

Content of this Issue

This magazine informs customers of M-Base Engineering + Software GmbH about the latest developments in material information and design software. Furthermore, it introduces new M-Base products and projects. This issue deals with the following specific subjects:

- **CAMPUS 5.2 - New Version released**
- **Application Database in Material Data Center**
- **New Literature about Natural Fibers**
- **Miscellaneous**

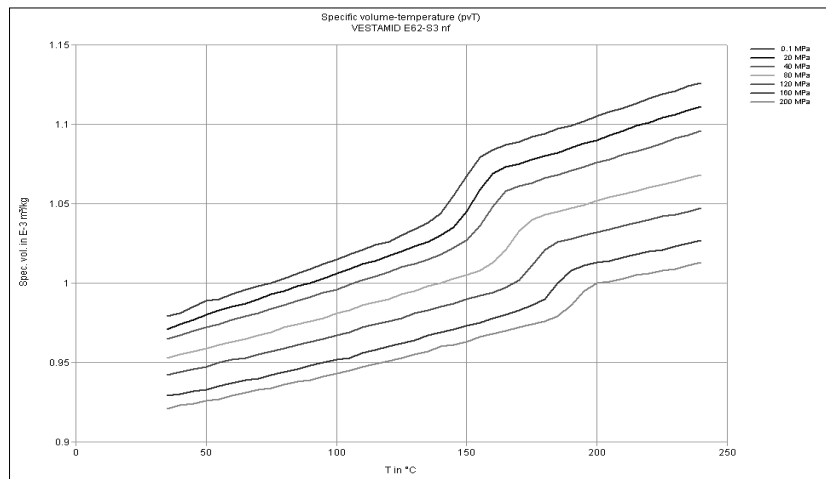
CAMPUS® 5.2

The plastics database CAMPUS has become one of the most important sources of information for demanding designers worldwide. Since its introduction in 1988 CAMPUS has been released in several new versions and the range of data as well as the functionality have been expanded in stages. Today CAMPUS is now widely known and in part taken for granted. However, many engineers, particularly younger ones, do not know the background and the special quality of the CAMPUS data. Thus the publication of the new version 5.2 comes as a welcome opportunity to revisit the special features of this polymer information system.

Comparable Data

CAMPUS was developed in response to pressure from the automotive industry which demanded an electronic database from the resin suppliers. At the time the individual companies had very different methods for testing plastics. Even the preparation and geometry of the test specimen were not uniform. Every experienced engineer was well aware that material data from different manufacturers was not comparable with each other. Despite this there were some attempts to collect all the data from all suppliers and publish it in databases.

In order to prevent chaos, several polymer producers got together and with CAMPUS produced not only a consistent database, but also ensured that the test methods were very precisely laid down, meaning that the material data in CAMPUS really is comparable. The test methods used



PvT Diagram as an Example for High End CAMPUS Data

are documented in the international standards ISO 10350 and ISO 11403. On top of this there is a policy document with definitive guidance wherever standards allow some latitude. This document is freely available on the Internet under the title "Content of CAMPUS" and is binding for all CAMPUS participants.

Testing of polymers according to the CAMPUS regulations is very complex. Polymer manufacturers have therefore invested a great deal of money in this data. However, the CAMPUS project has been worthwhile for the producers, because the resulting harmonization has made many national and often even internal customer standards obsolete. Large manufacturers have saved millions each year through this development. The downstream parts of the value added chain have also benefited from this harmonization through the disappearance of many individual material tests. CAMPUS has resulted in long term improvements in the level of trust between manufacturers and

customers. Many companies that 20 years ago conducted systematic material tests at great expense today trust the information from suppliers and have reduced testing to a few special cases.

Design Data

Already in version 2.0 CAMPUS contained comprehensive graphical representations of design data alongside single point values. Even today CAMPUS is practically the only source of stress/strain diagrams, isochronous stress/strain diagrams, viscosity diagrams, pvT diagrams, etc. Nowhere else can one find such high quality design data that with the help of suitable software can also be used for the provision of CAE data.

Access to CAMPUS Data

The classic CAMPUS software is an offline program that is installed on local computers. The most widespread access is through the official CAMPUS website at:



CAMPUS® 5.2

www.CAMPUSplastics.com,

where the latest version of the software and data can be downloaded for free. The software also has a Web Update function that at the press of a key checks whether a newer software version or new data is available and automatically updates the local database.

