



CES Selector 2007 Release Notes

These Release Notes apply to the following CES Selector editions and to customized CES Selector packages created by adding additional data modules to one of these editions:

- CES Selector (Standard Edition)
- CES Eco Selector
- CES Polymer Selector
- CES Medical Polymer Selector
- CES Aero Selector

The Release Notes detail the enhancements in CES Selector 2007 compared with the previous release, CES 4.6.

What is new in CES Selector 2007?

CES Selector Software

1. **Improved user interface**, particularly for selection – the ‘Selection’ stage, which is used to create and apply selection criteria is now much clearer with a ‘wizard’-style panel guiding the user through the key steps of:

- Dataset selection
- Definition of graphical, limit and tree stages
- Ranking of results

Benefits:

- More intuitive operation, reduced learning time

2. **Ranking of selection results** – this is a new selection feature that enables the results of the selection process to be ranked according to the value of one of the properties, or performance indices, used in the selection stages.

Benefits:

- Simplifies interpretation of selection results
- Particularly useful in analyzing performance against complex combinations of properties – for example, in studying ‘cost per unit of function’ when making selection or substitution decisions

3. **Attribute notes** – each datasheet attribute in the MaterialUniverse and ProcessUniverse data modules is now linked to a short document that contains the following information:

- **Description:** one-line description of the attribute
- **Test notes:** details on how the attribute value is determined

- **Material selection notes:** details/guidance on how to use the attribute in material selection and how similar attributes are related
- **Link to 'science note'** (where applicable): in-depth, textbook-level information (authored by Professor Mike Ashby of Cambridge University) on: how the attribute is determined, the science underlying its origins, and how performance relates to generic material class/structure

Benefits:

- Provides users with a direct link to the meaning of material and processing attributes and gives guidance on how they should be used
- Enables users to readily confirm that they are using the most suitable attributes for their selection
- Science notes enable users to quickly drill down to an authoritative description of the underlying science relating to an engineering attribute – saves time otherwise spent looking up reference information when in-depth analysis of a problem is required

4. **Family 'envelopes'** – this feature, which can be switched on/off, draws envelopes around related records in two dimensional material property charts and highlights the location of material families within the property space.

Benefits:

- This highly visual feature identifies how generic material families (e.g., metals, polymers, foams, hybrids, etc.) perform, relative to each other, and enables users to quickly establish which classes of material may be of interest to their design

5. **Labeling of records on graphs** – the record-labeling feature has been extended to work from the results, browse, and search windows. This enables records to be quickly identified on selection charts, from all parts of the user interface.

Benefits:

- Creates a more intuitive link between the visual graphical stages and the text-based browse, search, and results features

6. **Improvements to graph formats** – the following improvements have been made to the output of graphical stages:

- Record bubbles are now colored in
- Format of graph axes can be defined by the user
- Advanced functions are automatically inserted into axis titles
- The width of bars on bar charts can be adjusted

Benefits:

- Graph stages are simpler to interpret
- Bolder and clearer graphics aid presentation of results
- Graphical results can be tailored to suit formatting of external documentation/presentations

**MaterialUniverse & ProcessUniverse data modules
(including the PolymerUniverse subset and the Eco Selector superset)**

7. Material prices in the MaterialUniverse have been completely revised.

- New estimated prices for over 3,000 materials have been generated using an improved and updated price model

Benefits:

- For commonly used materials, pricing is both up-to-date and more accurate in absolute terms. For less common materials, where 'real' pricing is hard to obtain, prices are predicted more reliably than before and give a much better indication of relative trends within a class of materials – for example, within cast irons or aluminum alloys or filled thermoplastics
- An important resource for cost reduction initiatives
- An important resource for trade-off studies, e.g., cost vs mass of components; plastic vs metal
- Makes it possible for Granta to supply pricing updates to customers more frequently, independently of full product releases

