

kuraray

**Thermoplastic
Elastomers
For Medical Goods**



Elastomers for maintaining a high quality of life

Safe and non-toxic, Kuraray's SEPTON™ and HYBRAR™ products offer flexibility and performance in the design of medical products where superior performance and safety is needed most. Distinguished by their high clarity, non-allergenic characteristics and easy processability, Kuraray's Elastomers deliver highest quality for applications like medical tubes and pouches, orthopedic gels, patch adhesives and elastic nonwovens.

Selected grades fulfill the requirements for medical compliance and food contact conforming to the FDA, USP & EU standards. For detailed information concerning the admission requirements in your country please contact your local sales team.

Products for medical applications at a glance

	Application	Product	Function
	Medical Bags	HYBRAR™ 7311F HYBRAR™ 7125F SEPTON™ 2004F	Softening Sealing Strength Impact Strength
	Medical Tubes	HYBRAR™ 7125F HYBRAR™ 7311F	Softening without plasticizer PVC free
	Orthopedic Gels	SEPTON™ 4000 Series SEPTON™ J Series	Tear strength Shock absorbing and dampening
	Patch Adhesives	SEPTON™ 2063 SEPTON™ 4000 Series	High product cleanliness Strong adhesion
	Elastic Nonwovens & Films	SEPTON™ 4000 Series	Creep resistance Hysteresis

SEPTON™ and HYBRAR™ for Medical Bags

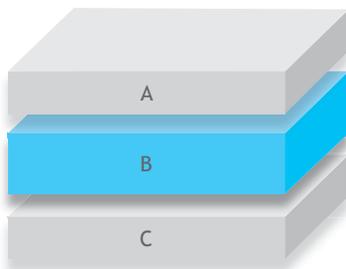


Kuraray has developed a range of materials that are suitable for dry blending in film extrusion processes. These Styrenic Block Copolymers show maximum softness and elasticity. Due to their excellent compatibility with polyolefins, they allow great flexibility to design film properties that normally cannot be achieved with commodity polyolefin resins alone.

Key Features

- Flexible and transparent without plasticizer
- High temperature performance/ sterilizable
- Downgauging due to improved impact resistance
- Excellent processability
- No migration of PVC plasticizer (vs. PVC bags)

In the field of flexible packaging films made from polyethylene and polypropylene, HYBRAR™ offers various grades that can be added for specific customization. Compared to plastomers or polyolefin elastomers, these materials perform in the lowest concentrations necessary to achieve maximum value. Here, the main advantage is impact resistance for downgauging purposes. Specifically for polypropylene, HYBRAR™ can reduce the Sealing Initial Temperature (SIT) up to 10 degrees.



A/C: Seal or outer layer (15-50 µm)
B: Core Layer (100-160 µm)



HYBRAR™ for Medical Tubes



HYBRAR™ is a cost-effective solution for soft-touch applications and provides extremely tough, transparent and flexible performance for medical tubing. In comparison to PVC, HYBRAR™ is considered a more environmentally friendly alternative.

Its high compatibility with PP and its high affinity to polyolefins and styrenics make HYBRAR™ very easy to process. Moreover, compounds

made out of HYBRAR™ and PP have high tensile and excellent impact strength. The polymer structure of HYBRAR™ also ensures relatively good oxygen and moisture permeability compared to other elastomers.