The offline version of CAMPUS has all the database functions needed for material data handling (searching, tables, sorting, etc.) and a powerful graphics engine that can be used for example with multi-point data. However the classic CAMPUS software still only allows the data from one manufacturer to be viewed and cross-manufacturer searches are not possible. M-Base, a commercial program, however allows the data from all manufacturers to be loaded together to conduct crossmanufacturer searching and create tables (additional information is available from M-Base).

As an alternative to the offline system data sheets of all CAMPUS materials are also available free of charge on the CAMPUS website. Whilst this offers only limited search facilities and graphical support, the data is always up to date and users do not have to worry about updates. This route is recommended for users that are looking for quick access to data sheets.

CAMPUS data sheets are offered in a total of ten languages.

CAMPUS Version 5.2

After a relatively long period where the range of data in CAMPUS has been constant, additions resulting from partnerships with the automotive industry have now been decided. The basis for this came from a working group at the VDA (German Automotive Industry Association). VDA guideline 232-201 "Data for the Selection of Thermoplastic Materials" is an overview of the most important properties and standards for the

selection of materials in the automotive industry. As far as possible material properties and standards for all application areas were taken directly from CAMPUS. In some cases additional information such as resistance to light, extended media resistance and emission values were included that had not previously been available in CAMPUS.

The gaps were the subject of intensive discussions between the VDA group and representatives of CAMPUS who were able to agree on common properties and standards. Accordingly CAMPUS 5.2, which was released in January 2010, was extended to include numerous new properties.

New Data

The coefficient of linear expansion in CAMPUS is given as the average over the temperature range between 23 to 55°C, which is in accordance with ISO 11359. Now the average value for the temperature range from -40 to 100°C has been added, as demanded by the automotive industry. On top of that there is the option of looking at the progression with temperature as a diagram instead of the average value. Naturally the coefficient of linear expansion is given in both cases for two directions.

The values for weathering stability, measured under a Xenon arc lamp, and for emissions are brand new. In the case of emissions unusually VDA guidelines are used instead of ISO standards. There is however the desire to integrate these tests into an international standard in the short term.

With regard to chemical resistance several new test media that are important to the automotive industry have been added. However, what is particularly interesting is, that CAMPUS for the first time uses a numerical value as an indicative property rather than the previously used general assessment by the manufacturer. Initially the loss of impact strength after storage in the medium has been

chosen as the criterion. Information for 150, 500 and 1,000 hours are compulsory, but suppliers are free to supply values for additional times. The data can be represented as a table or diagram. The use of impact strength as an indicative property is controversial. Reasons for this include the fact that, if the sample does not break, there is no benchmark. It is therefore to be expected that in the future further properties will be added as criteria.

Appreciation of CAMPUS

The new version once again shows that CAMPUS responds to requests coming from its circle of users and where necessary instigates further developments. These developments are welcomed by the market, but unfortunately many users are no longer aware of how much work the producers have to perform in order to furnish the grade specific data. It is certainly justified to reflect the existence of a good and up to date CAMPUS version positively in a supplier assessment. In the case of manufacturers who are not in a position to supply such data one should inquire critically what the reason for this is.

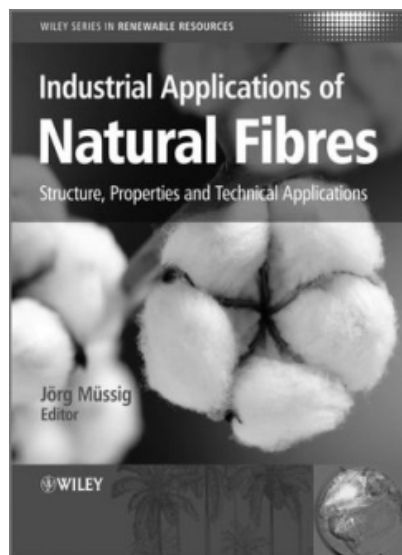
Outlook

The polymer producers believe that the new version of CAMPUS offers users a sensible upgrade and that with the new data entries they have taken on board the wishes of the automotive industry. It is expected that the discussion will continue and that the jointly agreed material properties will in future be preferred in specifications in the automotive industry leading to a harmonization here as well.

Based on previous experience it will be several months before manufacturers will have entered the new properties in CAMPUS.



New Literature about Natural Fibres



Industrial Applications of Natural Fibres: Structure, Properties and Technical Applications, Wiley and Sons, 2010

Natural fibres have applications in a wide range of industries, from textiles and consumer products to the automotive and construction industries.

