

Release Notes:

CES Selector 2018

Key new features in CES Selector 2018

- **New quick-start videos and exercises** – Refresh yourself on the tools and features available in CES Selector - See item 1.
- **Enhanced version of the MaterialUniverse** screening data set - See items 11 through 20
 - 10 new combined properties, such as specific strength, thermal shock resistance and warmth to touch added for all materials
 - Weldability added for all metals
 - Updated price and environmental data
 - New data on human bone and soft tissue (Medical Edition)
- **Updated format of properties in the Prospector Plastics and M-Base Plastics data sets** – enables data measured according to different test standards (e.g. ASTM and ISO) to be considered in selection projects and compared alongside each other. See items 21 through 24.
- **New JAHM Curve Data module** – Provides temperature dependent curve data for over 2,900 materials, covering: mechanical, thermal, physical and electrical properties, stress-strain curves, fatigue, creep and magnetic properties. See item 33.
- **Latest version of the Senvol Database for additive manufactured machines and materials** – 70% increase in the coverage of materials produced by additive manufacturing. See item 34.
- **International metals standards** added to StahlDat SX – the European Resister of Steel. See item 25.

These and other enhancements are detailed below. Descriptions are organized in sections according to:

- [Core software](#)
- [MaterialUniverse \(Core screening data set\)](#)
- [Specialist Editions](#)
- [Add-on tools](#)
- [Add-on Data Modules](#)
- [Software help](#)

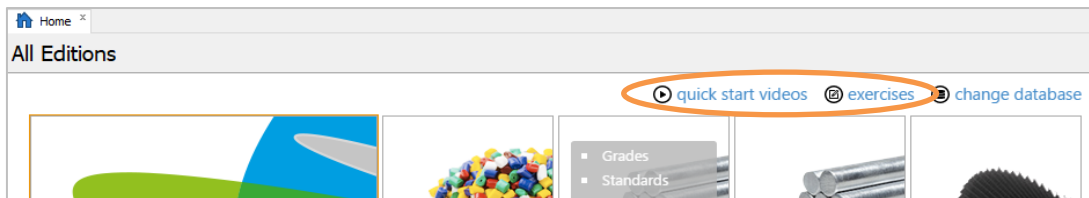
What's New?—Detailed Descriptions

This section details the new features and enhancements in CES Selector 2018.

Core software

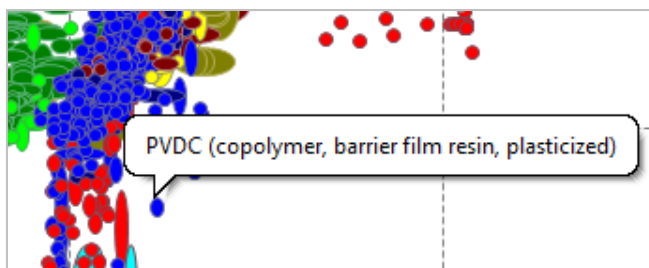
The following usability enhancements have been made to the core selection and comparison tools:

1. New **quick-start videos and Getting started exercises**, accessed from links on the database homepage.
 - 10 short 'Quick-start' videos (total running time = 15min) provide a quick overview of the core tools and features of CES Selector
 - 33 short exercises provide a broader overview of the full set of tools and features in CES Selector. Split into two sections; 'Getting started', and 'Getting the most out of CES Selector'



Benefits:

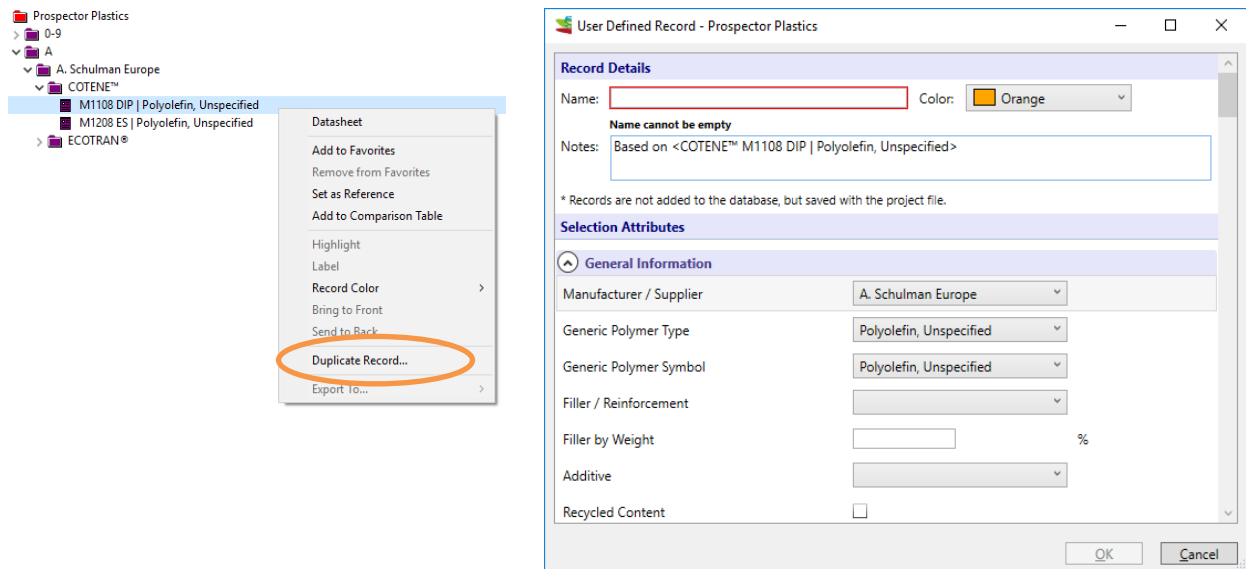
- Reduce the time to get up and running, and start applying CES Selector to answer your material questions.
 - Refresh yourself on the tools and features available in CES Selector
2. **Identify chart bubbles on mouseover**—On charts, record names are now displayed temporarily on mouseover of bubbles – making it easier to identify materials without needing to create labels



