


CHOOSING THE RIGHT TPE

The 7 Essential Considerations

1. INTENT

What is the intent for selecting a new TPE material?



Replacing a different material

Replacing another TPE

Resistance to Bending

Tear Strength

Abrasion Resistance

Stretch & Bounce Back

7. MATERIAL PERFORMANCE

Are there performance or physical property requirements?



Compression Set

Hardness

2. MANUFACTURING PROCESS

How will the TPE part be manufactured?



Co-extrusion

Blow Molding

Overmolding

Injection Molding

Extrusion

3. COST TARGETS

Do you have a target cost for the material or the part?




Material: Cost per pound (or kg)

Part: Cost per piece

4. ENVIRONMENTAL CONDITIONS

Where and how will the TPE part be used?



Temperature Requirements

Usage

Exposure to weather / UV

Chemical Exposure

6. LOOK & FEEL

What are the aesthetics considerations?



Surface Feel / Haptics

Color & Clarity

Scent

Surface Finish

5. REGULATORY CONCERNS

Does the TPE require certification by a regulatory body or is it subject to restrictions?



UL

NSF

FDA

ISO



CHOOSING THE RIGHT TPE The 7 Essential Considerations



1.

INTENT FOR TPE SELECTION
New Grade or Material Replacement
Specify.

Current Material Used:

.....

Why the change?

.....

Any Special Requirements?

.....



2.

MANUFACTURING PROCESS
Formulating for Processability
Check which apply.

- Injection Molding Extrusion Blow-Molding
 Overmolding Co-extrusion

For overmolding and co-extrusion, specify substrate:

.....



3.

COST TARGETS
Balancing Price & Performance
Specify.

Material: Cost per pound (or kg)

.....

Part: Cost per piece

.....



4.

ENVIRONMENTAL CONDITIONS
Use and Exposure
Comment.

Temperature Requirements: Minimum and maximum constant use temperature, time exposed to extreme temperatures

.....

Exposure to UV or extreme weather conditions

.....

Chemical exposure: Is splash resistance required or will the part be submerged? Temperature during the exposure? Chemical type: acid, base, oil, cleaning solution, etc.?

.....

Usage: Is the part under load, or will it be repeatedly flexed or extended?

.....



5.

REGULATORY CONCERNS
Industry and Market
Comment.

Electrical/Wire & Cable: UL certification or listing may be required, REACH SVHC compliance

.....

Automotive: OEM material specification approval

.....

Consumer Products, Housewares, Toys: Compliance with the FDA for food contact in the US, or European directives for Food Contact (EU 1935/2004 and PIM 10/2011) and Toy Safety: 2009/48/EC and EN-71-3

.....

Medical & Healthcare: ISO 10993-5 compliant recipes for biocompatibility

.....

Building & Construction: NSF 51 and NSF 61 certification for use with potable water

.....



CHOOSING THE RIGHT TPE The 7 Essential Considerations



AESTHETICS & SURFACE APPEARANCE

Determine Look & Feel

Circle which apply.

Surface Feel/Haptics

- High surface friction or “grippy” Dry feel or silicone-like Silky-smooth or lubricious to the touch

Surface Finish

- Glossy (able to mimic high gloss levels of PVC) Matte (low gloss, rubber-like look & feel)

Color

- Clear Translucent Opaque Pre-colored



MATERIAL PERFORMANCE

Property Prioritization

Provide Information.

Hardness: Although the Shore A scale is most often used, TPEs can be measured on Shore OO, A, or D scales, and can range from a super soft gel (think shoe inserts) to a hard plastic like polypropylene.

Requirement:

Comments:

Stretch and Bounce-Back: By definition, a TPE can be stretched to twice it’s length and return back to it’s original shape. How a TPE stretches and “bounces back” is indicated by it’s tensile and elongation properties.

Requirement:

Comments:

Compression Set: Will the TPE part be under load, or expected to hold a seal over a long period of time? Under what conditions; elevated or low temperatures? Compression set requirements will determine what family of TPEs to choose.

Requirement:

Comments:

Abrasion Resistance or Resistance to Wear: Is this a disposable product, or something that needs to withstand repeated use over a long period of time? The “toughness” of the TPE depends on its chemistry.

Requirement:

Comments:

Tear Strength or Puncture Resistance: Consider how the product will be used, for example, for baby products, you’ll want a TPE with resistance to biting and tear. Tear strength can be measured, and TPEs can be optimized for maximum tear and puncture resistance.

Requirement:

Comments:

Resistance to Bending: Will the TPE be bent or flexed during use? This may translate into a flexural modulus requirement, which measures the TPE’s tendency to bend.

Requirement:

Comments:

Adhesion to Other Materials: Will the TPE be over-molded onto a rigid plastic like polycarbonate, like in a power tool handle? Will it be co-extruded with polypropylene to create a hard/soft seal? The substrate material is important when selecting the appropriate TPE.

Requirement:

Comments:

Special Requirements: Consider any special characteristics or attributes that may be needed for the TPE. Some examples:

- Energy absorption for acoustic dampening
- Recycled content
- Mineral reinforced
- Anti-microbial

Requirement:

Comments: