PROSISOFT
Gesellschaft für Umweltmanagementsysteme mbH

HSM - Hazardous Substance Management based on Microsoft Dynamics™ NAV (Navision)

The *Hazardous Substance Management* or *GSM* provides a specific solution for the management of hazardous substances and dangerous goods. This software - based on *Microsoft Dynamics™ NAV (Navision)* - contains all the functionality and data required for a facility's product safety and safe transport related processes, especially important for enterprises highly dynamical in product development.

Since *HSM* is fully integrated into *Microsoft Dynamics™ NAV (Navision)* its data and objects are located in the *NAV* database (*SQL Server*). All operating processes can be mapped seamlessly within the system. The user interface [1] completely corresponds to the *NAV* standards, of course.

Core functionality:

- Substance database
- Multilingual phrase catalogue
- Formulation management
- Flexible design of properties and views
- Report views (Safety Data Sheet, workplace instructions, technical data sheet, declarations of conformity etc.) predefined and/or user configurable
- Calculation of classification and labelling
- Dangerous goods classification and processing (transport documents ADR, IMO, IATA)
- Configurable flowchart processor for further evaluations and calculations
- Research module for database wide evaluations
- Automatical Safety Data Sheet dispatch
- Region related versioning management
- Provision of data for label printing

Experience

Long standing experience in the development of information systems and with the internal processes of the process industry as well as precise knowledge of the legislation on handling and transport of hazardous substances produced a piece of software which can be adapted to various demands thanks to its modular and parameter controlled design.

Integration

HSM is integrated into industry solutions for the chemical industry as well as for pharmaceuticals, cosmetics, food and food additives. The functions and data of the H*SM* module are used by production and storage up to shipment.

Integration means that all data are available throughout the system anytime. Thus double input and access to data, which are not up-to-date, are avoided. This leads to significantly better reliability of all product safety related processes and a considerably lower expenditure of time.

[1] The screenshots shown here are taken from the NAV version NAV 2009 RTC (Role Tailored Client) except for Figures 12 and 13.1, which show the Unicode-capable version NAV 2013.

So for example recipes (= formulations) are entered only once and are then available for the calculations and reports required by hazardous substance legislation, for production processes, and for internal calculation. In shipment transaction the legally required documents like Safety Data Sheets (SDSs) and transport documents are compiled and created for all necessary languages. Dispatched SDSs are archived and logged with customer reference.

Information about reports created for a customer is directly accessible from the Customer card. Likewise properties and reports of a certain item may be called directly from the Item card.

To every delivery note you may get information on Safety Data Sheets, accompanying transport documents etc.

Flexibility

In the overall conception flexibility is maintained down to the level of data structures. The easy adaptability of the system to the enterprises' demands guarantees that peculiarities resulting from changing business requirements can be met. Adaptation to the permanently changing laws, directives, ordinances and regulations may be carried out quickly and without big expenditures. This means security for your investment, because *HSM* will keep pace with the growth of your enterprise and with the requirements of the legislator as well.

With *HSM* you have the possibility to map structures and properties of complex contents of information far beyond the subjects mentioned here.

Flexibility of a program also means, that new requirements may implemented not necessarily by permanent adaptation of the software as such, but also by a change in data design.

Thus one can adapt and configure properties, data input views and reports. The FCC (Flow Chart Processor) even allows the configuration of one’s own calculations and evaluations.

Safety Data Sheet

When creating a new sales order in *NAV*, the languages necessary for the destination region are determined, and a regional (and multilingual if necessary) version of the Safety Data Sheet is created, printed and stored. The date of shipment of the item and its assigned SDS will be logged for monitoring purposes - in accordance with the 12 Months Rule establishing the commitment of shipping a new SDS on relevant changes.

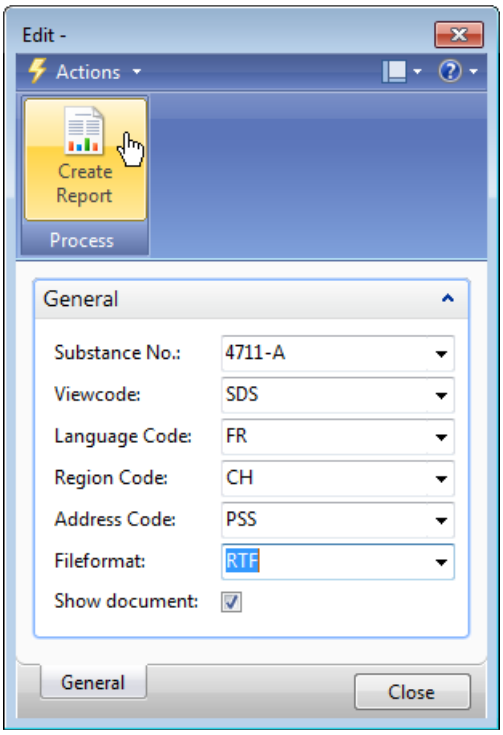


Figure 1: Report creation (Safety Data Sheet for Switzerland in French)

