



Overmolding 2019



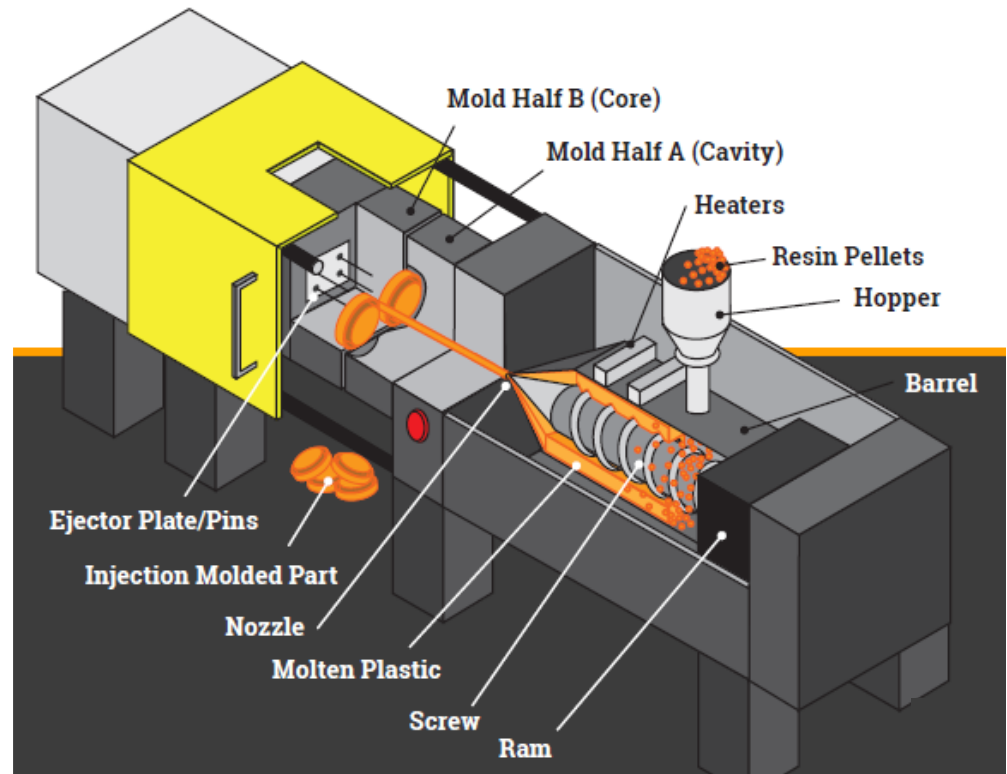
Agenda

- Injection Molding
- What is Overmolding
- Complex Overmold Examples
- Feature Specifications
- Material Evaluation
- Substrate Inefficiencies
- Surface Finishes
- File Preparation