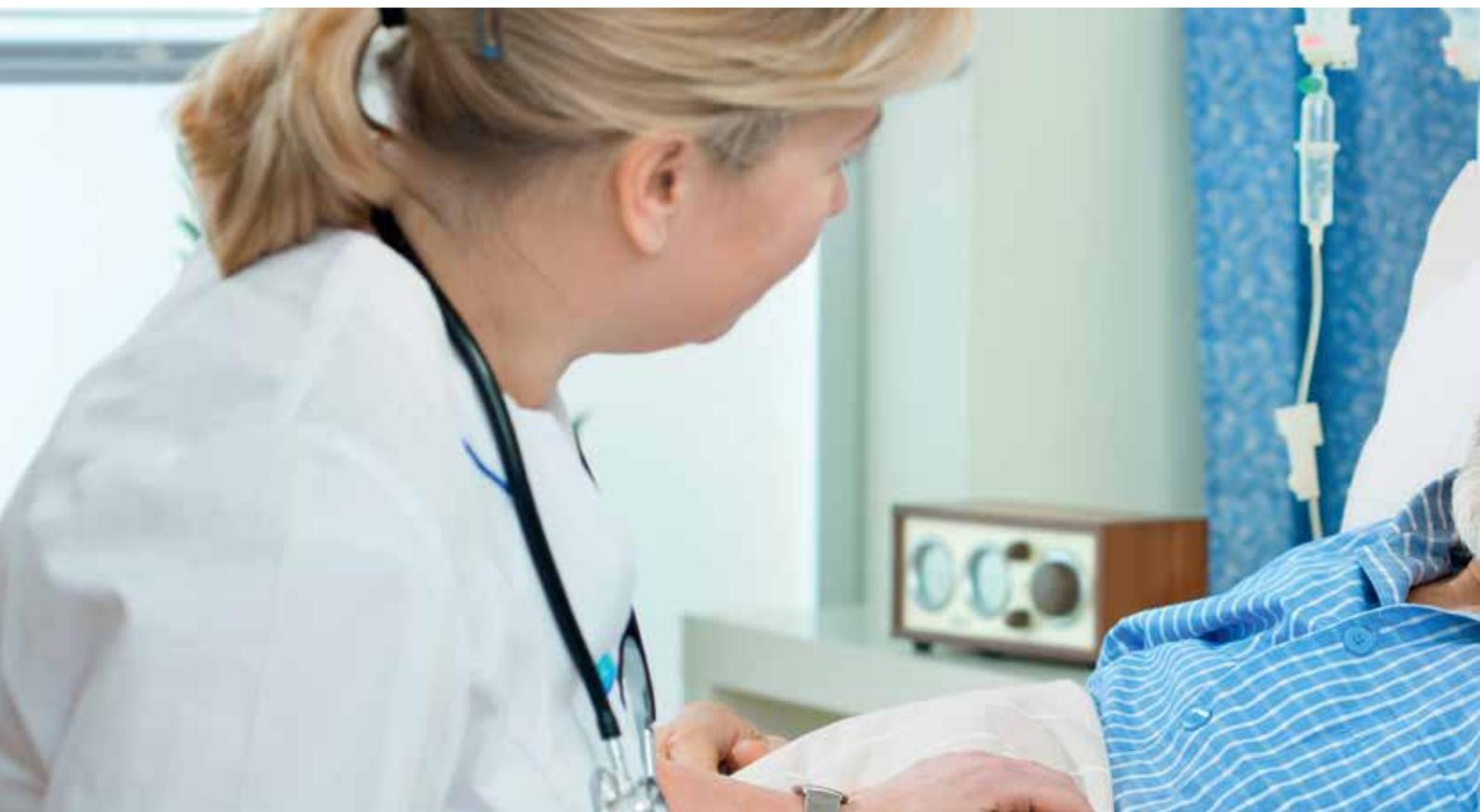
Key features of HYBRAR™ 7000 Series

- Soft
- Transparent
- Good kink resistance
- High temperature performance
- Solvent bondable
- Excellent processability
- No migration of PVC plasticizer (vs. PVC bag)

Soft-Elastic Modification of Polyolefin Tubes

	1	2	3	4	5
Formulation					
Polypropylene (Random)	100	70	50	70	50
HYBRAR™ 7125F		30	50		
HYBRAR™ 7311F				30	50
Hardness (Shore A)	98	98	94	96	93
100% Modulus (MPa)	-	11.5	7.5	10.1	6.4
Tensile Strength (MPa)	37	25	24	25	21
Elongation	490	780	780	810	930

Tested by Kuraray



SEPTON™ 4000 Series and SEPTON™ J Series for Orthopedic Gels



The Kuraray Elastomer portfolio comprises various materials that can be used in the processing of orthopedic gels. SEPTON™ J-Series and SEPTON™ 4000 Series provide orthopedic gels with their necessary stability and super soft characteristics giving the products a natural skin-like feel. With their low

specific gravity and high tear strength characteristics, these products can replace silicone in various applications.

Developed for high-performance products where long lasting stability and compression set are key requirements, SEPTON™ J-Series and SEPTON™ 4000 Series can be used in applications such as cushions for artificial limbs or orthopedic bandages. Their excellent shock absorbing and damping properties combined with non-allergenic qualities meet the high demands in this industry.

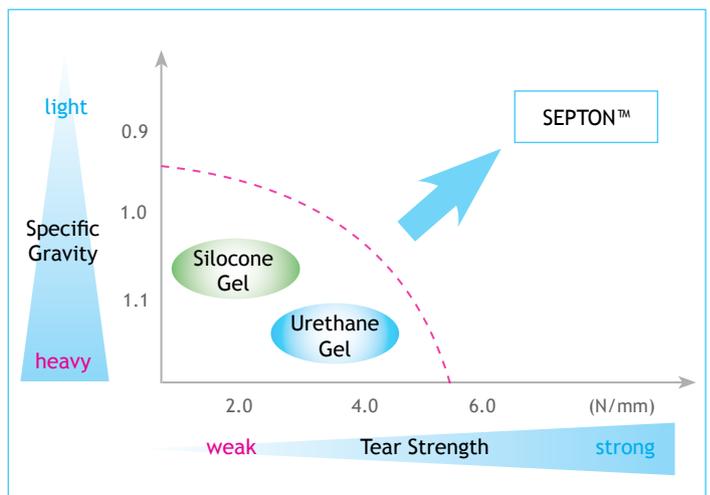
Additionally, characteristics like lower melt viscosity, excellent low temperature behavior and superior processability at a low shear rate ensure enhanced processability and soft, flexible compounds over a broad temperature range.

