



Electronic Resources Reviews

Material ConneXion Materials Database

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Introduction

The Material ConneXion (MCX) database provides access to curated data of materials properties. This database provides access to over 10,000 materials from over 7,000 manufacturers ([MCX, 2021a](#)). The information includes applications and properties, associated processes, and vendors/companies. Rather than categorization by current use, the database uses a form of categorization based on chemical composition of the materials. This allows users to better understand limitations, potential, and new applications for materials ([Beylerian et al., 2005](#)). The categories of materials are: polymers, naturals, glass, ceramics, carbon-based, cement-based, metals, and process.

Authority of Publication

MCX was founded over 20 years ago and has become both an authoritative physical and digital materials library. MCX has an international research team, provides consulting services, and partners with many leading household brands ([2021c](#)). Information about individual materials is provided to MCX by the supplier/manufacturer and MCX works with them to evaluate the claims. Suppliers submit their material through a “materials review system” for examination in order to obtain approval for inclusion ([MCX, 2021e](#)).

Scope, Content, Currency, and Intended Audience

The scope and content of the database is new/innovative materials from around the world. The database is updated monthly. The intended audiences are companies/firms, corporate libraries, and academic libraries that require new materials information. Engineers, designers, architects, and branders (at both a student and a professional level) are some of the research audience who would benefit from using this database.

Record Format

The records in the MCX database are called “material profiles.” Each material contained in the database has its own profile/record. The descriptive metadata available on a material’s record includes title, supplier/vendor, MC #, description of material, and categories. The categories metadata correspond to the eight material categories of chemical makeup used to organize its content. Other key metadata found in the material profile record includes the material’s manufacturer (which contains the manufacturer/vendor’s contact information), processing/applications, properties, and sustainability. These metadata are organized in tabs, which gives the record a clean appearance.

The material profile also contains images of the material with thumbnails arranged on the far left of the profile and an embedded viewer on the left which displays a larger version of the image alongside the descriptive metadata on the right. Figure 1 shows a detailed record, or material profile, with metadata and features labeled.

The screenshot shows a material profile for TervAlloy™. On the left, there are three thumbnails and a larger image viewer showing a metallic ball. The main content area on the right contains the following information:

- Title:** TervAlloy™
- Vendor:** Terves Inc
- MC #:** MC 8735-01
- Material category:** METALS
- Description:** The first high-temperature-dissolvable metal alloy suitable for the oil and gas industry. Made using predominantly magnesium, the alloy will dissolve in potassium chloride, sodium chloride, acid, and freshwater solutions. Unlike current dissolvable alloys with a standard operating temperature of 212 °F (100 °C), this patented alloy is engineered with excellent mechanical properties and with a reliable dissolution at 300 °F (150 °C). The alloy can be purchased in a broad range of shapes in lengths up to 48 in (20 cm), and in ball configurations up to 5 in (13 cm) in diameter. It can be manufactured using traditional casting and extrusion processes. The alloy is designed to have over 50 ksi (0.34 gpa) yield strength and over 70 ksi (0.48 gpa) ultimate strength. The inherent color is a dull metallic grey. Current applications include plugs, balls, and other tools used in fracking of oil and gas.
- IMPORTANT:** Information provided here is supplied by the manufacturer/supplier. While MCX works with each manufacturer/supplier to understand their technology and assess the validity/claims made by the manufacturer in good faith, the material interview process conducted by MCX is not intended to replace further verification, validation, or 3rd party testing to ensure the material meets your technical and/or chemical requirements for use in your product. Information contained herein is for informational, educational, and inspirational purposes.
- "My Materials" functionality:** + Add to My Materials
- Sharing options:** Facebook, Twitter, LinkedIn, Pinterest, Tumblr, Email, Print

Below the main content, there is a section for **Additional Metadata** with a note: "When contacting the manufacturer, please be sure to reference the material's name, and not the MC Number." This section is organized into tabs: MANUFACTURER, PROCESSING + APPLICATIONS, PROPERTIES, SUSTAINABILITY, and DOWNLOADS. The PROPERTIES tab is currently selected, showing the following data:

PERFORMANCE PROPERTIES		PHYSICAL PROPERTIES	
Acoustics	Sound Reflecting	Stiffness	Stiff
Chemical Resistance	High	Structure	Closed
Colorfastness	High	Surface/Texture	Matte
Fire resistance	N/A	Transparency	Opaque
Impact Resistance	Good	Surface Hardness	Hard
Outdoor use	Yes		
Reflectivity	Slightly Reflective		

At the bottom of the PROPERTIES tab, there is a **CERTIFICATIONS** section.