Benefits:

- Quicker and easier to identify materials on property charts
 - Save time by reducing the need to add, and delete, unwanted record labels
3. New capability to **duplicate records**—Add a new record, based on data in an existing record, using the new 'Duplicate Record' option added to the right-click context menus for record names and chart labels.
 - Creates a new user defined record containing all 'selectable' information in the parent record - long text, images and curve data fields are not copied.

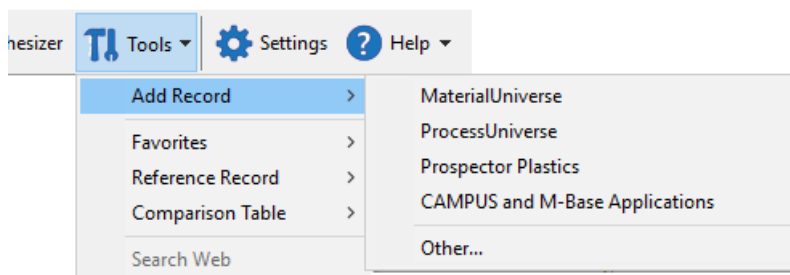
- New record is appended to the Browse tree in a 'My records' folder. Behaves as a standard user defined record. Saved in project file rather than added to database.
- All copied values can be edited, and new values added for unpopulated properties.



Benefits:

- Saves time when manually adding user defined records, particularly useful when adding a family of materials that contain many shared properties
- When using the Part Cost Estimator - use to refine the cost model data in a standard ProcessUniverse record to match your specific production facility

4. **Specify table for user defined records**—When using the 'Add Record' feature from the 'Tools' option on the main application tool bar, users are now asked to choose which table they would like to add the record to. The application remembers the last four tables that records have been added.

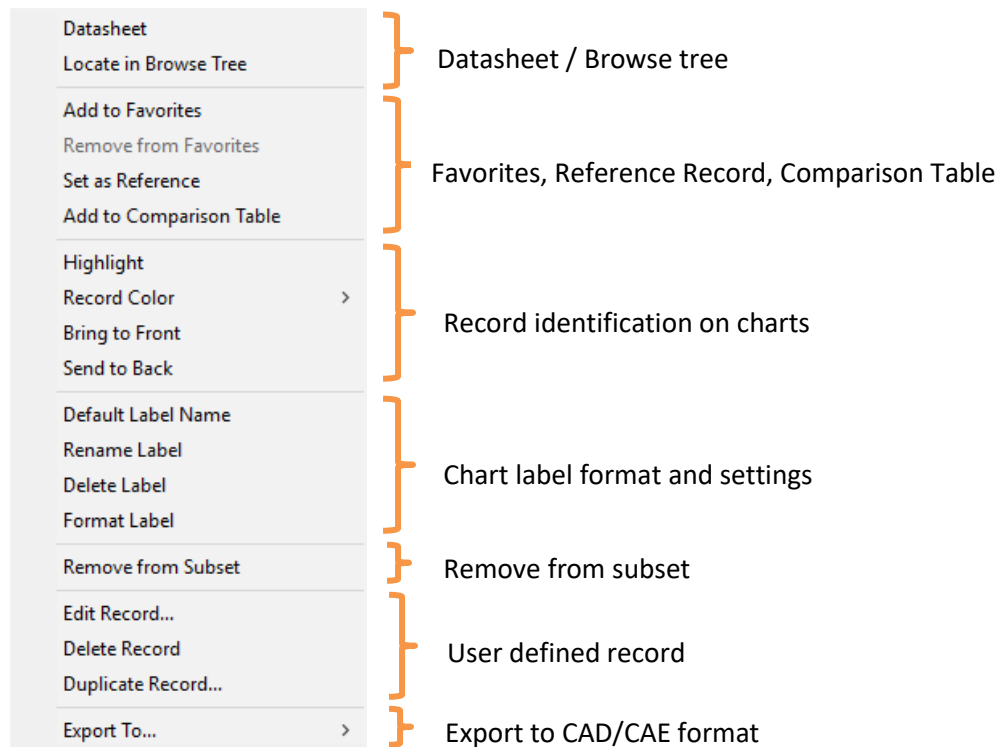


Benefits:

- Simplifies addition of user defined records
- Saves time by preventing inadvertent addition of records to the wrong table

5. **Right-click context menus standardized**—The order of options listed in context menus has been standardized as shown below. Options and sections are only displayed when relevant to the context

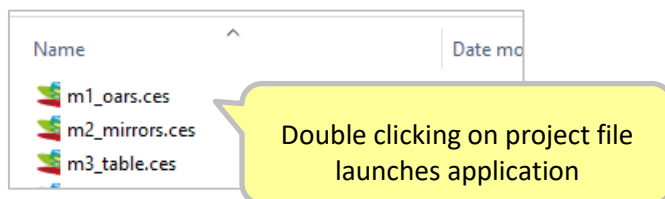
the menu is accessed from. As part of this work, '**Export to...**' has been added to the chart label menu.