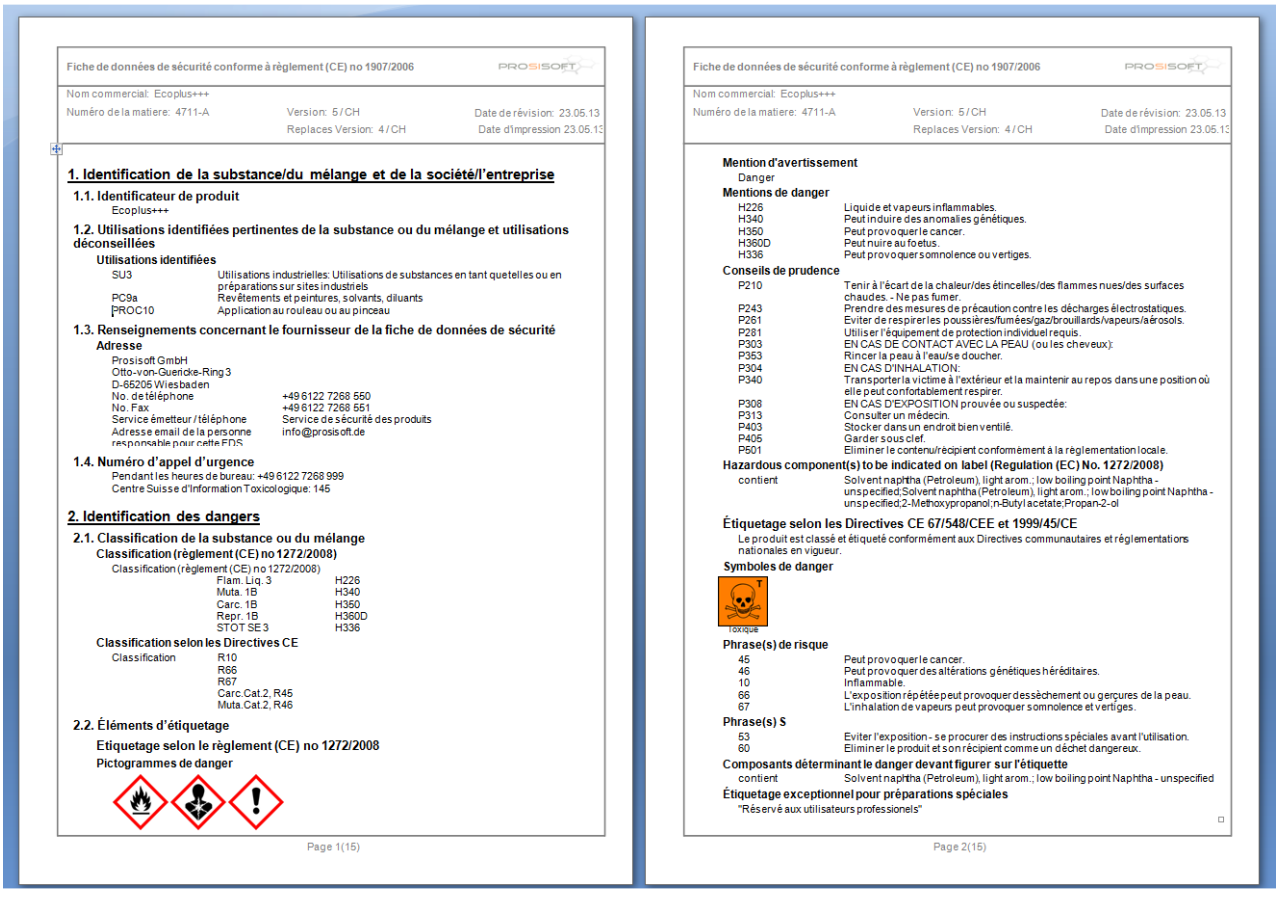


Figure 2: Report page view (SDS for Switzerland in French)

Automatical Safety Data Sheet dispatch

Via processing a stack all Safety Data Sheets for a certain customer including a cover sheet may be created and mailed. By this procedure you can provide your customers with all necessary SDSs periodically. In *HSM* the prerequisites for electronic mailings are already given too.