Injection Molding Selection Criteria

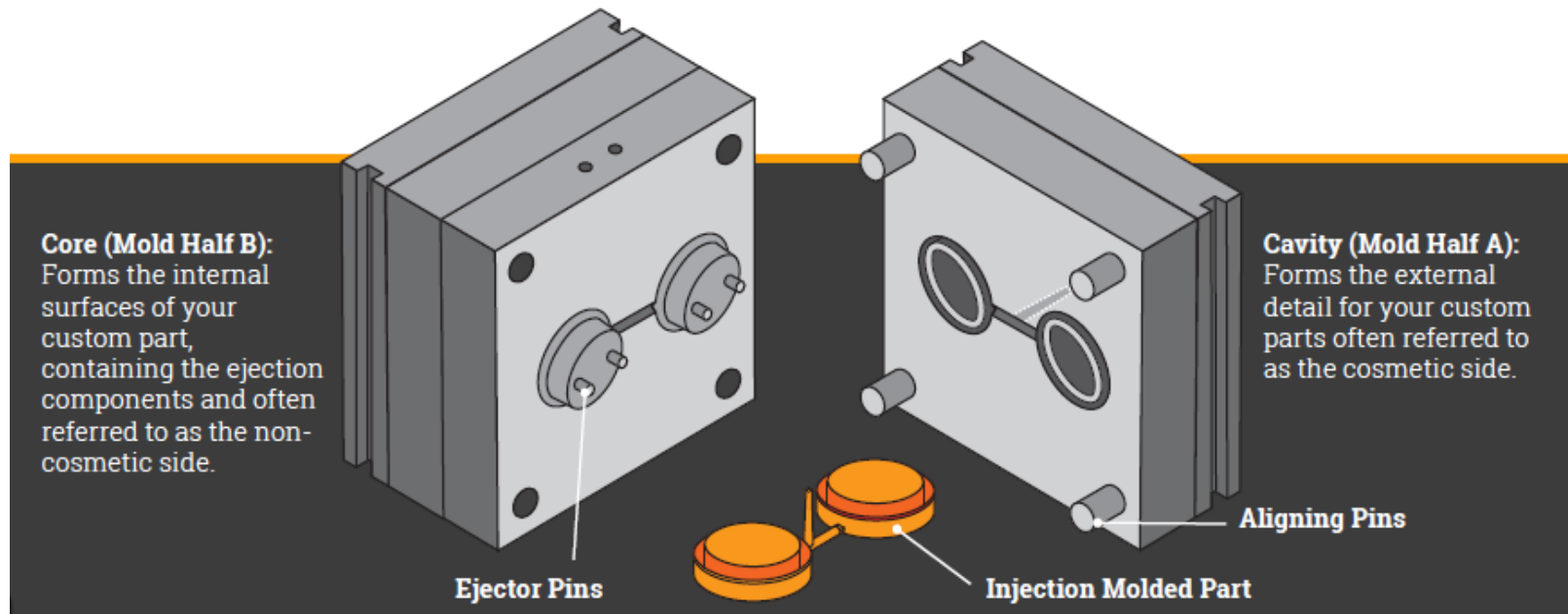
□ Why choose injection molding?

- ✓ Design integrity
- ✓ Part tolerances
- ✓ Form-fit-function
- ✓ Iteration cycle
- ✓ Cost
- ✓ Repeatability
- ✓ Scale
- ✓ Prototype-to-production
- ✓ Time-to-market

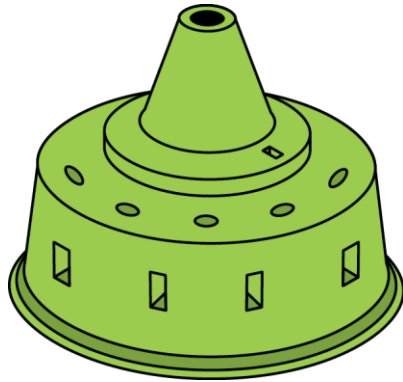


Injection Molding Fundamentals

- ❑ High quality, efficient tooling relies heavily on good part design as well as advanced skills in mold design and the manufacturing of the tool.

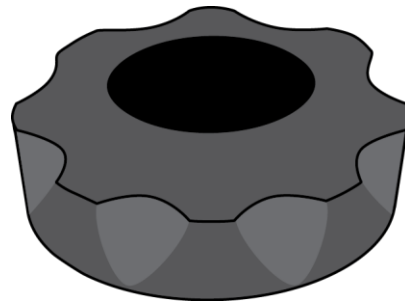


What is Overmolding?