Figure 1. An MCX database record

Searchability: Search Capability and Functionality

The search capability of the MCX database is simple and powerful. Keyword queries are the default way to search for materials. The database will check if the keyword is present in the material name, manufacturer name, and material descriptions. It is also possible to search by manufacturer. Materials may be limited by country in a search. Results are relevancy-ranked.

The most precise way to search for a known material is by having that material's MC #. Each material in the MCX database is assigned an MC #, which is a unique identifier that allows for authority control. When querying by MC #, the results display the material profile of the exact material associated with the requested MC #.

Interface: Display and Navigation, Appearance, Ease of Use, Searching Options, Help screens and Output

The user interface (UI) is exceptional; the principles of design that are important to MCX are clearly reflected in the database's intuitive UI. The UI is visually appealing due to both the web design best practices employed and the high-quality images of the materials. The database also has a responsive design that allows for the UI to be presented to mobile and tablet users, scaling effectively to various devices.

Clear headings and labels throughout the database ensure that the user experience (UX) is not confusing. It is clear where a user must type their query, and the filter options are clearly visible. The top navigation has a link to instructional videos if a user needs instruction. Context sensitive indicators and navigation are consistent throughout the database. For example, navigation options are present on search results and in material profile records. The UX is also engaging; for instance, the use of carousels to highlight "New Materials" and "Popular Materials" in the database (see Figure 2). This provides an interactive way to spot key trends in materiality and encourages users to take advantage of browse functionality.

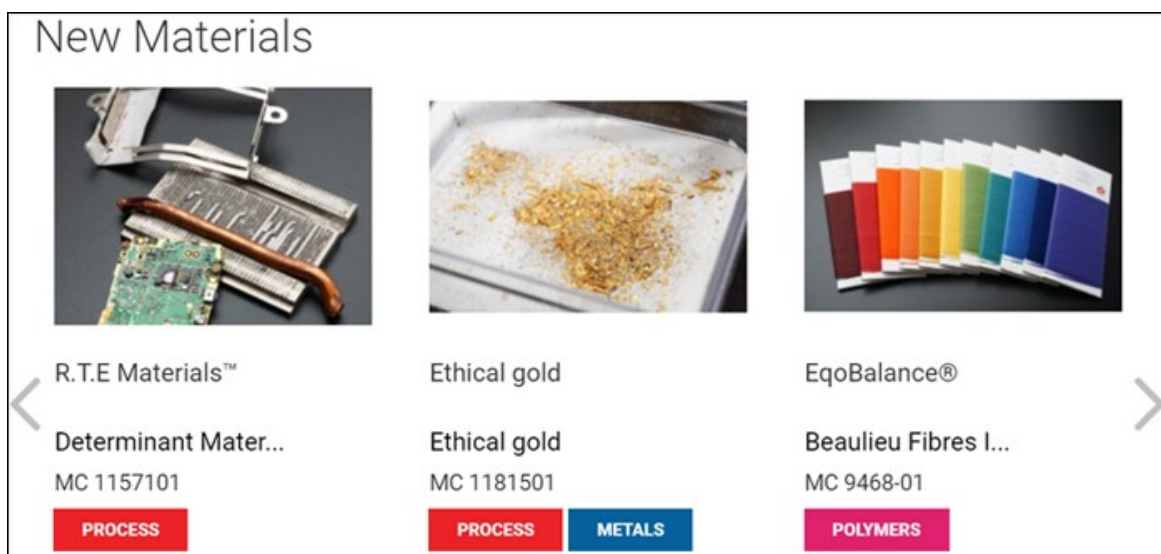
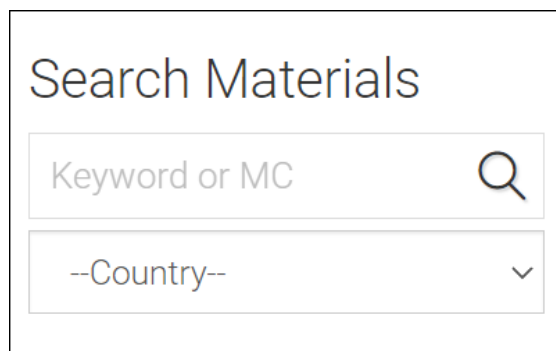