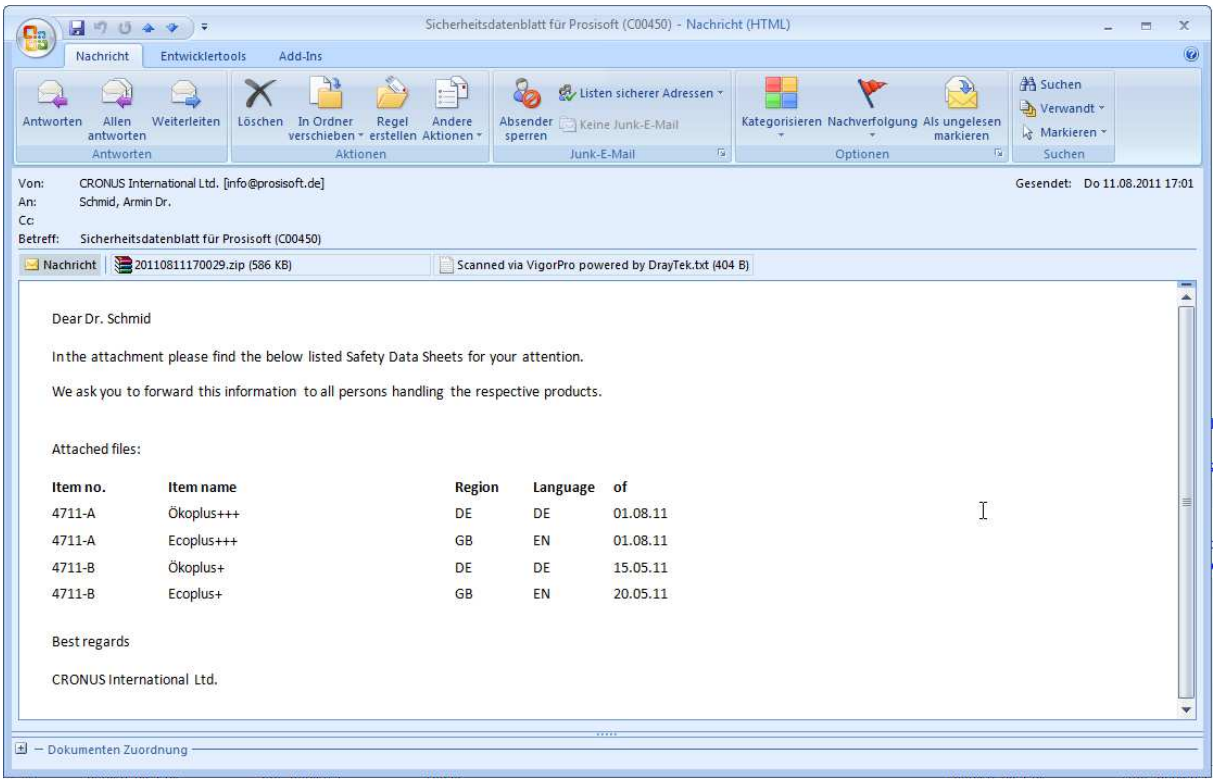


Figure 3: Automatic e-mail SDS distribution (Cover letter with attached zip file)

Substance data

In *HSM* substance data of chemical substances or mixtures, raw materials, intermediates and products is entered and maintained. This data form the basic pool of information and is accessed by various functions. For managing this information the module offers a number of comprehensive views and evaluations.

Several items of the *NAV* ERP part may be assigned to a certain substance entry whose chemical characterisation is located in the substance data base. The chemical substance relevant formulation is taken over. Based on this information the classification of the related mixtures can be determined.