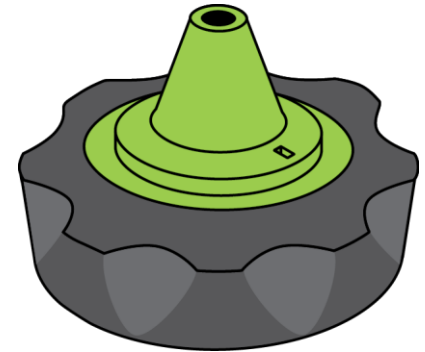
Substrate
1st Shot

+



Overmold
2nd Shot

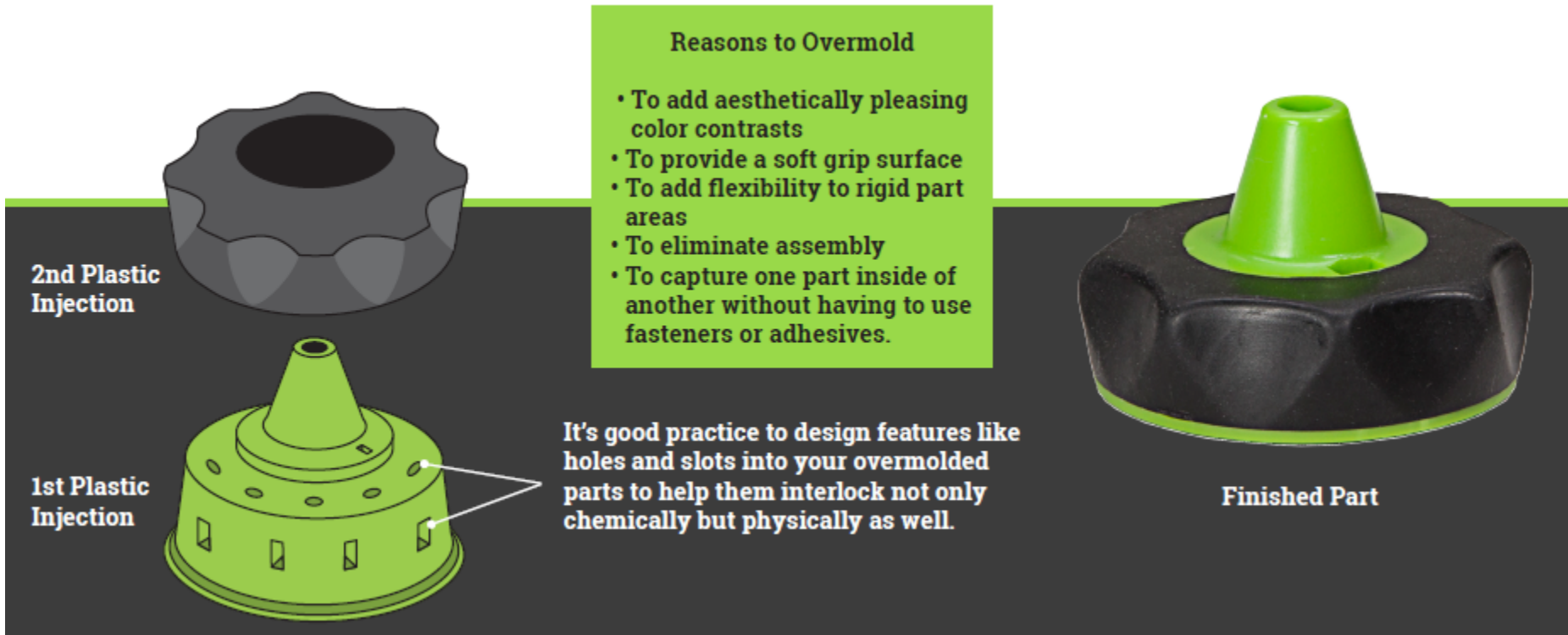
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Assembly

What is Overmolding? (Continued)

- ❑ Overmolding plastic parts can help in wide range of functional and structural uses. A wide range of materials are capable of being overmolded, including both hard and soft plastic resins.