Benefits:

- Easier to find menu options when accessed from different areas of the software. Such as records in browse tree, results list, search results, and chart labels.
- Export option on chart label menu enables material cards to be created directly from property charts, saving time trying to locate record in the results list or browse tree

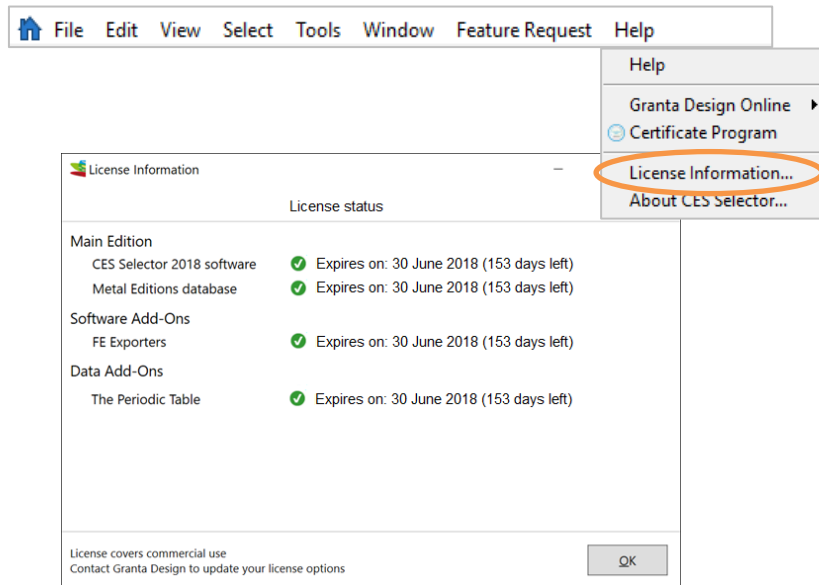
6. **Launch application from project file** (bug fix)—When double clicking on project files in e-mails or file explorers, the project will launch CES Selector and correctly load the project file



Benefits:

- Fewer mouse 'clicks' to open shared project files
- Avoid stress caused by thinking that project data has been lost

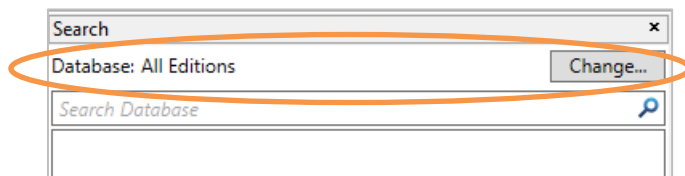
7. New **'License Information'** dialog—Provides information on licensed components and remaining license period. Accessed from the help option on the main application menu bar.



Benefits:

- Check which components are covered by your license agreement.
- See when your license is due to expire and how many days of access you have remaining.

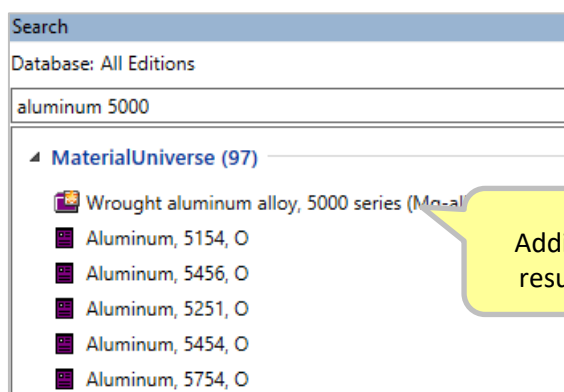
8. **Database name displayed in Search pane**—Identifies the active database in the search window, and includes option to change to other installed databases.



Benefits:

- Identifies the active database when carrying out text searches
- Fewer mouse 'clicks' to change database from Search Pane
- Provides consistency across all left-hand pane options: Browse, Search, and Chart/Select

9. Updated behavior for **adding favorites from Search results** (bug fix)—When ‘overview’ records are added to ‘Favorites’ from the ‘Search’ results list, the underlying child records are no longer added to the favorites list.

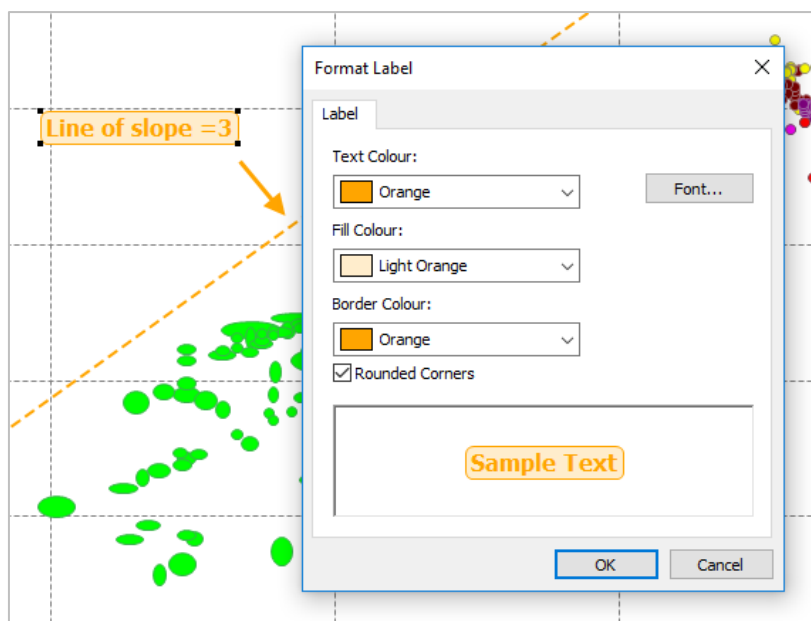


Adding overview record to favorites from Search results does not automatically add child records

Benefits:

- Prevents false positives being added to the favorites list, particularly important when creating a custom subset based on favorites from a text search

10. **Orange added to text annotations** on charts—Orange, and light orange, has been added to the text font, fill and border colors options for chart labels.



