Release Notes: CES Selector 2017

Key new features in CES Selector 2017

- New **chart annotation tools** – add curves and arrows to charts to show trade-off curves, highlight trends, and communicate results. See item 1.
- **Improved datasheet layout** makes it easier to work with the data. See item 2.
- **CNC Machining** added to the Part Cost Estimator – enabling the cost of machining to be considered alongside net-shape processes. See item 3.
- **Updated versions of MaterialUniverse and the specialist data modules** (e.g. Prospector Plastics, MMPDS, etc.) – access the latest materials property data. See items 5 through 24.
  - New **Restricted Substance Risk indicators** added to MaterialUniverse. These allow you to consider REACH and the SIN List (Substitute It Now) when selecting and comparing materials. See item 7.
  - **Enhanced metal selection** – new 'Machining speed' and 'Stress corrosion cracking' properties added to MaterialUniverse for metals, providing greater differentiation between similar alloys and better selection capability. See items 8 - 9.
- **Access to recordings of the bi-monthly online training sessions and FAQs** – sign in to your 'My Granta' account to access these resources. See item 27.
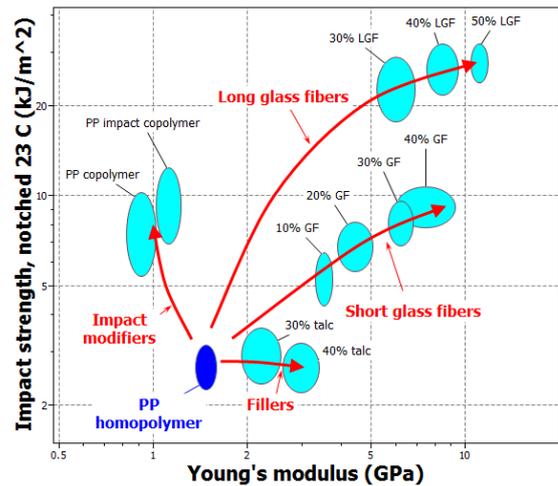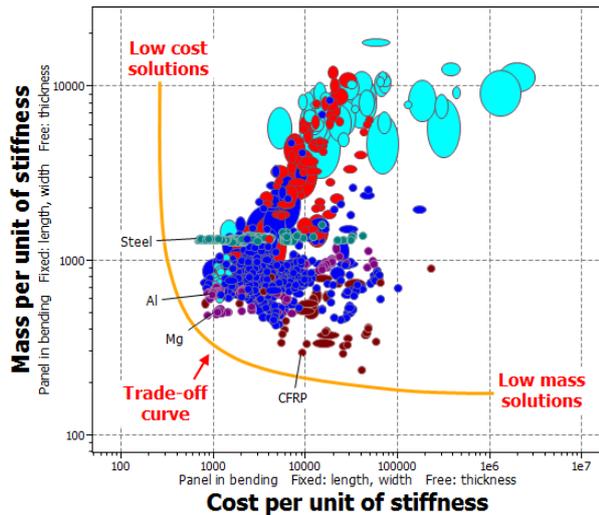
These and other enhancements are detailed below. Descriptions are organized in sections according to software, or data modules.

What's New?—Detailed Descriptions

This section details the new features and enhancements in CES Selector 2017.

CES Selector software

Charting – Chart annotations

Examples of chart annotations used to highlight trends and communicate results

1. New capability to add **arrow and curve annotations** to charts. You can highlight trends and communicate results using the new curve and arrow tools on the chart toolbar.

Capability includes:
- Customize line style, color, width, and end styles.
- Set default style for arrows and curves.
- Add and edit points.
- Copy and paste annotations.

Benefits:
- Annotate charts to emphasize key points and help communicate results in reports and presentations.
- Add trade-off curves and highlight trends on charts.

Enhanced usability

2. A number of developments have been made to simplify navigation and use of the software:

- New **Home** and **Settings** buttons added to the main application toolbar to provide direct access to the homepage and system settings (e.g. unit settings, chart axis fonts, and number format)

- New datasheet format makes it easier to find and use the data.

- Enhanced support for High Definition monitors – provides better rendering of the product and display of large font sizes.
- When opening folders in the database tree, folders with only one sub-folder now open automatically, reducing the number of clicks required to browse to records – particularly useful when viewing trees in Link windows or custom subsets.
- Record limit for user-defined records increased from 25 to 100 – enables a larger set of in-house data to be added to a project.
- Disabled stages are shown with a red cross on the stage tab, making it clearer to recognize whether a stage is enabled/disabled before opening.