"Industrial Applications of Natural Fibres" examines the different steps of processing, from natural generation, fibre separation and fibre processing, to the manufacturing of the final product. Each step is linked to fibre properties and characterization, highlighting how different fibres influence the product properties through a discussion of their chemical and structural qualities.

This book reviews the current research and technical applications of natural fibres.

Topics covered include:

- Introduction to the chemistry and biology of natural fibres
- Economic aspects of natural fibres
- Vegetable fibres
- Animal fibres
- Testing and Quality Management
- Applications: Current and Potential

"Industrial Application of Natural Fibres" will be a valuable resource for scientists in industry and academia interested in the development of natural based materials and products. It is particularly relevant for those working in chemical engineering, sustainable chemistry, agricultural sciences, biology and materials sciences.

This interesting new book from editor Jörg Müssig, includes a contribution from M-Base about material data and material models.

Application Database in Material Data Center

It is a well known fact that most important decisions in the material selection process are not only based on the quantitative and numerical information stored in material databases. Very often information on application examples has an even higher influence in the decision making process.

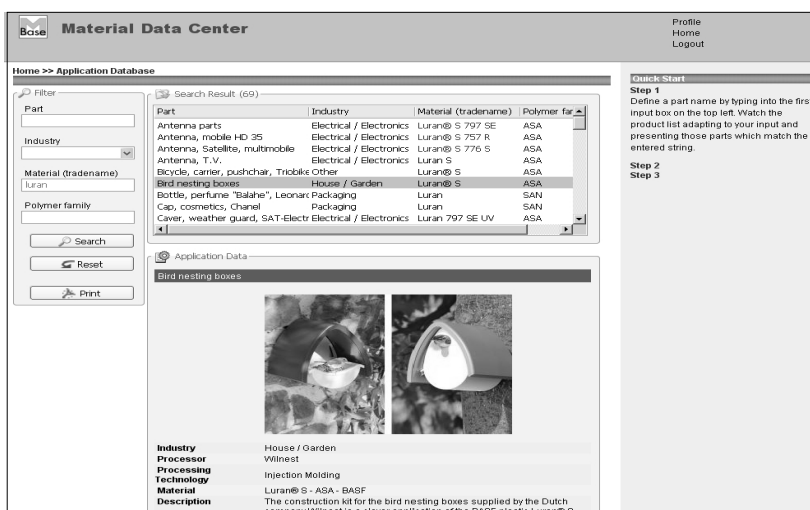
For many years M-Base has developed specific software to handle such application information in a structured and well organized format.

We also have collected thousand of application examples from the plastics industry.

This valuable information is available in Material Data Center. Access is free for registered users at:

www.materialdatacenter.com.

The application examples are classified in categories and are searchable. In most cases a picture is available. Links to literature with additional information are also



Part	Industry	Material (tradename)	Polymer family
Antenna parts	Electrical / Electronics	Luran® S 797 SE	ASA
Antenna, mobile HD 35	Electrical / Electronics	Luran® S 757 R	ASA
Antenna, satellite, multimobile	Electrical / Electronics	Luran® S 776 S	ASA
Antenna, T.V.	Electrical / Electronics	Luran S	ASA
Bicycle, carrier, pushchair, Triobike	Other	Luran® S	ASA
Bird nesting boxes	House / Garden	Luran® S	ASA
Bottle, perfume "Balahe", Leonard Packaging	Luran	Luran	SAN
Cap, cosmetics, Chanel	Packaging	Luran	SAN
Cover, weather guard, SAT-Electr	Electrical / Electronics	Luran 797 SE UV	ASA

Application Data
Bird nesting boxes

Industry: House / Garden
Processor: Wilnest
Technology: Injection Molding
Material: Luran® S - ASA - BASF
Description: The construction kit for the bird nesting boxes supplied by the Dutch company Wilnest is a clear smeltization of the BASF plastic Luran® S.

Example from Application Database

offered. The system allows decision makers to draw very easy and powerful analogies concerning the use of a material in a specific application or for specific requirements. This way it becomes a very helpful tool in combination with the quantitative, numerical content of a material database.

Resin suppliers and plastic pro-

cessors are invited to send their application examples for inclusion to the system.

The software is also available for installation in customers individual intranets to be filled with internal and confidential information. Typical customers would be technical support departments at resin suppliers or design offices.