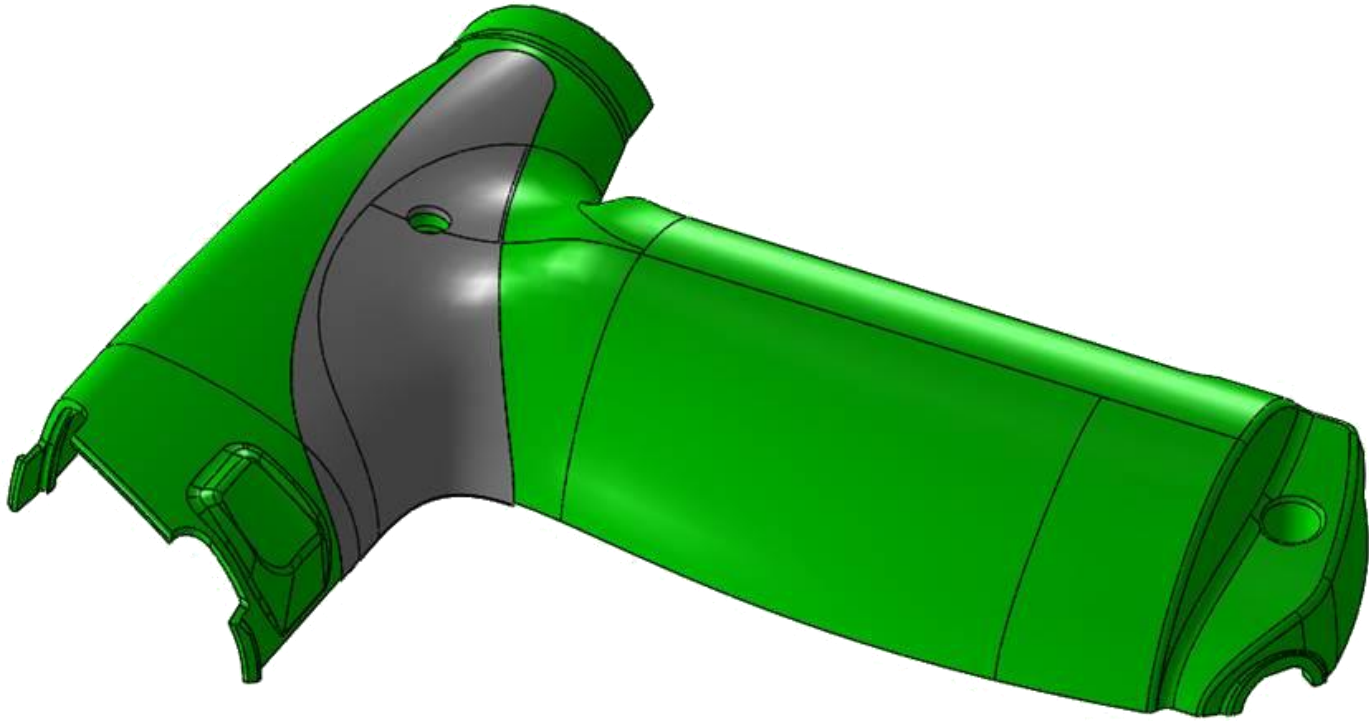


Design Considerations

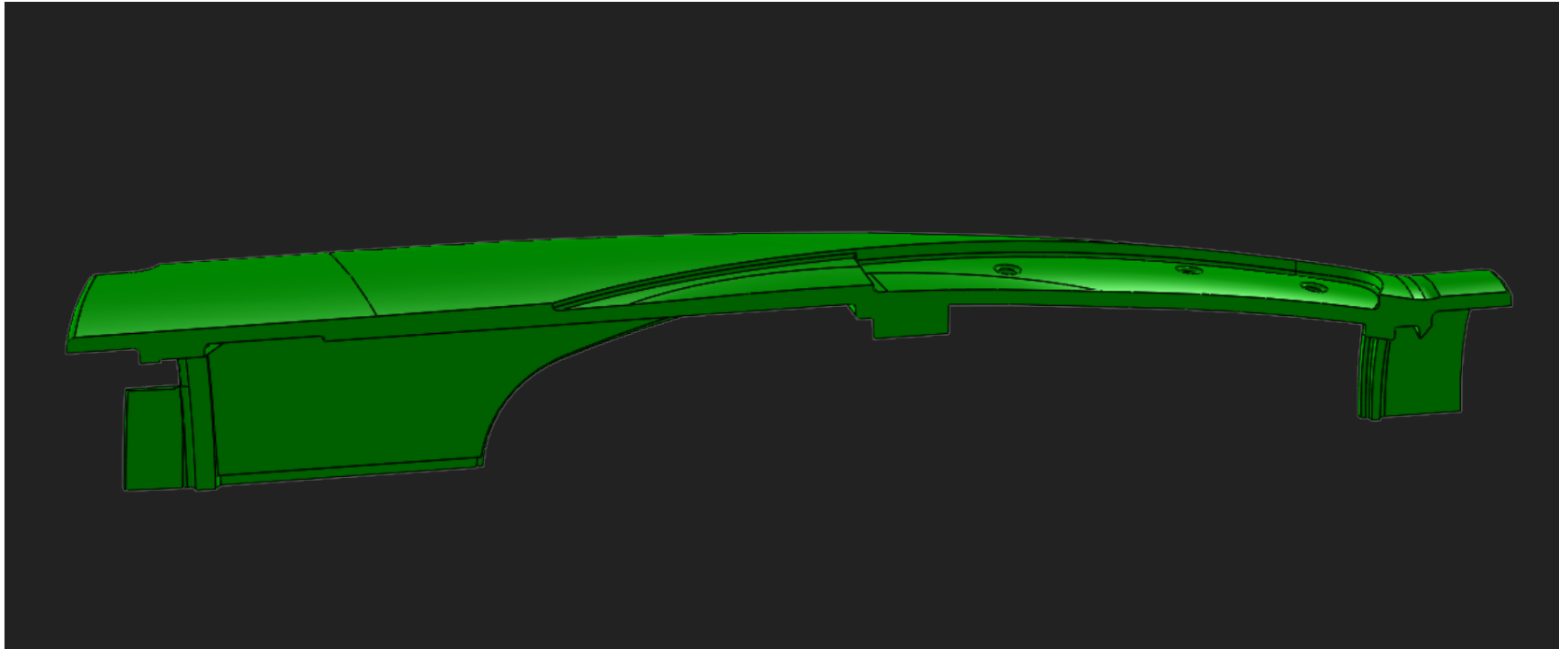
- Material Evaluation
- Feature Specifications
- Surface Finishes
- File Preparation



