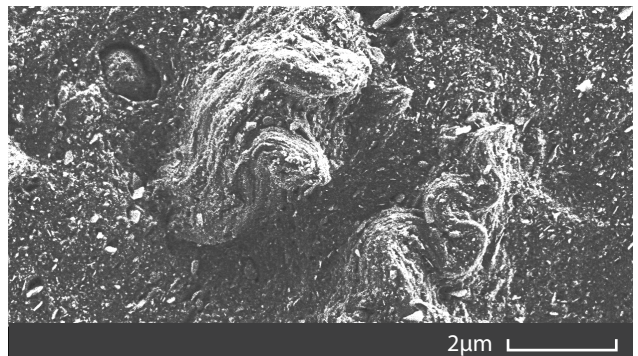


Fig. 4: SEM of GUR® SBR rubber blend

Performance

耐磨性和摩擦係數

GUR® 作為添加劑可提高橡膠的耐磨性和摩擦係數。因此，在橡膠中添加 GUR® 可以顯著延長橡膠件的使用壽命降低更換和維護成本。由於其極高的黏度，GUR®

在橡膠/GUR® 共混物中保持自己的相。這種共混結構有助於改善磨損和摩擦性能。

下圖展示了改進之處

由於添加了 GUR®，橡膠的耐磨性和摩擦係數得到了改善。

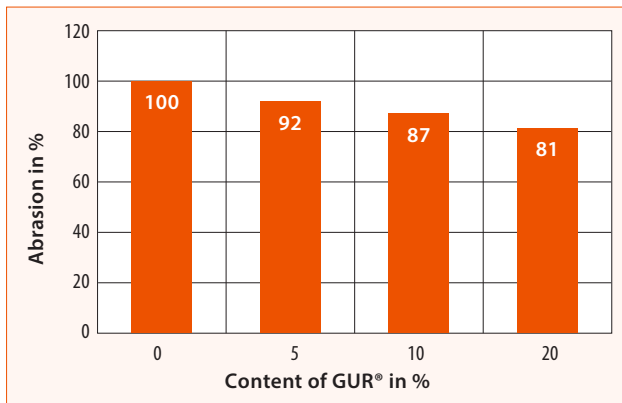


Fig. 5: Abrasion of GUR®-SBR rubber

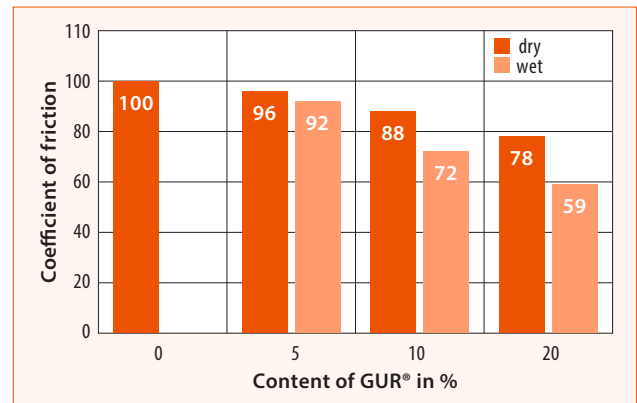


Fig. 6: SEM of GUR® SBR rubber blend

Energy dissipation

專門設計的 GUR® 產品具有獨特的形狀（見圖 2），改善了 GUR®/橡膠共混物中的能量耗散。這種改進有助於降低現場應用中的噪音水平。圖 7 顯示了楊氏損耗模量的結果，其中較高的損耗模量對應於較高的能量耗散。

Other Physical Properties: Crack Propagation, Young's Modulus, Hardness (Shore A)

由於其能量吸收能力得到改善，含有 GUR® 添加劑的橡膠可減緩裂紋擴展。隨著 GUR® 添加量的增加，橡膠的剛度和硬度也會隨之增加。

圖 8 顯示了機械性質隨著橡膠中 GUR® 含量的增加而變化。

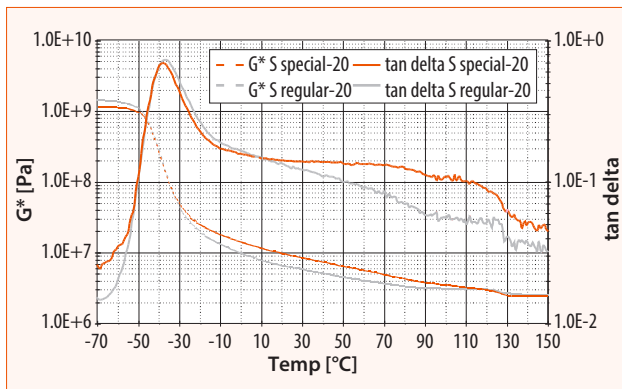


Fig. 7: Rheology Measurements of SBR rubbers with GUR® special and regular Morphology