8. New thermoplastic elastomer (TPE) subset has been added to the MaterialUniverse.

- 70 TPE records, segregated into 11 classes (SBS, PVC-elastomer, POP/POE, TPO, SEBS, TPV, TPU, TEEE, PEBA, MPR)
- Includes the following new attributes; tensile strength at 100% and 300% elongation, compression set at 23, 70, and 100°C, tear strength and abrasion rate

Benefits:

- Helps to optimize engineering design with TPEs. Designers can: navigate the TPE jungle; find the optimal TPE for the job; avoid the cost of the wrong choice; know that they have surveyed the field and considered all the options
- Supports production and marketing of TPEs. Materials producers can: develop new materials and analyze their value; analyze and present competitive positioning - both within class (e.g. TPU vs TPU), and out of class (e.g. TPV vs SEBS); support customer service and design consulting

9. Upgrade of polypropylene (PP) materials – commercially available PPs (homopolymer, copolymer, impact-modified, reinforced, and unfilled) have been reviewed, the grading structure updated, and new grades introduced. Nylon/PP polymer blend has been added.

Benefits:

- Helps plastic selection. PP-based materials continue to grow in importance due to their favorable balance of low cost, low weight, mechanical properties, and chemical inertness

10. New data on biodegradable polymers – three new records have been added for commercially available biodegradable polymers (TPS, PHA and PLA).

Benefits:

- Helps environmentally informed polymer selection. Particularly important for the selection of materials for packaging applications

11. A range of new attributes have been added (see Table). These are in addition to the new attributes introduced as part of the TPE subset (see item 8).

Heading	New attribute	Subsets
Impact	Impact strength, unnotched 23°C	Polymer
	Impact strength, unnotched -30°C	Polymer
	Impact strength, notched -30°C	Polymer
Thermal	Minimum service temperature	All
Electrical	Comparative tracking index	Polymer
Optical	Refractive index	Polymer (unfilled only)
Absorption, permeability	Water absorption @ 24hrs	Polymer, TPE
	Water vapor transmission	Polymer, TPE
	Permeability (O ₂)	Polymer, TPE
	Permeability (CO ₂)	Polymer, TPE
	Permeability (N ₂)	Polymer, TPE
Eco properties, processing	Casting energy	All
	Ceramic powder forming energy	All
	Forging, rolling energy	All
	Glass molding energy	All
	Machining energy	All
	Metal powder forming energy	All
	Polymer extrusion energy	All
	Polymer molding energy	All
	Vaporization energy	All
Durability to flame, fluids, sunlight	Chem. Resistance index	Polymer
	Env. Stress crack index	Polymer

Benefits:

- New impact and thermal attributes provide more information on low temperature performance, enabling more informed material selection, particularly for polymers for low temperature application
- Refractive index of unfilled transparent polymers aids the selection of polymers for optical applications
- Absorption and permeability values for polymers and TPEs enables the barrier properties of these materials to be compared
- Chemical resistance and environmental stress cracking indexes provide an indication of the general stability of polymers to chemicals and stress cracking and enables rapid assessment on whether a material is likely to be susceptible to chemical attack
- The new eco processing attributes enable the processing energies of various materials to be determined, which, in combination with the material's embodied energy, form a vital part of a component's energy audit

12. New data on magnetic materials has been added to the MaterialUniverse.

- Two additional families of magnetic materials: ceramic soft-magnetic ferrites (e.g., Mn-Zn, Ni-Zn, Co-Ni ferrites) and electromagnetic amorphous alloys (e.g., Metglas iron-based & cobalt-based alloys)
- Data is given for magnetic properties (remanent and saturation inductions, coercive force and maximum permeability) and for certain other properties

Benefits:

- Improved material selection for applications requiring low-loss magnetic materials, for example, components used in high-frequency electronic devices

13. **Renaming of attributes** – the following attributes (see table) have been renamed since the CES 4.6 release.