Benefits:

- Text annotation colors now match options available for line annotations and record colors
- Enables better correlation between text and line annotations on charts

MaterialUniverse (Core screening data set)

11. **10 new combined properties** added to all material datasheets in the **MaterialUniverse**—Covers commonly specified requirements, such as specific strength and thermal shock resistance, as well as ‘softer’ properties, such as warmth/ softness to touch and acoustic velocity. The calculations used are quoted in the Design Note, accessed by clicking the ‘i’ icon next to the property name. The full set of properties, listed by datasheet header, are:

- **Mechanical properties**
 - Specific stiffness
 - Specific strength
 - Elastic stored energy
- **Impact and fracture properties**
 - Toughness (G)
- **Thermal properties**
 - Thermal shock resistance
 - Thermal distortion resistance
- **Electrical properties**
 - Electrical conductivity
- **Optical, aesthetic and acoustic properties**
 - Softness to touch
 - Warmth to touch
 - Acoustic velocity

Optical, aesthetic and acoustic properties

Refractive index	(i)	1.53	-	1.54
Transparency	(i)	Opaque		
Softness to touch	(i)	* 41.3	-	47.4
Warmth to touch	(i)	* 169	-	175
Acoustic velocity	(i)	1.37e3	-	1.67e3
Mechanical loss coefficient (tan delta)	(i)	* 0.0138	-	0.0446

Design Note

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Acoustic velocity

Is a measure of the propagation speed of sound in a solid, and is also known as pitch or natural frequency.

Notes

The acoustic velocity can also be referred to as speed of sound and can be calculated from Young's modulus and Density via the following equation:

$$\text{Acoustic velocity} = (\text{Young's modulus} / \text{Density})^{0.5}$$

Higher values indicate that sound passes more quickly through the material, meaning that less is absorbed. Typical values for the acoustic velocity of some materials are shown below:

Benefits:

- Select, filter and compare materials based on these commonly specified properties, which are not typically quoted on material datasheets
 - Save time, and avoid errors when creating these combined properties using the Advanced chart function
12. **New weldability attribute added for metals**—Rates the weldability of a metal on a four-point scale between excellent and unsuitable, and includes information on what pre and post treatment may be required to achieve a satisfactory weld.

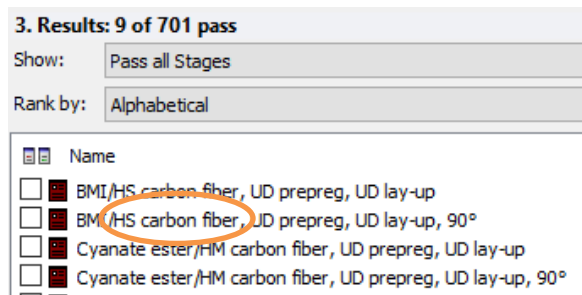
Processing properties

Metal casting	(i)	Unsuitable
Metal cold forming	(i)	Limited use
Metal hot forming	(i)	Excellent
Metal press forming	(i)	Acceptable
Metal deep drawing	(i)	Limited use
Machining speed	(i)	183 m/min
Weldability	(i)	Poor
Notes		Preheating may be required, post weld heat treatment is required

Benefits:

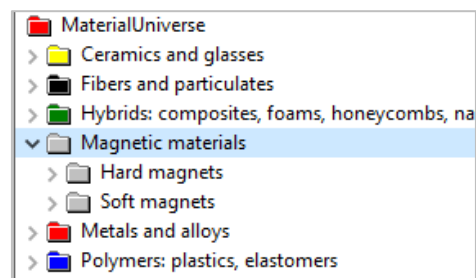
- Consider this important manufacturing requirement alongside machinability and other critical quality requirements.
- Flag differences in weldability when comparing candidates in Comparison Tables

13. **Fiber type added to carbon fiber composite record names**—For carbon fiber reinforced composites, the type of fiber has been added to the record name (HS = High Strength, IM = Intermediate Modulus, and HM = High Modulus).

*Benefits*

- Makes it easier to differentiate between the standard high strength (HS) carbon fiber and more specialist intermediate (IM) and high modulus (HM) grades.
- Quickly identify the type of carbon fiber on charts and in selection and search results.

14. **New magnetic materials folder** added to browse tree—Categorized into hard and soft grades. Previously, these grades were dispersed throughout the tree and listed under their respective material class.

*Benefits*

- Raises profile of this important class of functional material.
- Easier to differentiate between permanent (hard) and electromagnetic (soft) grades.

15. Updated **Material prices**. New prices are available for all 4,000+ 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, such as mass vs cost and plastics vs metals.