- *Pass not applicables*, listed under **Settings**, renamed to *Pass records with no data* – useful for comparing data in 'incomplete' datasets.
- Limit stage headers can now be opened by clicking anywhere on the header section, making it easier to open and close property groups.
- **Select all** has been added to all lists in Limit stages – making it easier to specify criteria when most options are valid.
- New help links added to Limit stages, Tree stages, and the Performance Index Finder – provides direct access to new help content on how, and when, to use these core tools.
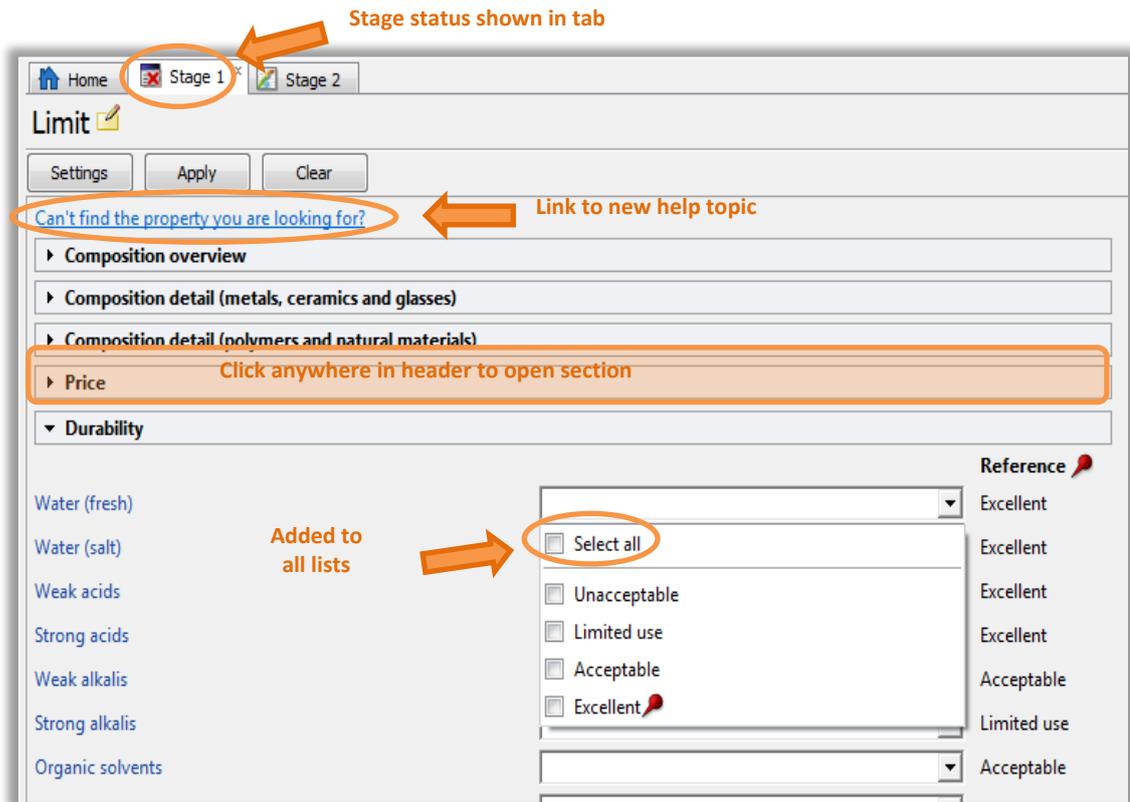

Overview of changes made to limit stage

Benefits:

- The software is easier to learn and easier to use – users can find data and materials faster, and more efficiently.

