Reducing Carbon footprint

ESA Plastics Reduction Initiative.
Sustainable SWG Spacers in Bio-degradable materials

Plastic spacers are commonly used to separate spiral wound gaskets during transport to prevent damage to the sensitive graphite sealing surfaces.

Materials such as **PLA (polylactic acid)** and **ZPHA (polyhydroxyalkanoates)** are becoming popular choices because they can break down into water, carbon dioxide, and biomass, thus reducing the environmental impact of plastic waste.

1. ZPHA
Full Name: **PHA (Polyhydroxyalkanoate)**.
PHA or polyhydroxyalkanoates, is a bioplastic produced by vegetable substances which contains 30% of coffee residue. It has similar properties of PLA but faster degradability so it is considered highly compostable. This material it is certified OK COMPOSIT INDUSTRIAL - PA 8012005198 from Austrian TUV

- **Technical Properties**:

PROPERTIES	STANDARD	RESULTS
BASIC PROPERTIES		
Density	ISO 1183-1	1.2 g/cm^3
Melt Mass Flow (MFR)	ISO 1133-2	2.5 g/10min
Parallel mould shrinkage	ISO 294-5	0.50-0.90%
Across mould shrinkage	ISO 294-5	0.50-0.90%
THERMAL PROPERTIES		
Melting point	ISO 11357	140°C
Glass transition temp.	ISO 11357	2°C
Vicat, softening temp.	ISO 306	122/97°C
Heat distortion temp.	ISO 75	103/- °C

    - Plant-based.
    - Breaks down into water, CO_2, and biomass.
    - Suitable for general organic waste streams.
- **Biodegradable** breaks down naturally via microbes.

- **Compostable**:
    - **Industrial Compostable**: Can decompose in high-heat industrial composting facilities.
    - **Home Compostable**: Can also decompose in lower-temperature home composting conditions.

2. ZPBS

- **Full Name: PBS = Polybutylene Succinate.**
- **Technical Peoperties:**

PROPERTIES	STANDARD	RESULTS
BASIC PROPERTIES		
Density	ISO 1183-1	1.26 g/cm^3
Hardness	ISO 868	60 ±1 Shore D
Tensile strength	ISO 527	≥ 50 MPa
Elongation at break	ISO 527	≥ 450%
Abrasion	ISO 4649	64 mm^3
THERMAL PROPERTIES		
Melting point	ISO 11357	114°C
Glass transition temp.	ISO 11357	-32°C
Vicat, softening temp.	ISO 306	99°C

    - **Marine-safe – helps prevent ocean pollution.**
    - **May biodegrade faster in aquatic environments than traditional compostables.**
- **Bio-compostable:** can decompose under specific composting conditions.

  containing 40% renewable content with Austrian TUV certification
- **Dissolves in Seawater:** designed to break down in marine environments.

However, the effectiveness of bioplastics is not always straightforward. For proper biodegradation, these materials require specific environmental conditions, such as industrial composting settings. In landfills, where oxygen is scarce, bioplastics may not degrade effectively.
These alternatives still require plastic adhesive tape or foil, and these options typically have a limited shelf life of 6-8 months.

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