Figure 2. A carousel of newly added materials

Search Features: Presence of Basic or Advanced Search, Keyword Searching, Natural Language Queries, Sorting, Pattern Matchers, Limits, and Browsing

All search features can be found under the Material Database on the top navigation bar. A basic search bar is available for keyword searches (Figure 3). There is no advanced search bar. Limiters may be applied. Browsing is not only possible in the database, but practical, largely due to the UI/UX coupled with the image-driven nature of the MCX.



The image shows a search interface titled "Search Materials". It contains a text input field with the placeholder "Keyword or MC" and a search icon (magnifying glass) to its right. Below this is a dropdown menu with the placeholder "--Country--" and a downward arrow icon.

Figure 3. Basic search

Search Results: Quality and Quantity of Records, Search History, Display of Results, and Manipulation of Search Results

The records that appear in the search results are of good quality and are relevant to the query. Results can be displayed in a *grid* or *list* format. 16 results are shown by default, but up to 64 results can be shown at a time.

Search results can be manipulated and refined further by using the filters. Multiple filters can be applied at the same time. Top-level filter options include the following:

- Category
- Sustainability
- Processing
- Physical Properties
- Performance Properties
- Availability
- Seal of Excellence

Some of these can be narrowed even further, allowing users to drill down for more granular results. For example, when refining by "Performance Properties," a user can filter the material's chemical resistance by either *high*, *low*, or *medium*.

Some of the most powerful filters can be found under the "Refine By" heading under the "Category" section (see Figure 4).

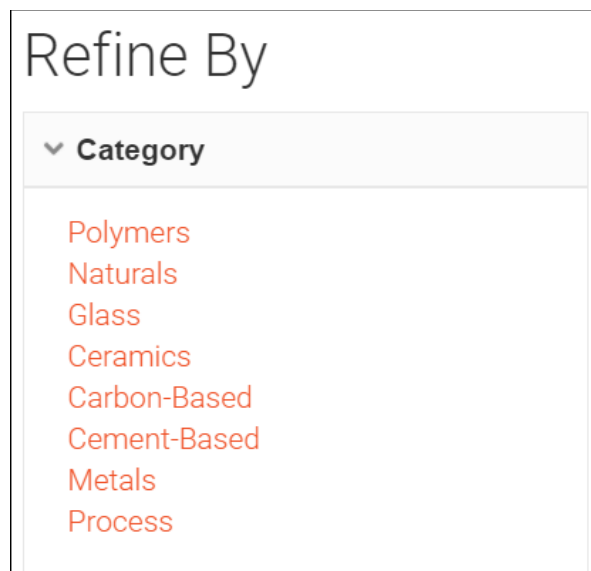


Figure 4. Filters for the 8 material categories

Here, it is possible to organize results based on the eight material processes listed in this review's introduction. For example, clicking on the "Carbon-Based" category filter would allow a user to see only carbon-based materials in their results. As mentioned, MCX categorizes the materials in the database by their chemical makeup, making these filters key to finding cross-industry use of materials. They also allow for the serendipity of discovery while restricting results within specific chemical properties.

Added Features: Share and Save Options, Ability to Obtain Statistics, and Image Capabilities

The MCX database contains several additional features of note. Materials can easily be shared on social media, emailed to others at your institution, or saved for later using the options available on the material's profile. The "My Materials" functionality allows users to save materials for easy retrieval later. School member usage can be viewed in the administrative portal.

Having several different images of a material on each material profile and the image viewer are among the most impressive added features of this highly visual database.

A missing expected feature is the lack of an option to add external links, such as an outbound OpenURL product. However, this is not a drawback as such links would have little use in a specialized database like this.

Authentication

IP address authentication is available. The administrative interface allows the database administrator to add and save the institution's IP ranges in order to authenticate users by IP. It is also possible to specify whether or not your institution uses EZProxy. An EZProxy stanza for MCX is available from OCLC.