Part Example 1



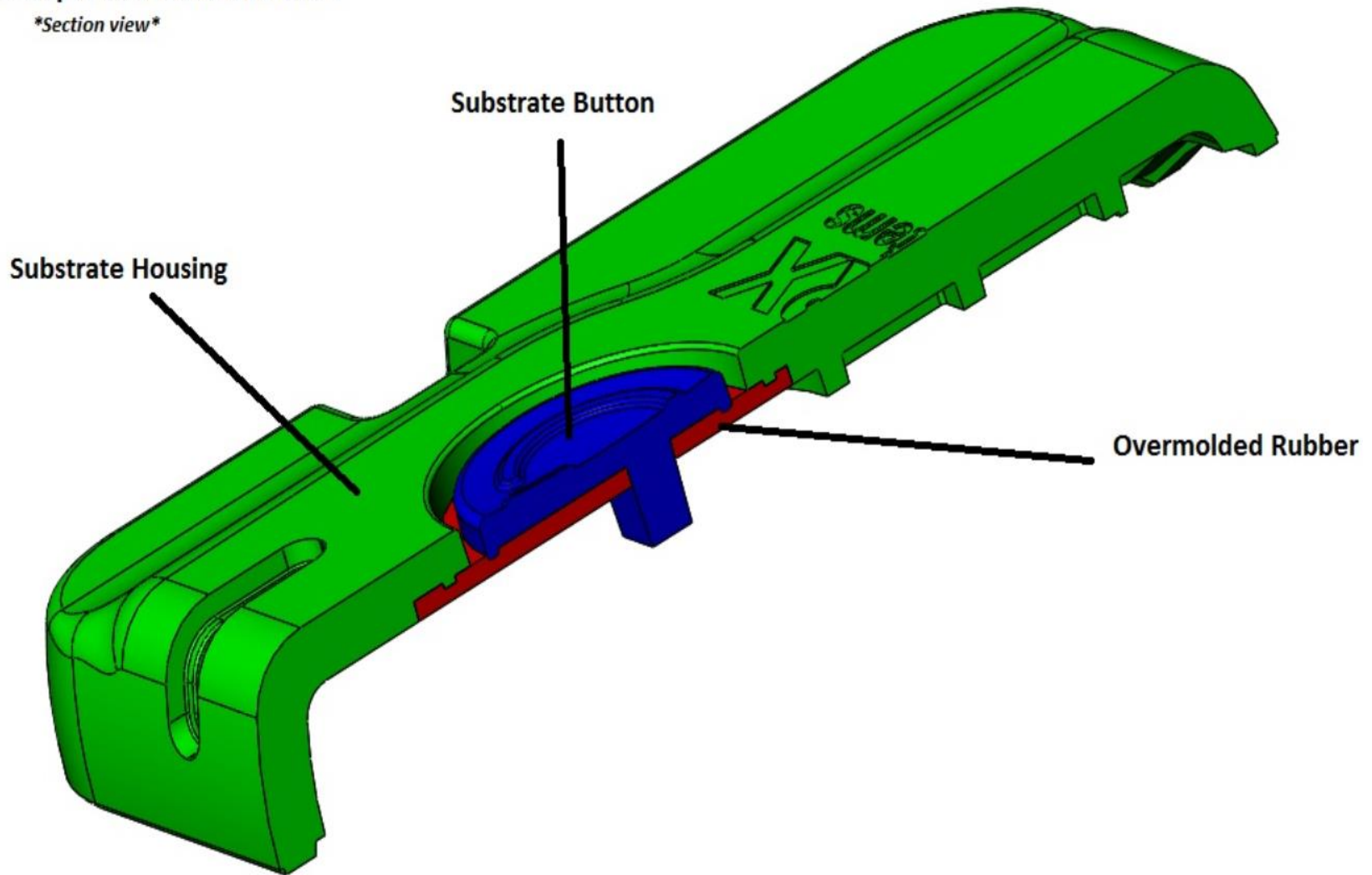
Part Example 1 (Continued)