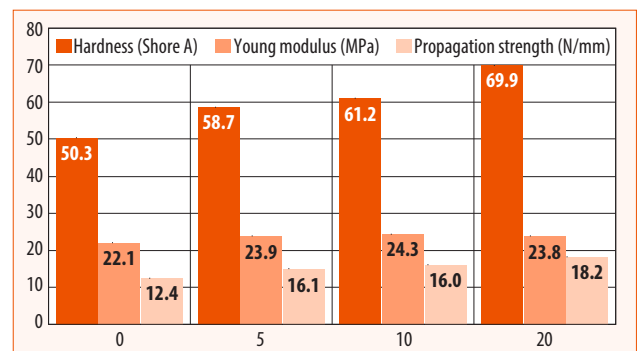


Fig. 8: Young's modulus, Hardness (Shore A), Crack growths vs of GUR® special (SBR)

Typical Physical Properties

Properties	Unit	Test-Method	Test-Specimen	Range
Density	g/cm ³	ISO 1183 Method A	Sheet	0.928 - 0.934
Viscosity number (VN)	ml/g	ISO 1628 Part 3	Decahydronaphthalene 0.0002 g/ml solution	2200 - 6000
Bulk density	g/cm ³	ISO 60	Powder	0.2 - 0.5
Mechanical properties measured under standard conditions of 23 °C and specific humidity				
Modulus of elasticity in tension	MPa	ISO 527 Part 1+2	Type 1B	700 - 800
Ball Indentation Hardness (30s value test load 358 N)	N/mm ²	ISO 2039 Part 1	Sheet 4 mm thick	35 - 40
Charpy notched impact strength	kJ/m ²	ISO 11542 Part 1	120 x 15 x 10 mm ³	≥ 100
Thermal properties				
Vicat softening point	°C	DIN ISO 306 Method B	10 x 10 x 4 mm ³	80
Melting point DSC, 10 °C/min	°C	ISO 3146 Method C	Powder	130 - 135
Coefficient of linear thermal expansion (between 23 and 80 °C)	K ⁻¹	ISO 11359 Part 1+2	30 x 10 x 4 mm ³	2 x 10 ⁻⁴

Chemical Properties

GUR® 與其他線性高密度聚乙烯一樣，具有非常好的耐腐蝕性介質（強氧化性酸除外）的性能。溶解較低分子量的芳香烴和鹵代烴（例如十氫化萘）和聚乙烯只會導致 GUR® 產品部分溶脹。耐化學性隨著分子量的增加而增加。

Flammability

聚乙烯遇火焰點燃，燃燒時發出微弱的火焰。當火焰移開時，它會繼續燃燒並熔化並產生熔融滴。

Storage

建議 GUR® 產品在室溫下乾燥儲存。

Dosage

共混橡膠中 GUR® 的含量各不相同按重量添加在 3% 至 20% 之間，具體取決於應用所需的特定性能。該材料可用常規混合設備分散。GUR® 良好的熱穩定性允許高強度混合，同時顆粒變形最小。

Packaging

GUR® (Bulk density 0.4-0.5 g/cm³): 25 kg bags

GUR® (bulk density 0.2-0.3 g/cm³): 12.5 kg bags



ENGINEERED MATERIALS

celanese.com/engineered-materials

Engineered Materials

- Celanex® thermoplastic polyester (PBT)
- Hostaform® and Celcon® acetal copolymer (POM)
- Celstran®, Compel® and Factor® long fiber reinforced thermoplastic (LFRT)
- Celtran® continuous fiber reinforced thermoplastic (CFR-TP)
- Fortron® polyphenylene sulfide (PPS)
- GUR® ultra-high molecular weight polyethylene (UHMW-PE)
- Impet® thermoplastic polyester (PET)
- Riteflex® thermoplastic polyester elastomer (TPC-ET)
- Thermx® polycyclohexylene-dimethylene terephthalate
- Vandar® thermoplastic polyester alloy (PBT)
- Vectra® and Zenite® liquid crystal polymer (LCP)

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