Add-on Tools: Synthesizer Tool - Part Cost Estimator

3. **CNC machining added** as a secondary shaping process – utilizes the new *Machining speed* property in MaterialUniverse to differentiate between different metal alloys.
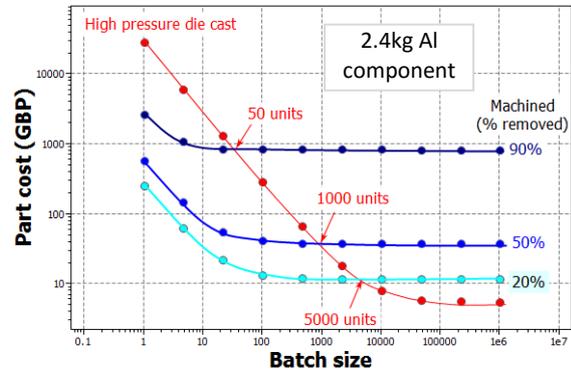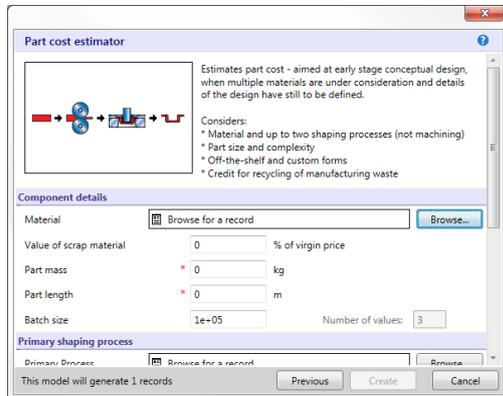
Benefits:

- Consider the cost of machining on part cost – particularly important for the production of low-volume metal components.
- Compare the cost of machining against near net shape forming processes, and establish the production volumes where it becomes more economic to use a net shape forming process.

4. **Tree displayed in process dialogs updated** to show only processes that can be used for primary or secondary shaping processes, rather than both.

Benefits:

- Easier to find and specify primary and secondary shaping processes, and avoid inappropriate allocation of processes.

Data Modules

MaterialUniverse data

5. Updated **Material prices**. New prices are available for all 3,900+ materials in MaterialUniverse. These have been generated using Granta's price model, based on data from the world commodity markets.

Benefits:

- Use up-to-date prices, reflecting current differences between material types and classes.
- Accurate cost reduction initiatives.
- Accurate trade-off studies, e.g., cost vs mass; plastic vs metal.

6. New **Price per unit volume** property added for all materials – important for selecting materials with a fixed design.

Price			
Price	ⓘ	* 0.484 - 0.582	GBP/kg
Price per unit volume	ⓘ	* 3.77e3 - 4.6e3	GBP/m^3

Benefits:

- Account for differences in material density when comparing material prices.
- Quickly generate cost performance charts for designs with a fixed volume.

7. Two new **Restricted Substances Risk Indicators** added for all materials, based on data in Granta's proprietary Restricted Substance solution. Indicates whether a material may contain substances listed on the **REACH Candidate list** or the **SIN list** (Substitute It Now).

Restricted substances risk indicators			
RoHS (EU) compliant grades?	ⓘ	✖	
Notes Contains (wt%): more than 0.1% lead (Pb)			
REACH Candidate List indicator (0-1, 1 = high risk)	ⓘ	0.07	
Notes May contain (wt%): Pigment up to 2%, Stabilizer up to 2.5%, UV-stabilizer up to 2%			
SIN List indicator (0-1, 1 = high risk)	ⓘ	0.07	
Notes May contain (wt%): Anti-oxidant up to 1%, Pigment up to 2%, Stabilizer up to 2%, UV-stabilizer up to 2%			

Implemented as follows:

- Rates the risk that a material may contain a restricted substance on a scale of 0 to 1, where; 0 = no risk, and 1 = high risk
- The notes field details which constituent(s) may be responsible (e.g. stabilizer, flame retardant, etc.) and indicates the level of use (wt%).
- The Design note, accessed by clicking on ⓘ icon next to the property, details what the rating represents and how it should be applied.
- Designed to be used in conjunction with the RoHS rating, which now lists which elements are responsible for non-compliance.

Benefits:

- Quickly establish whether materials may contain a restricted substance and identify the constituents responsible.
- Filter out materials that may be impacted by restricted substances.
- For products with a long design life, avoid materials that may become restricted in the future.

8. New **Machining speed** property added for all metals and alloys. Provides relative machining speeds for metals in their specified condition.

Processing properties			
Metal casting	ⓘ	Unsuitable	
Metal cold forming	ⓘ	Limited use	
Metal hot forming	ⓘ	Acceptable	
Metal press forming	ⓘ	Acceptable	
Metal deep drawing	ⓘ	Limited use	
Machining speed	ⓘ	91.4	m/min

Benefits:

- Consider machinability in the selection of metals, and understand the trade-off between performance and processability.

9. New **Stress Corrosion Cracking property (SCC)** added for all metals. Listed on all metal datasheets and available for selection in the *Metals* subset. Ranks a metal's susceptability to Stress Corrosion Cracking on a four point scale, from not susceptible to highly susceptible. The Design note details the environment used for the quoted rating and lists additional environments where the material is also susceptible.