Part Example 2

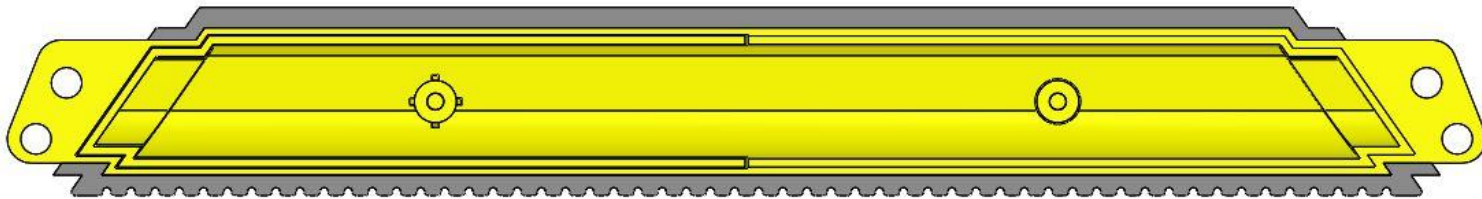
Multiple Substrate Overmold

Section view



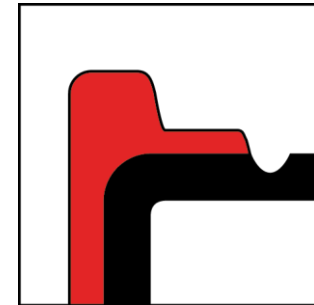
Feature Specifications

- Wall Thickness
 - Nominal Thickness (Good Flow)
 - Minimum Requirements
 - Best practice to be consistent with both substrate and overmold.



Feature Specifications (Continued)

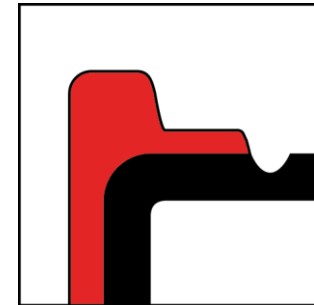
- Radii
 - Treat overmold as separate part
 - Eliminate hard flow / sharp corners
 - Must be consistent on both substrate and Overmold



Feature Specifications (Continued)

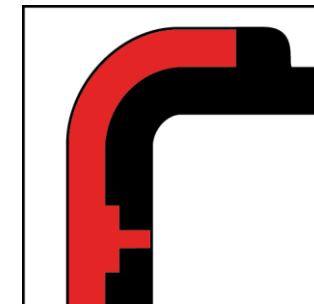
- Radii

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- Subgates / Gate Location

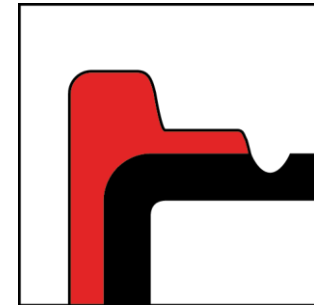
- Use through holes to access from design core side of substrate
- Use mechanical holds as a subgate