16. Revised and **updated environmental data**. The following routine updates have been made:

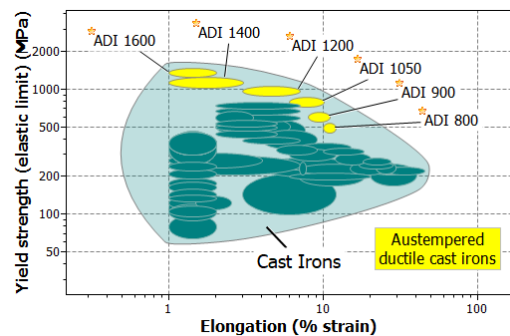
- Data values and sources for **Energy usage** and **CO₂ Footprint** has been updated for polymers, polyurethane foams, paper and cardboard
- The **REACH Candidate list** and **SIN list** (Substitute It Now) Restricted Substances Risk Indicators have been updated to reflect the latest restrictions

Benefits:

- Use up-to-date data, based on the latest sources, to inform and guide environmental design

17. New **Austempered ductile iron, cobalt-based superalloys and copper-nickel alloys added**. The following metal alloys have been added to the MaterialUniverse:

- Austempered ductile iron
 - ADI 800, ADI 900, ADI 1050, ADI 1200, ADI 1400, and ADI 1600
- Cobalt-based superalloys
 - CCM- high carbon and low carbon) - annealed
 - CCM (high carbon and low carbon) - hot worked
 - CCM (low carbon) - warm worked
- Copper-nickel alloys
 - C64700 (98/2 copper-nickel) – hard and soft
 - C72650(87.5/7.5 copper-nickel), hard/spinodal and soft



Benefits:

- Consider austempered high strength ductile cast irons in applications requiring high wear resistance and strength, such as timing gears, steering knuckles, rollers, wear plates, wheel hubs, crankshafts etc
- Consider cobalt based superalloys for surgical implants, such as bone fixation, heart valves, joint replacement and spinal devices
- Consider Copper-nickel alloys for high temperature electrical connectors, switches, relays and springs, etc.

18. **Coverage of paper increased** to include datasheets for bond/copier paper, glazed art paper, newsprint, paper board and tissue paper.

Benefits:

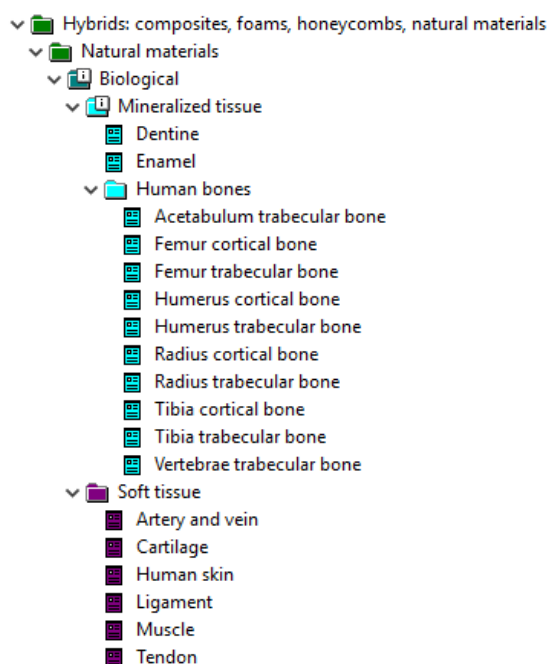
- Provides data on the main types of paper and board
- Consider the environmental impact of these packaging materials in the Eco Audit Tool

19. Datasheets for **Human bone and tissue** added (Medical Edition only)—Listed under ‘Natural materials’ in the ‘Hybrids’ folder of the MaterialUniverse.

- Includes data for trabecular and cortical bone.
- Due to the nature of these materials, the data quoted is limited to mechanical and physical properties for bone, and mechanical, thermal and physical properties for soft tissue.

Benefits:

- Supports the development of medical devices that come into contact with the human body - enables synthetic materials to be screened based on their similarity to the properties of the bone or tissue it comes into contact with.
- Aids the development of surgical tools that need to cut bone or tissue.



20. **Updated format of Healthcare applications** property (Medical Edition only) —Updated from a long text field to a discrete list, covers 27 different applications.

Healthcare & food

Food contact		Yes
Medical grades? (USP Class VI, ISO 10993)		✓
Medical tradenames		
Gatone, Ketaspire, Ketron, PEEK-OPTIMA, PEEK-CLASSIX, TECAPEEK, Unitrex, VESTAKEEP, Victrex, Zeniva		
Healthcare applications		Bone fixation and repair, Catheters and cannulas, Endoscopes, Hearing aids, Joint replacement, Nerve stimulators, Spinal devices, Surgical instruments, Wound and tissue closure

Benefits:

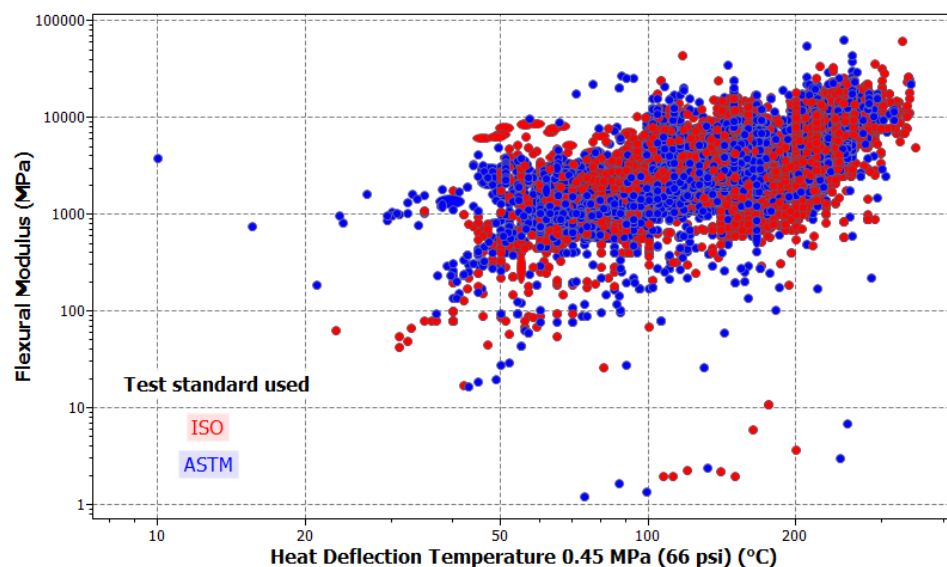
- Enables data to be readily filtered by Healthcare application using Limit and chart stages in selection projects

