strengthening the materials core of manufacturing enterprises

Materials Specifications Manager

Hubert Lobo
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Materials

Testing × Software × Data Infrastructure

DatapointLabs

technical center for materials

materialsphere

DatapointLabs affiliate

matereality

EST 1995
ISO 17025
Quality

America's Fastest Growing Private Companies

DatapointLabs

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Heritage

• 1986 - Cornell Injection Molding Program (CIMP)
  – Research: Properties of molten plastics for CAE
• 1995 - Datapoint Testing Services
  – Commercialization: Properties of plastics for molding CAE
• 1998 - TestPaks Alliance Program
  – Partnerships with FEA companies – properties & modeling for FEA
• 2000 - Company rebranded as DatapointLabs
  – Supporting 8 simulation codes for plastics
• 2002 - Matereality started
  – R&D to create multivariate material database for plastics
• 2014 - Today
  – Testing any materials, any properties; supporting 34 CAE codes
  – Super-database+software to analyze and transform material data
What are *Material Specifications*?

- **Used by manufacturing enterprises to:**
  - Define desired requirements and characteristics
    - Type of material
    - Composition
    - Method of manufacture (processing)
    - Required level of performance
      - Desired properties (Min-max, target)
    - Certifications
      - ROHS...
  - Pricing & Availability
## Performance criteria

<table>
<thead>
<tr>
<th>Property</th>
<th>Units</th>
<th>Min</th>
<th>Max</th>
<th>Target</th>
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<tbody>
<tr>
<td>Modulus</td>
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<td>3000</td>
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<tr>
<td>Strength</td>
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<td>100</td>
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<tr>
<td>Melt Flow Rate</td>
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<td>10</td>
<td>15</td>
<td>12</td>
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<td>Thermal Expansion</td>
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<tr>
<td>Izod Impact</td>
<td>J/m²</td>
<td>50000</td>
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<td>60000</td>
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</table>
How are they used?

• To evaluate candidate materials
  – Right kind of material?
  – Does it have the required certifications?
  – Does it meet the property acceptance criteria?
  – Is it available in the required locale?

• To assign a material to one or more components
  – Fuel pump housings
  – Fuel line connectors, etc.
Stakeholders

- Corporate consumers
  - Design engineers
  - CAE engineers
  - Manufacturing engineers
  - Purchasing

- Materials engineers (gatekeepers)

- Material suppliers (sources)
Material Specification Manager

- Used by materials engineer to
  - Create specifications
  - Evaluate candidate resins
  - Add materials that meet acceptance criteria
Matereality Engineering Apps

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Creating a specification
Defining the spec material

Specification Name, Class, Subclass

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Adding compositional details
Declaring a fiber-filled plastic
Declaring fiber details
Adding processing steps

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<th></th>
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<th>6</th>
<th>hopper dryer</th>
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<td>Drying Time</td>
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<td>6</td>
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<td>Drying Time Notes</td>
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<td>Barrel Temperature - Middle</td>
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<td>Barrel Temperature - Front</td>
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<td>300</td>
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<td>Barrel Temperature - Nozzle</td>
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<tr>
<td>Processing Temperature</td>
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<td>Mold Temperature</td>
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<td>Back Pressure</td>
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Declarating availability
Adding property ranges
**Entering min. strength details**

<table>
<thead>
<tr>
<th>Result</th>
<th>Value</th>
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<tr>
<td>Tensile Strength at Break</td>
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<td>MPa</td>
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<tr>
<td>Tensile Strength at Yield</td>
<td>160</td>
<td>MPa</td>
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Density/Specific gravity
Completed specification
Evaluating candidate materials

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Checking for acceptance

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Material Specification Viewer

- Used by all engineers to
  - Find current material specifications and property ranges
  - Find accepted materials for a specification
  - Find properties of accepted materials
- Attach material specs to parts and components (BOM)
Using the Specification Viewer

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The Material Info View

<table>
<thead>
<tr>
<th>Material Name</th>
<th>Class</th>
<th>Subclass</th>
<th>Subsubclass</th>
<th>Processing</th>
<th>Supplier</th>
<th>Composition</th>
<th>Color</th>
<th>Availability</th>
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</table>

*Chemical abbreviation according to ISO 1043-1: PBT Moulding compound ISO 2761-1: PBT/GT/CT; MGHR, 05-05*
Conclusions

- Software for managing material specifications
- Useable by material suppliers and OEMs
- Captures workflows in digital format
- Manage app allows materials engineers to create and manage specifications
- Viewer app presents data and specifications to rest of the engineering community