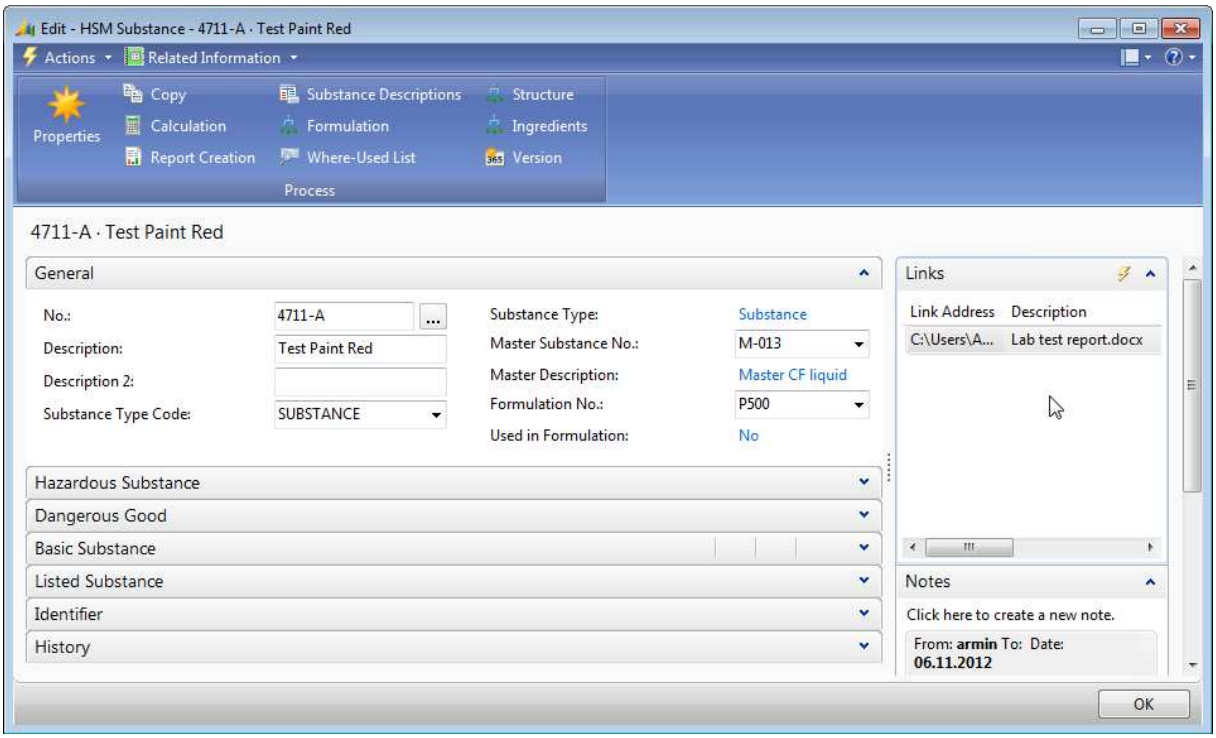


Figure 4: Substance card

Formulations

In *HSM* the composition of product mixtures is stored in a formulation, which normally results from the raw materials contained in the production BOM (bill of materials).