Specialist Editions

Polymer Edition

21. **New property format**—Properties on polymer manufacturers datasheets are always quote according to certain test standards, such as ASTM and ISO. As the preference for standard system varies with global region, this results in a mix of standards being used for any one property in the Prospector Plastics and M-Base Plastics data sets. In previous versions, as there are small differences in test method between different standards bodies, this data has been split out into separate properties (e.g. Young's Modulus (ASTM D638) and Young's Modulus (ISO 527-2), making it difficult to compare the performance for all materials in these data sets. For this release, all values for a property have been listed under one property name, with the test standard used to measure the property quoted in the property note. This allows all data for a property to be compared, irrespective of test standard used.

Mechanical			
➔	Tensile Strength at Yield	49.6	MPa
	Notes ASTM D638		
	Tensile Elongation at Break	5	% strain
	Notes ASTM D638		

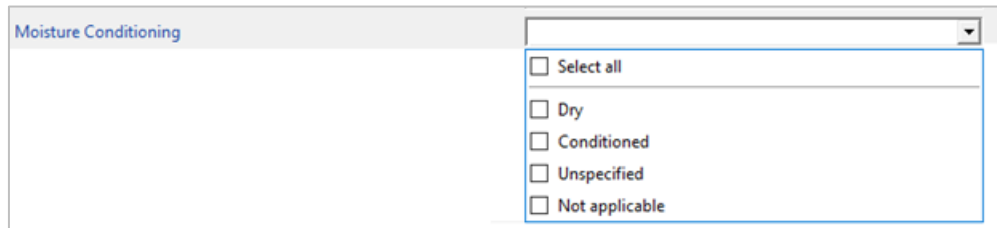


Example of chart in Prospector Plastics, showing direct comparison of ISO and ASTM data

Benefits:

- Compare all available data for a property, irrespective of test standard used for measurement
- Reduced number of property options makes it easier to identify properties in charts and limit stages
- 'Find Similar' rankings are not influenced by the test standard used
- Simplifies use of these large collections of manufacturers' datasheets

22. **Updated 'Moisture Conditioning' attribute**—Options listed have been extended to include scenarios where the tested condition for a moisture sensitive material has not been specified.



- Dry - moisture sensitive material measured in dry state
- Conditioned - moisture sensitive material measured in conditioned state
- Unspecified - moisture sensitive material, where measured state has not been specified*
- Not applicable - material not sensitive to moisture

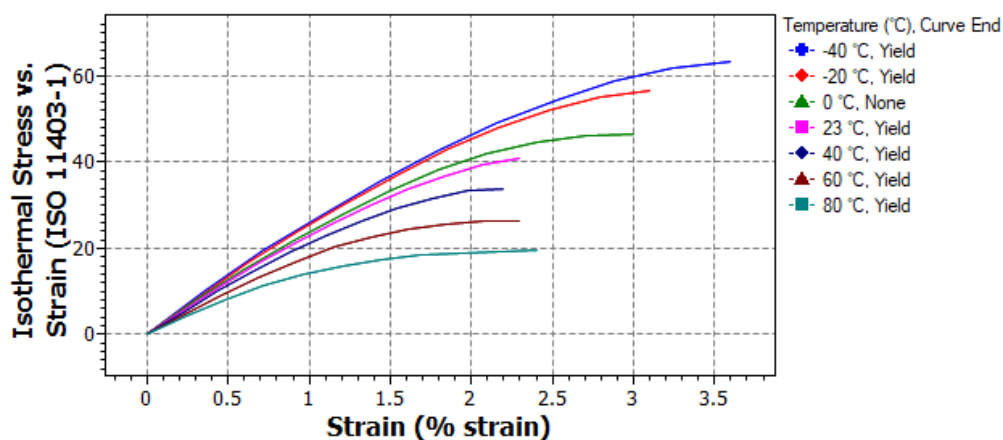
(* typically relates to the dry condition)

Benefits:

- Enables better filtering and comparison of moisture sensitive materials, such as nylons
- Compare moisture sensitive materials in the conditioned state against materials that are not moisture sensitive

23. **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:

- New property format – see item 21 above
- Updated 'Moisture Conditioning' attribute – see item 22 above
- Updated 'Agency Rating' property – The options listed under this property have been extended to allow filtering on a specific standard, rather than just the test agency
- New REACH (EC 1907) property added – enables the dataset to be readily filtered based on whether the manufacturer has stated that their grade satisfies REACH requirements
- New Curve data – Over 6750 curves for over 75 polymers and 30 suppliers. Includes stress-strain, creep and fatigue curves.