Feature Specifications (Continued)

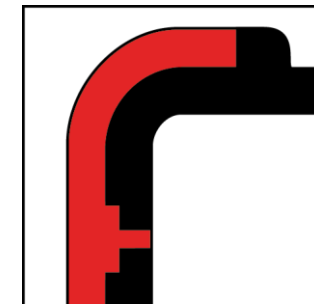
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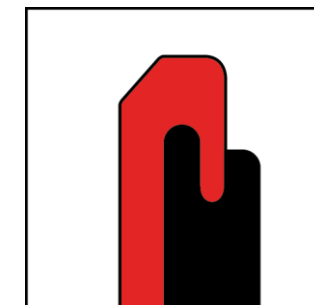
- Subgates / Gate Location

- Use through holes to access from design core side of substrate
- Use mechanical holds as a subgate



- Shut-offs

- Use accent groove and hard shut-offs
- Shutoff insures that the part is clean and free of any flash or mismatch.
- A stable substrate facilitates an even parting line between substrate and Overmold



Material Evaluation

- Utilize Data Sheets
- Substrate

Preferred Materials (Good bond or adhesion)

- ABS
- PC/ABS
- PC
- Some Nylons

Tough Materials (Lubricity a factor)

- Polypropolene
 - HDPE
 - LDPE
 - Acetal
- 2nd Shot
 - Durometer vs. Flexural Modulus
 - Utilize Data Sheets

The image shows a technical data sheet for ABS Proquigel AM. The sheet is titled 'ABS Proquigel AM' and 'PROSPECTOR®'. It includes a 'Technical Data' section with various properties and their values. The data is organized into several sections: General, Physical, Mechanical, Thermal, and Electrical. The values are presented in a table format with columns for 'Material Value (Typical)', 'Nominal Value (DIN)', and 'Test Method'. The sheet also includes a 'Notes' section at the bottom.

Property	Material Value (Typical)	Nominal Value (DIN)	Test Method
Specific Gravity	1.04	1.04 g/cm ³	ISO 1183
Modulus (30°C)	2.1 GPa	2.1 GPa	ISO 178
Flexural Modulus (30°C)	2.1 GPa	2.1 GPa	ISO 178
Impact Strength (Charpy)	10 kJ/m ²	10 kJ/m ²	ISO 179
Heat Deflection Temperature (0.45 MPa)	105°C	105°C	ISO 7178
Dimensional Stability (0.1% strain)	0.1%	0.1%	ISO 11359-2
Surface Resistance (10 ¹¹ Ohm)	10 ¹¹ Ohm	10 ¹¹ Ohm	ISO 15841
Volume Resistance (10 ¹² Ohm-cm)	10 ¹² Ohm-cm	10 ¹² Ohm-cm	ISO 15841
Surface Resistance (10 ¹¹ Ohm)	10 ¹¹ Ohm	10 ¹¹ Ohm	ISO 15841
Volume Resistance (10 ¹² Ohm-cm)	10 ¹² Ohm-cm	10 ¹² Ohm-cm	ISO 15841