General Limitations

The MCX database does lack an advanced search bar and some expected advanced search functionality, as noted in the Searchability section. The database provides only a basic search bar with the ability to query by keyword or MC # only. In the former, a user may have to use filters effectively for precision.

Technical Requirements

There are no technical requirements necessary to use the database, other than a web browser and internet connection.

In testing, the database worked well in all major browsers. Browsers used to test the database for this review were Mozilla Firefox, Google Chrome, Brave, Opera, Safari, and Microsoft Edge.

As noted in the Usability section, it also has a responsive design that looks excellent on browsers for iOS and Android devices. Mobile browsers used in the test were Safari, Chrome, Firefox, and Ghostery.

Suggestions for Improvement

While the content and interface of the MCX database are excellent, these are three ways the database could be improved.

1. The addition of a citation button that automatically generates a citation for the material would be useful to researchers.
2. Highlight occurrences of the keyword used in the query, on hover in the results, and in the material profile.
3. Allow for cobranding opportunities, or links for such, in the header and footer of the UI. While an institution's name is displayed in the header, there is no opportunity to place an institutional logo. Figure 5a is the current header, while Figure 5b is a mock-up that shows one possibility for co-branding the MCX database with the libraries at Rensselaer Polytechnic Institute logo. In this mock-up the links are hidden behind a drop-down menu.

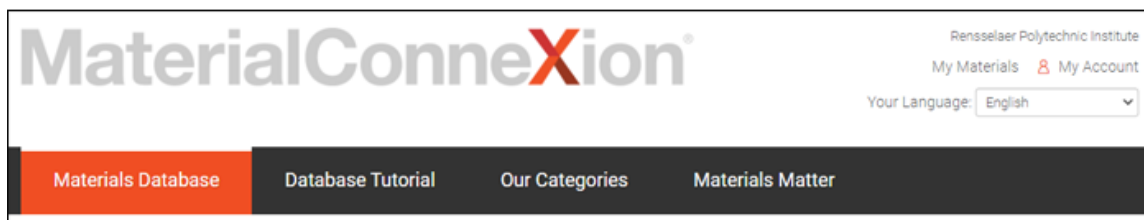


Figure 5a. Current MCX database header

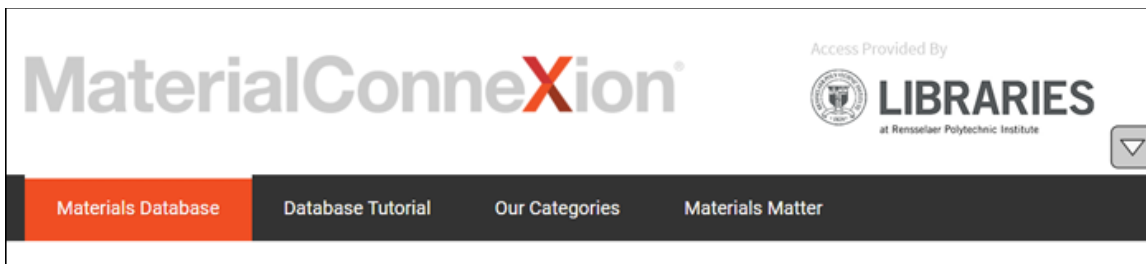


Figure 5b. A header mock-up with RPI cobranding

Vendor's Support

Product support is available in several modalities. A tutorial video created by MCX provides a demonstration-driven narrative on how to search for materials in the database. This video page is accessed on the navigation bar under "Database Tutorial." There are also support videos available on the eight material categories, which is important for understanding how the information is categorized in the database. This page is accessed on the navigation bar under "Our Categories." Another avenue of support is the MCX "Frequently Asked Questions" page, which contains a section of FAQs (MCX, 2021d) that deal specifically with the online database. Assistance is also available through a support email address or contact form and MCX ensures a 24-hour response time from the IT services team (MCX, 2021c).

Pricing Options

Different pricing options for the database are available depending on the size and scope of an institution. For example, pricing for academic institutions starts at \$4,500 per year (MCX, 2021b). Interested librarians and faculty should contact MCX for a custom quote as prices will vary.

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