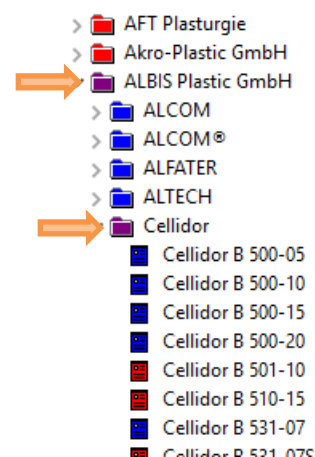
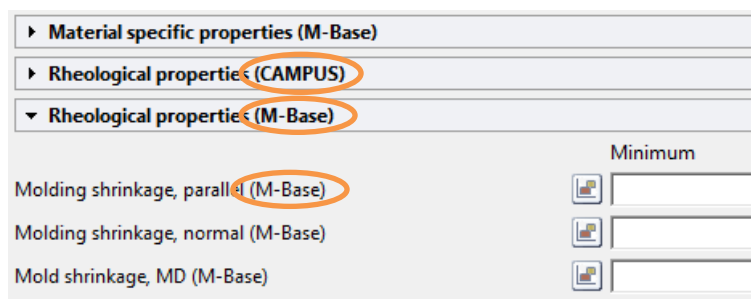


Benefits:

- Access the most up-to-date version of this comprehensive source of plastics data.
- Enhanced usability – quickly compare all available data
- Access hard to find curve data

24. **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). The latest version includes the following enhancements:

- New property format applied to the M-Base Plastics data —see item 21 above. (Note, due to contractual reasons, the CAMPUS data is still quoted as a separate property).
- ‘CAMPUS’ or ‘M-Base’ appended to all relevant property names and headers—provides greater clarity on what data will be considered in charts and limit stages
- Updated folder colors in browse tree—purple folders indicate that underlying records are a mix of CAMPUS (blue) and M-Base (red) datasheets
- Updated ‘Moisture Conditioning’ attribute – see item 22 above

*Benefits:*

- Access the most up-to-date version of this comprehensive source of plastics data.
- Enhanced usability – quickly compare all available data in M-Base Plastics
- Increased visibility of which dataset the data belongs to (i.e. CAMPUS Plastics or M-Base Plastics)

Metals Edition

25. **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. Improvements include the addition of international standards for the most commonly available steels. These are listed under

‘International standards’ on the datasheets and included in the ‘Technical delivery condition’ links to datasheets in the Standards table

1.0301 - C10

← → Datasheet view: Grades Show/Hide Find Similar

Further information

AISI	1010
International standards regions	America, China, Japan, Russia

International standards

- American:
Grade M1010 to ASTM A 575, Grade 1010 to ASTM A 510, Grade 1010 to ASTM A 519, Grade MT1010 to ASTM A 513, Grade 1010 to ASTM A 711, Grade 1010 to ASTM A 830, Grade 1010 to ASTM A 29, Grade 1010 to ASTM A 787, Grade MT1010 to ASTM A 512
- Chinese:
10 to GB/T 13796, 10 to GB/T 8162, 10 to GB/T 3275, DX1 to GB/T 15675, 10 to GB/T 3094, 10 to GB/T 3639, 10 to GB/T 3078, 10 to GB/T 13795, 10 to GB/T 8164, 10 to GB/T 699, 10 to GB/T 9948, 10 to GB/T 710, 10 to GB/T 13237
- Japanese:
S10C to JIS G 4051
- Russian:
10 to GOST 1050

Availability ⓘ Excellent

Benefits:

- Up-to-date access to the Register of European Steels information.
- Find equivalents to specifications from other global regions

26. **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.

Aero Edition

27. **Latest version of MMPDS-11**—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.

Medical Edition

28. **Latest version** includes the following enhancements:

- New MaterialUniverse records for human bone and tissue– see item 19
- Updated format of ‘Healthcare applications’ property in MaterialUniverse – see item 20
- Latest versions of Prospector Plastics and CAMPUS and M-Base Plastics – see items 23 through 24

Benefits:

- Access the latest MaterialUniverse and polymer data
- Enhanced usability when filtering on agency ratings and applications

Add-on tools

The following enhancements have been made to the Eco Audit Tool:

29. New capability to **consider a reused part** – ‘Reused part’ added to options available under ‘Recycled content’. When selected, no input is required for the primary or secondary processes, and no energy or CO₂ Footprint is associated with use of the part

Material, manufacture and end of life ?							
Components							
Qty.	Component name	Material	Recycled content	Mass (kg)	Primary process	Secondary process	% re
1		Aluminum, commercial p...	Reused part	0	Not applicable	Not applicable	0
			Virgin (0%)				
			Typical %				
			Reused part				

Benefits:

- Consider this important end-of-life option when investigating environmentally informed designs

30. **Restricted Substances flagged in Bill of Materials (BoM)** – New warning triangle is displayed in the BoM, whenever a material that contains, or may contain, a restricted substance is specified. This warning is based on the SIN List Indicator listed on the MaterialUniverse datasheet, and the constituents responsible for the warning are displayed on mouseover. Two types of warning are displayed

- Hollow orange diamond – material may contain restricted substances
- Solid red diamond – material contains restricted substances

Material, manufacture and end of life ?						
Components						
Qty.	Component name	Material	Recycled content	Mass (kg)	Primary proc	
1		ABS (flame retarded,...	Virgin (0%)	0		
1		Beryllium-aluminum al...	Virgin (0%)	0		
Restrictions: Contains (wt%): 64% (Be)						

Benefits:

- Flags the potential presence of restricted substances at the point of entry – prompting the user to look for alternatives
- Broadens the scope of the Eco Audit Tool to ‘consider’ restricted substances as well as Energy usage and CO₂ Footprint

31. **Updated Environmental data** – revised and updated data for Energy usage, CO₂ Footprint, REACH Candidate list and SIN list indicators – see item 16 above.