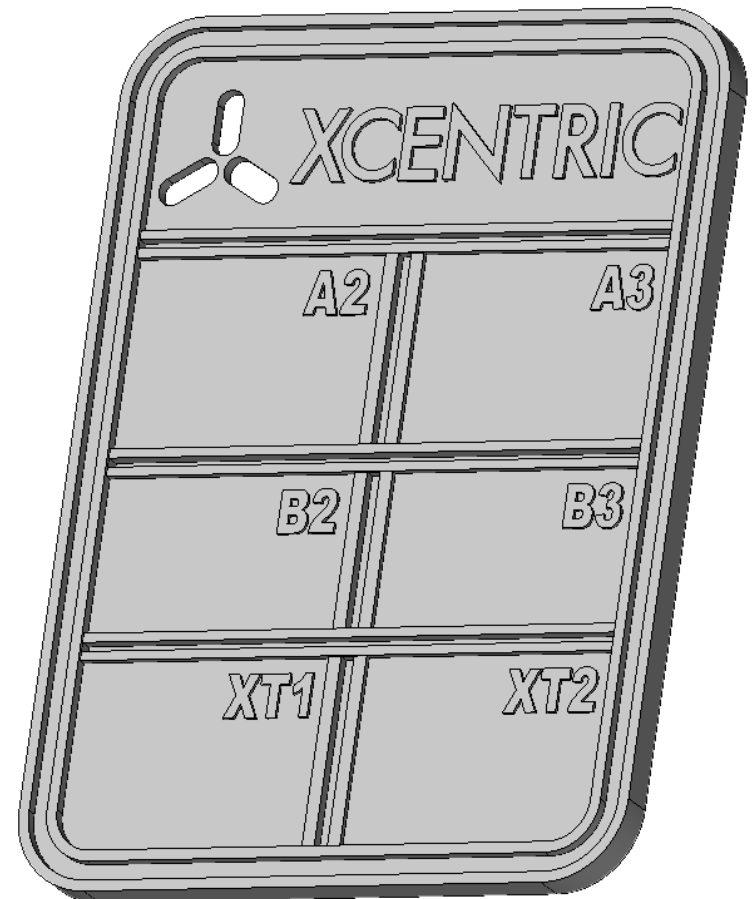


Substrate Inefficiencies

- Consistency in the overmolding process relies on a consistent substrate
- Substrate defects can create molding issues within the overmolding process
 - Warped parts can fault your shutoff on the overmolding
 - Inconsistent shrink on substrate promote irregular substrate sizes
- Concentricity matters.
 - Oblong round parts are problematic

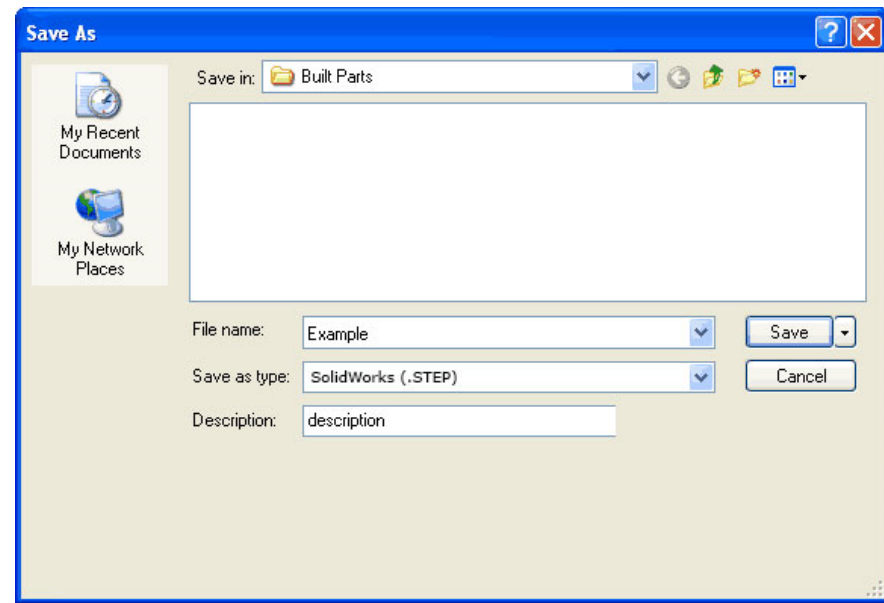
Surface Finishes

- Our Process
 - Expect B3 or Blast
- Polishes will stick
- Keep your part integrity



File Preparation

- Upload three files
 - Assembly file (separate bodies)
 - Two separate files for substrate and overmold



Summary

- Evaluate Materials
 - Do your research
 - Check Data Sheets
- Treat Overmold as Separate Part
 - Nominal wall thickness is critical
 - Radii for good flow
 - Design flow channels / Mechanical holds
 - Use accent grooves and hard shut-offs to prevent flash and peel
- B3 or Blast to prevent sticking
- Files for Quote
 - 3 separate files (one assembly, one substrate and one overmold)
- Design it as you dream it. The right manufacturer can make it come to life.



Q&A



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Thank You!