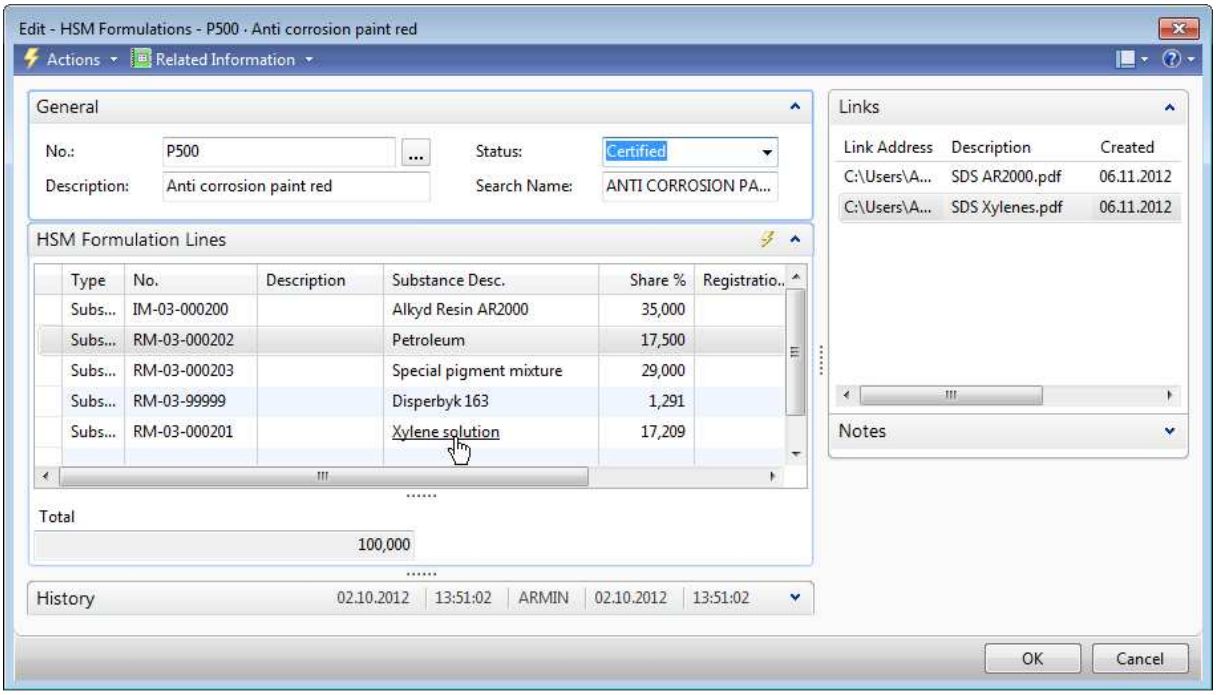
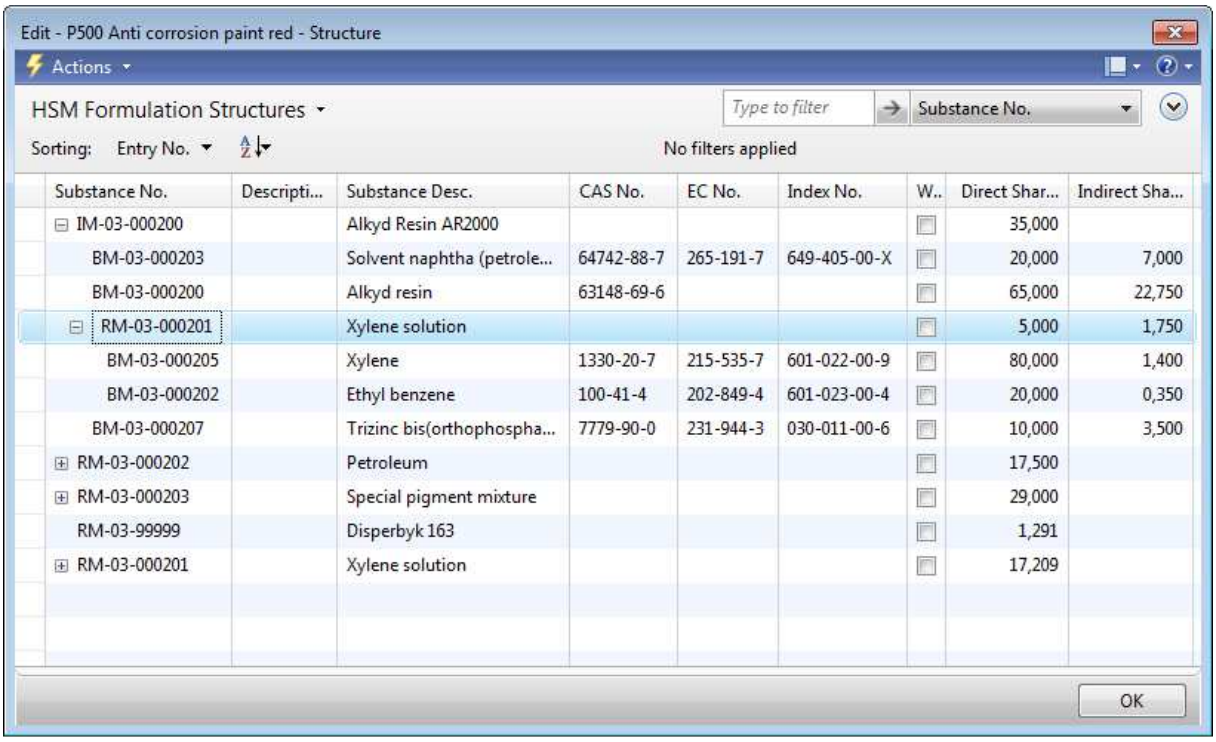