Benefits:

- Apply the latest environmental data in the Eco Audit Tool

Add-on Data Modules

32. **Default selection templates** added to all databases with one selection table — sets the selection table and subset on opening the Chart/Select pane. Added for the following databases:

- ASME BPVC
- Coatings
- ESDU MMDH
- Global Powder Metallurgy
- The Periodic Table

Benefits:

- Speeds up the creation of selection projects by removing the need to define the selection table and subset.

33. **New JAHM Curve Data** module—compiled by JAHM Software Inc. Provides temperature dependent curve data for: mechanical, thermal, physical and electrical properties, stress-strain curves, fatigue, creep and magnetic properties for over 2,900 materials, covering:

- Ceramics and glasses
- Composites (ceramic, metal & polymer matrix)
- Elements, organics, hydrocarbons and other compounds
- Functional materials (fuel cells, batteries, electro-ceramics, molds, semiconductors & optical)
- Metals and alloys
- Woods
- Polymers and elastomer

Benefits:

- Fast access to, difficult to find, temperature dependent and curve data for materials
- Selecting and comparing materials at elevated temperatures

34. **Updated version of the Senvol Database™**—the latest version of the most comprehensive source of suppliers' data on industrial additive manufacturing (AM) machines and materials. Contains:

- Data on over 1200 materials (increased from 700) processed by additive manufacturing, including information on both the feedstock and processed material. Covers ceramics, composites, metals, polymers, sands, and waxes.
- Data on over 750 industrial machines (increased from 500) —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.

35. **Latest version of The Periodic Table database**—supplied as standard with all versions of CES Selector. Provides information on the fundamental crystallographic, mechanical, thermal, electrical, diffusion, magnetic, and nuclear properties of elements across the Periodic Table. New developments include:

- Updated names for elements 112, 115, 117 and 118, to the new agreed names of: Copernicium (Cn), Moscovium (Mc), Tennessine (Ts) and Oganesson (Og).
- Added five new electronic attributes
 - Electronic structure
 - Valence
 - First ionization energy
 - Second ionization energy
 - Electronegativity (Pauling)

Benefits:

- Ready access to data on elements of the periodic table
- Compare properties and performance using the charting and filtering capability in CES Selector

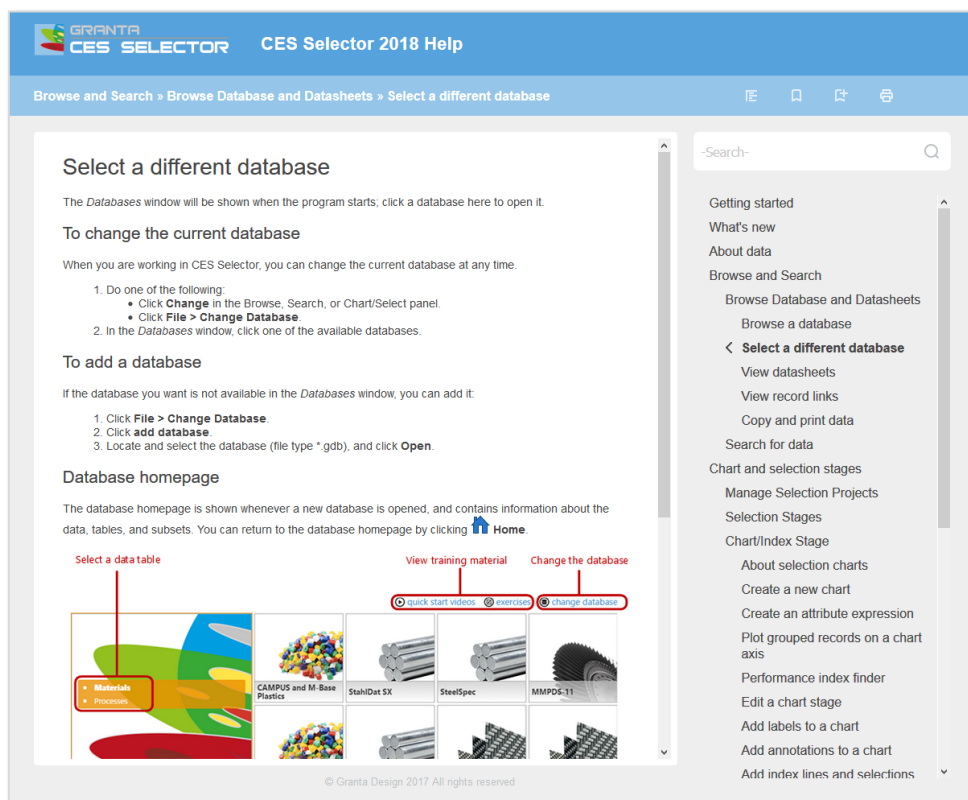
Software help

36. **New help topics** covering new software functionality, such as duplicate a record. New “About data” section, including information on types of data, and a summary of data tables.

Benefits:

- Learn more about the data available in CES Selector.
- Use the software more effectively.

37. New online help, delivering the help in a new, modern style.



Benefits:

- Improved search engine to help you find content fast.
- Create bookmarks to access commonly-used pages.
- Responsive design, suitable for viewing the help on desktop, tablet, or mobile screens.

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.