


**THERMOPLASTIC ELASTOMERS • STRUCTURAL • WEAR
CONDUCTIVE • COLOR • FLAME RETARDANT**




**Practical Guide to
Plastics Selection**

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Fear Not!
YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS


Purpose of this presentation:

- Remove the mystery
- Help you understand our language



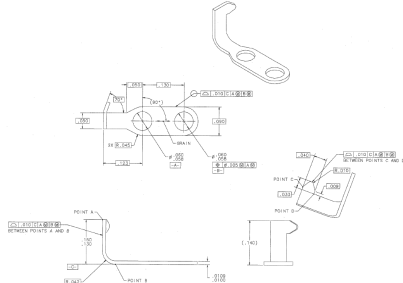
Overview of the Process
YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- What does it do?
– **Part Qualification**
- Where does it live?
- Manufacturing process
- Other technical requirements
- Understanding history
- Economics



What does it do?
YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- How does the part function?
- Understand the assembly





What does it do?
YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

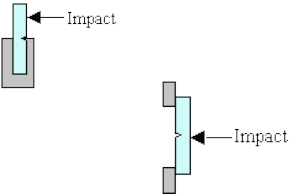
- Define known mechanical property requirements
 - Strength
 - Stiffness
- Electrical
 - Insulative
 - Antistatic
 - Conductive

What does it do?
YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- Flame Retardance
 - Connectors
 - Electronics
- Wear Resistance
 - Gears
 - Bearings
 - Bushings
 - Seals

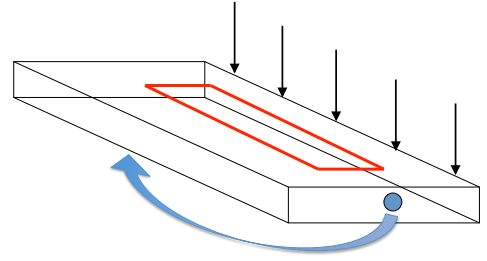
What does it do?
YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- **Impact resistance**
 - Izod impact
 - Charpy impact
 - Falling dart
 - Drop tests
- **Anisotropic properties**
 - Semicrystalline materials
 - Fiber reinforced materials



What does it do?
YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- How will material be qualified?
- Part vs. specimen testing
- Example: RTP 102 CC (15% GF PP)




Suggestions for testing
YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- Make it realistic
- Test the part
- Make it repeatable

Where will it live?
YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- Environment
- What does it need to survive?
 - Chemical Resistance
 - UV
 - Temperature
 - Humidity





Chemical Resistance

YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- Supplier information is often general
- Real data best for comparison
- Data on specimens doesn't guarantee success
- Data on specimens doesn't guarantee failure

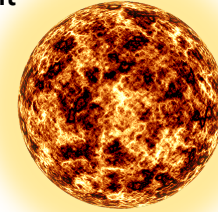
Narrow down the options



UV

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- Every UV situation is different
- Define failure criteria
 - Color
 - Stress cracking
 - Material degradation



No guarantees on time



Temperature

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Temperature for:

- Storage
- Normal use
- Temperature spikes



Temperature needs to be related to TIME



Humidity

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- Important to understand for hygroscopic materials
- Examples:
 - Nylons change properties
 - Polyesters may degrade




RTP Co. **Manufacturing Process**
Imagining Plastics YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- **Production process**
 - Molding, extrusion
- **Tolerances**
 - How flat/how tight?
- **Secondary Operations**
 - Welding, fastening




RTP Co. **Other Technical Requirements**
Imagining Plastics YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- **Regulatory/Agency Compliance**




RTP Co. **Other Technical Requirements**
Imagining Plastics YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- **Surface aesthetics**
 - External parts
 - Hidden parts
- **Color**
 - For ID
 - For Marketing



RTP Co. **Understanding History**
Imagining Plastics YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- **Understand project status**
 - New application
 - Existing application (non-thermoplastic)
 - Why change?
 - Does tool exist?





Economics

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- Price is a property
- Look at the system cost

Material Cost
+ Manufacturing Cost
+ Operational Advantages
= System Cost



Case Study

YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- Description: We are looking at an explosion proof wireless antenna cover. The cover must withstand operating temp range of -20°C to 75°C (-5° F to 170° F); good chemical and impact resistance
- Requirements: Currently, all our instrument covers are aluminum die cast for ex-proof application



Requirements

YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- Explosion-Proof
 - Impact resistance
- -20°C to 75°C (-5° F to 170° F)
- Good chemical resistance
- Good impact resistance
- Currently aluminum die-cast

Long glass (VLF) Rigid Polyurethane



Refined Information

YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- Does it need to be flame retardant?
 - YES
- Define “explosion-proof”
 - Resists catastrophic static discharge
 - “ATEX”

PermaStat® Plus Nylon 6 + FR



Summary
YOUR GLOBAL COMPOUNDER OF CUSTOM ENGINEERED THERMOPLASTICS

- **No Fear**
- Plan out **part qualification**
- Compound technologies = **SCIENCE**
- Applying technology = **ART**



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**Thank you for attending today's
Workshop!**

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