Corrosion resistance of metals		
Stress corrosion cracking	ⓘ	Susceptible
Note		Rated in chloride; Other susceptible environments: Halide, water

Benefits:

- Use for preliminary screening and comparison of materials for applications where the component is subjected to both stress and a corrosive environment.

10. **Condition added to record name for all metal alloys**—details the basic heat treatment applied to the alloy. Further information is provided in the *Condition* field on the datasheet.

Benefits:

- Understand the differences between heat treatment of alloys in the results list and search results without having to open up the datasheet.
- Increased efficiency when searching for materials.

11. **Revised and updated 'Standards with similar compositions'** property. Updated content, and new display format where the standards are grouped by country:

Benefits:

- Increased coverage of standards and designations
- Easier to identify standards with similar composition based on country

12. **Revised and updated 'MRI Safe' property**—renamed 'Guidance for MRI Safety' and listed under a new 'Healthcare & food' header (formerly called Bio-data). Uses a new four-point scale, from 'No Interaction – MR safe' to 'Caution – Strong Interaction')

Benefits:

- Clearer definition of what the property and rating means.

13. New **Cell type** property added for foams and honeycombs. Listed on datasheets under 'Physical properties' and available for selection in the **Foams** and **Core materials** subsets. Specifies whether the material is open-cell or closed-cell.

Benefits:

- Filter foams and honeycombs based on this important characteristic.

14. **Extended column in compression indices** in the Performance Index Finder now include the following design conditions:

- Fixed outer radius, variable wall thickness
- Fixed wall thickness, variable outer radius

Benefits:

- Trade-off multiple objectives and multiple constraints for applications that use tubes in compression, such as hydraulic rams.

15. **Coverage extended** to include the following alloys and polymers:

- *Non-ferrous alloys*
  - Aluminum, 6066, T6
  - Aluminum, 6070, T6
  - Aluminum, 6156, T62, clad
  - Aluminum, 6262, T9
  - Aluminum, 6262,T6
  - Bronze, C67500, hard (manganese bronze)
  - Bronze, C67500, soft (manganese bronze)
  - Nickel-Fe-Cr alloy, Incoloy 800H, annealed

- *Ferrous alloys*
  - High alloy steel, Kovar, annealed
  - Stainless steel, martensitic, AISI 416, annealed
  - Stainless steel, martensitic, AISI 416, cold worked
  - Stainless steel, martensitic, FV535, hardened & tempered
  - Stainless steel, precipitation hardening, FV520, hardened at 450°C (BS S145)
  - Stainless steel, precipitation hardening, FV520, primary and secondary hardened at 450°C (BS S144)
  - Stainless steel, precipitation hardening, FV520, primary and secondary hardened at 540°C (BS S143)

- *Polymers*
  - AES (flame retarded)
  - AES (high-impact)
  - PA410 (impact modified)
  - PA410 (molding and extrusion)
  - PE-MD (molding and extrusion)

Benefits:

- Extends coverage to incorporate these widely used metal alloys and polymers.

16. **Aerospace subset extended** to include a wider set of metals and ceramics used in aerospace applications. Subset increased by 40% to 670 materials.

Benefits:

- Consider a wider range of materials when selecting materials for aerospace materials.

CES Metal Selector

17. **Latest version of SteelSpec dataset**—electronic version of the Steel Specification Book, published by UK Steel, the 14th paper edition of which was published in April 2013. Contains over 4,500 steel standards, including ASTM, BS, BS EN ISO, BS EN, BS ISO, SAE, and AISI.

    Benefits:
    - Access the latest data from UK Steel on steel specifications in CES Selector.
    - Find and apply data on US, European, or UK steel standards.

18. **Latest version of StahlDat SX**—the complete Register of European Steels (known as the "Stahl-Eisen-Liste" in German) augmented with composition, mechanical properties, material forms, and suppliers, plus temperature-dependent properties for many steels.

    Benefits:
    - Up-to-date access to the Register of European Steels information.

CES Polymer and CES Medical Selector

19. **Latest version of Prospector Plastics (formerly IDES Plastics)**—a global library of plastic and elastomer datasheets from UL Prospector. Includes the latest data for around 95,000 grades from over 800 manufacturers and specialty compounders. The latest version includes the following enhancements:
    - Record names have been updated to include the polymer type, making it easier to identify the resin type in the results list and on charts.
    - New 'Manufacturer/Supplier' property added, enabling the dataset to be filtered by supplier.
    - A default value (= 0) has been added to the 'filler by weight' property. This enables better filtering capability, so that datasheets for unfilled materials are not excluded due to no value being quoted.