Key features

- High oil load
- Natural skin-like feel
- High tear strength
- Low specific gravity
- High durability
- Odorless
- Shock absorbing and damping
- Flexible compounds
- Good moldability

Applications

- Cushions for artificial limbs
- Prostheses
- Orthopedic bandages
- Burn plasters



Tested by Kuraray

Patch Adhesives



Various products within Kuraray's SEPTON™ line can be processed for patch adhesives. SEPTON™ 2063 and SEPTON™ 4000 Series for example are perfect solutions when there is a need for products with extremely high cleanliness. Their well-balanced adhesion and cohesion force makes patch adhesives with SEPTON™ products easy to peel off. For the consumer this means higher wearing comfort without causing allergies.

Key features

- High cleanliness
- Superior adhesion force
- High flowability
- Excellent heat resistance



Elastic Nonwovens and Films



Kuraray's SEPTON™ 4000 Series (SEEPS) is designed for high performing elasticity among thermoplastic materials. For consumers the main advantage is a higher wearing comfort and creep resistance. These distinct properties further lead to downgauging probabilities.

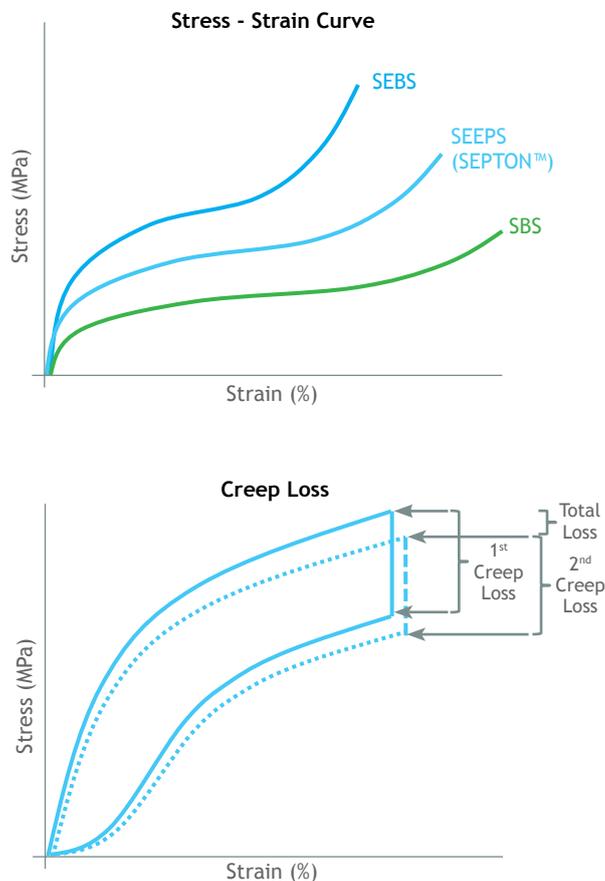
Significant material savings

can be achieved while maintaining mechanical properties, compared to other thermoplastic elastomers.

Premium elastics with

SEPTON™ 4000 Series (SEEPS)

Long lasting creep resistance even over high elongation: SEPTON™ 4000 Series (SEEPS) shows lower losses and lowest permanent set than any other material for this industry.



Schematic illustration
Measured by: Kuraray Research Technical Center Laboratory
Test Conditions: Internal Kuraray test method
2 cycle hysteresis testing on film - Transverse direction