Heading	Old name	New name
Mechanical	Elastic Limit	Yield stress (elastic limit)
	Endurance Limit	Fatigue strength at 10 ⁷ cycles
	Loss Coefficient	Mechanical loss coefficient
	Modulus of Rupture	Flexural strength (modulus of rupture)
Thermal	Thermal Expansion	Thermal expansion coefficient
Electrical	Resistivity	Electrical resistivity
	Dielectric Constant	Dielectric constant (relative permittivity)
	Dissipation (Power) Factor	Dissipation factor (dielectric loss tangent)
	Breakdown Potential	Dielectric strength (dielectric breakdown)
Durability	UV	Sunlight (UV radiation)
Eco properties	Incinerate	Combust for energy recovery
	Sustainable	A renewable resource?

Benefits:

- Attribute names are more informative and less ambiguous, providing clarity to users

14. The **ProcessUniverse** has two new joining records (snap-fit and projection welding) and one new surface treatment record (polymer powder coating).

Benefits:

- More comprehensive resource and selection tool for manufacturing processes for material joining and surface treatment

15. **Restructuring of process records** – a new uniform format in all levels and more intuitive organization ensures that key facts about processes are more prominent in the record. In addition, generic records have been introduced into the shaping processes and surface treatment trees.

Benefits:

- More intuitive structure, making it easier to navigate and find information

CES Polymer Selector

CES Polymer Selector is the new name for CES Optimal Polymer Selector (OPS). In addition to general software improvements (1-6, above) and new plastics data added to the MaterialUniverse (8-10, above), the following updates have been made to the plastics-specific data modules:

16. The **CAMPUS[®] Plastics** data module has been updated with the latest CAMPUS ISO comparable standards information.

- Information on approximately 5,880 resins from 25 leading vendors

Benefits:

- Provides the latest CAMPUS data

17. The Granta **IDES Plastics** database has been updated with the latest information. The layout and structure of the data has been improved for clarity and for speed of material selection using this particularly large database.

- Approximately 62,000 datasheets for specific resin grades
- Approximately 500 suppliers worldwide
- Approximately 53,000 ASTM and 19,000 ISO datasheets

Benefits:

- Provides the latest IDES data
- Makes material selection tasks approximately 50% faster

CES Medical Plastics Selector

18. **New medical plastics data module** – a new data module extends the MaterialUniverse data, providing additional data of interest to medical device designers. New materials records include TPE, PP, and biodegradable polymeric materials (items 8 - 10, above). The medical plastics module adds a **Bio-data** section to the standard MaterialUniverse attributes, and benefits from the addition of a number of the attributes described in item 11, above. Key attributes are:

- Bio-data: sterilizability (EtO, radiation, steam autoclave), medical grades available (ISO 10993 or USP class VI), food contact grades available (FDA 21 CFR 177, EEC/EU, BfVV/BfR, or NSF 51 and 61)
- Low temperature properties: minimum service temperature, low temperature impact strength
- Clear/transparent plastics: refractive index
- Chemical resistance: chemical resistance index, environmental stress cracking index

Benefits:

- Establishes the optimal plastic or elastomer for a medical device or food contact application and consider alternatives
- Finds materials with medical approvals and the right sterilizability
- Identifies which of these materials also have the required strength, stiffness, impact, thermal, electrical, optical, and chemical or environmental stress cracking resistance properties
- Helps users to consider all possible medical plastic and elastomer options with the systematic, rational, and exhaustive methods of CES Selector

CES Aero Selector

19. **The MMPDS data module** (originally MIL-HDBK-5) has been updated to version MMPDS-02.

- Extra graphical data on residual strength (vs crack length)

Benefits:

- Provides the latest MMPDS-02 data

Feedback

The expert staff at Granta Design can provide advice on database design issues, and can provide a consulting service to help with major database development projects.

Granta Design would welcome your feedback on any improvements you would like to see in the CES system, data, or documentation.

email: support@grantadesign.com

There is a general CES FAQ at the following location that may answer some of your questions.

[<http://www.grantadesign.com/members/kbase.htm>](http://www.grantadesign.com/members/kbase.htm)