    Benefits:
    - Access the most up-to-date version of this comprehensive source of plastics data.
    - Search for polymers based on supplier.

20. **Latest version of CAMPUS and M-Base Plastics**—includes the full dataset from the M-Base Material Data Center and CAMPUS (Computer Aided Material Properties to Uniform Standards).

    Benefits:
    - Get access to the most up-to-date version of this comprehensive source of data on plastics and elastomers.
    - Search for polymers based on application, special characteristics, or property profile.

CES Aero Selector

21. **Latest version of MMPDS-10**—The Metallic Materials Properties Development and Standardization (MMPDS) handbook (formerly known as MIL-HDBK-5) is the preeminent U.S. source for aerospace component design allowables relating to alloys and fasteners. MMPDS contains over 2,300 records of statistically derived design data for aerospace alloys in various forms, thicknesses, and heat treatments.

    Benefits:
    - Get access to the most up-to-date version of this critical source of design allowables for the global aerospace sector.

Add-on Data Modules

22. **New Senvol Database™**—the first and most comprehensive source of suppliers' data on industrial additive manufacturing (AM) machines and materials. Contains:
    - Data on over 700 materials processed by additive manufacturing, including information on both the feedstock and processed material. Covers ceramics, composites, metals, polymers, sands, and waxes.
    - Data on over 500 industrial machines—includes information on the specific machine configuration, including build envelope size, machine size, price, achievable layer thickness, and installation requirements. Covers the main industrial additive manufacturing processes, including: Binder jetting, Direct energy deposition, Material extrusion, Material jetting, Powder bed fusion, Sheet lamination, and Vat photopolymerization.
    - Material datasheets are linked to datasheets for compatible machines.

    Benefits:
    - Find and compare the performance of AM materials and machines, and understand the dependency between material and machine
    - Understand the benefits and limitations of this rapidly growing class of material, focused on the production of low volume, highly complex and custom parts.

23. **Latest version of the ASME Boiler & Pressure Vessel Code II-D database**—American Society of Mechanical Engineers (ASME) standard that provides rules for the design, fabrication, and inspection of boilers and pressure vessels. This module provides the 2015 Edition in electronic format. Enhancements include a new browse tree hierarchy and over 200 new steel and 70 new nickel alloy datasheets

    Benefits:
    - Get access to the most up-to-date version of this critical source of design data.

24. **Latest version of the Coatings database**—developed by Rowan Technology Group. Covers over 140 different types of coatings, including anodizing, conversion, corrosion inhibitor, CVD, electro/electroless plate, PVD, and thermal spray.

    Benefits:
    - Get access to the most up-to-date version of this growing information resource on coatings, their properties, and applications.

In-software Help and additional resources

25. **New Help topics** covering the use of **performance indices** and commonly-used areas of the software, with direct links from the software.

    - New 'What is a performance index?' link in Chart stages – explains what performance indices are, how to apply them, and how to create coupling lines, trade-off curves and penalty functions.

    - New 'How to use a tree stage' link in Tree stages – explains how to filter based on the tree hierarchy, links to records in other data tables, and how to use the tree to group records on a chart axis.

    - New 'Can't find the property you are looking for?' link in Limit stages – explains how selection properties are determined by the selection subset and how to change the properties that appear in a project.

    Benefits:

    - Learn about performance indices and how to apply them in the systematic selection process.

    - Use the software more effectively.

26. **New link to the CES Selector Certificate Program**, accessed from the 'Help' menu in the software – provides e-learning materials to get you up and running with how to use CES Selector.

    Benefits:

    - Learn how to use the core tools and understand the different data modules.

    - Validate your experience in using CES Selector or CES EduPack and become a certified user, and promote your expertise.

    - Extend your knowledge and use of CES Selector tools and methodologies.

    - Apply CES Selector more effectively, making quicker and better informed materials decisions.

27. **New Resources available online**, accessed through your 'My Granta' account. Sign in to access:

    - Recordings of past online training sessions.

    - Answers to 'Frequently Asked Questions'.

    Benefits:

    - Listen to past training sessions, as and when you need them.

    - Direct access to answers to common issues reported by users.

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 Selector system, its data or documentation.

Please send your ideas using the **Feature Request** button on the main toolbar. Alternatively, you can email your suggestions to support@grantadesign.com.