Key Features

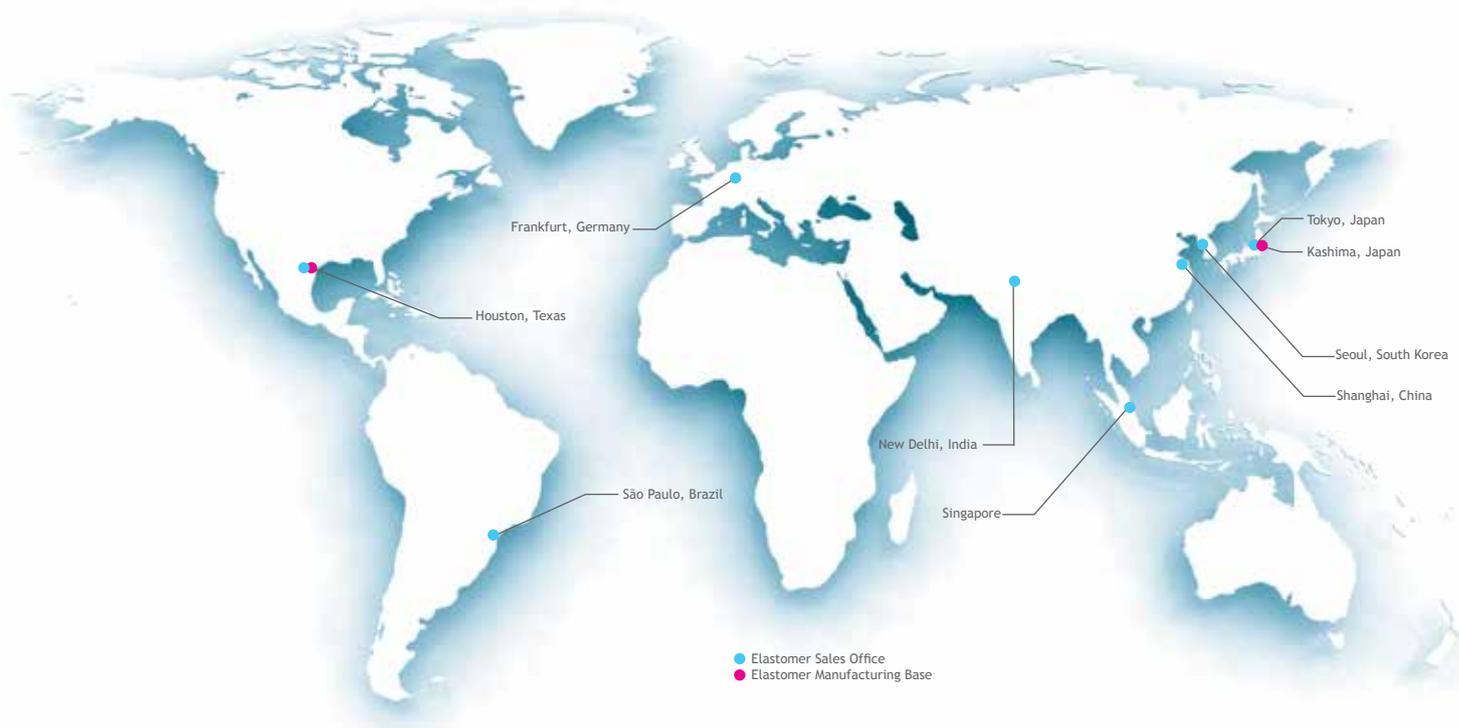
- Combining strength of SEBS and softness of SBS and SIS
- Up to 40% lower material usage due to downgauging
- Lower fish eye level compared to conventional products resulting in higher consistency and lower scrap rates
- 40% weight reduction over competitive products
- Best balance of properties and processability compared to SBS, SIS, SEBS, and POE

Applications

- Surgical masks
- Diaper waistbands
- Medical apparel
- Wound dressing



Adding value to your products - worldwide



SEPTON™, HYBRAR™ and KURARITY™ are Kuraray's trademarks for thermoplastic elastomers (TPEs). They are a special type of synthetic rubber that combine the elastic properties of rubber with the benefits of thermoplastics. They can be processed into almost any shape. TPEs have a pleasantly soft touch and good wear comfort. They also increase shock absorption. What's more, they are recyclable. Kuraray's TPEs are environmentally sound, free of PVC and do not need additional plasticizers. They are used for an extremely wide range of applications including many plastic compounds for every-

day products. Examples include toys, toothbrushes, medical tubes, sports equipment, sealants and car tires. The flexible types are used as lubricant additives and base components in adhesives. Kuraray is a leading supplier of TPEs and offers customers more than 30 different grades with individual properties.

For further information, please contact your local Kuraray office or visit our website.

 www.elastomer.kuraray.com

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Disclaimer: Precautions should be taken in handling and storage. Please refer to the appropriate Safety Data Sheet for further safety information. In using SEPTON™ and HYBRAR™, please confirm related laws and regulations, and examine its safety and suitability for the application. For medical, health care and food contact applications, please contact your Kuraray representative for specific recommendations. SEPTON™ and HYBRAR™ should not be used in any devices or materials intended for implantation in the human body. Nothing contained herein constitutes a license to practice under any patent and it should not be construed as an inducement to infringe any patent and the user is advised to take appropriate steps to be sure that any proposed use of the product will not result in patent infringement.