Figure 5: Formulation

Formulation structure and ingredients

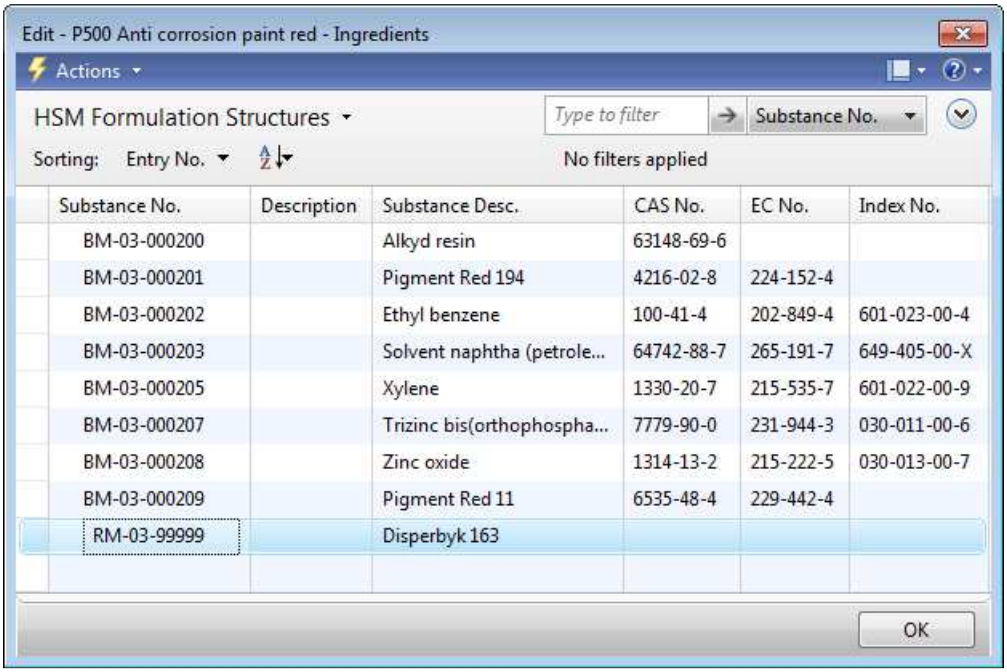
Since its ingredients often consist of other substance entries available in the system, the formulation can be displayed resolved on several levels, of course. Multi-staged formulations are displayed in a tree structure with the direct und indirect percentages.



Substance No.	Descripti...	Substance Desc.	CAS No.	EC No.	Index No.	W..	Direct Shar...	Indirect Sha...
IM-03-000200		Alkyd Resin AR2000					35,000	
BM-03-000203		Solvent naphtha (petrole...	64742-88-7	265-191-7	649-405-00-X		20,000	7,000
BM-03-000200		Alkyd resin	63148-69-6				65,000	22,750
RM-03-000201		Xylene solution					5,000	1,750
BM-03-000205		Xylene	1330-20-7	215-535-7	601-022-00-9		80,000	1,400
BM-03-000202		Ethyl benzene	100-41-4	202-849-4	601-023-00-4		20,000	0,350
BM-03-000207		Trizinc bis(orthophospha...	7779-90-0	231-944-3	030-011-00-6		10,000	3,500
RM-03-000202		Petroleum					17,500	
RM-03-000203		Special pigment mixture					29,000	
RM-03-99999		Disperbyk 163					1,291	
RM-03-000201		Xylene solution					17,209	

Figure 6: Formulation structure

In a complex formulation a basic chemical substance may be contained in different directly added ingredients. In order to determine the content of a substance in the entire formulation the formulation can be displayed completely resolved, as shown below. This listing of all basic substances forms the basis of calculations.



Substance No.	Description	Substance Desc.	CAS No.	EC No.	Index No.
BM-03-000200		Alkyd resin	63148-69-6		
BM-03-000201		Pigment Red 194	4216-02-8	224-152-4	
BM-03-000202		Ethyl benzene	100-41-4	202-849-4	601-023-00-4
BM-03-000203		Solvent naphtha (petrole...	64742-88-7	265-191-7	649-405-00-X
BM-03-000205		Xylene	1330-20-7	215-535-7	601-022-00-9
BM-03-000207		Trizinc bis(orthophospha...	7779-90-0	231-944-3	030-011-00-6
BM-03-000208		Zinc oxide	1314-13-2	215-222-5	030-013-00-7
BM-03-000209		Pigment Red 11	6535-48-4	229-442-4	
RM-03-99999		Disperbyk 163			

Figure 7: Ingredients

Calculation of classification and labelling

Manually calculating the classification and labeling not only means high expenditure of time, but also requires the current data and legally prescribed regulations anytime.

HSM contains a program module which runs these calculations. From the product's ingredients and its properties the following items (and some other things) will be derived and stored: classification and labelling according to hazardous substances legislation, references to workplace exposure limits, hazardous ingredients to be mentioned on the Safety Data Sheet and label data.

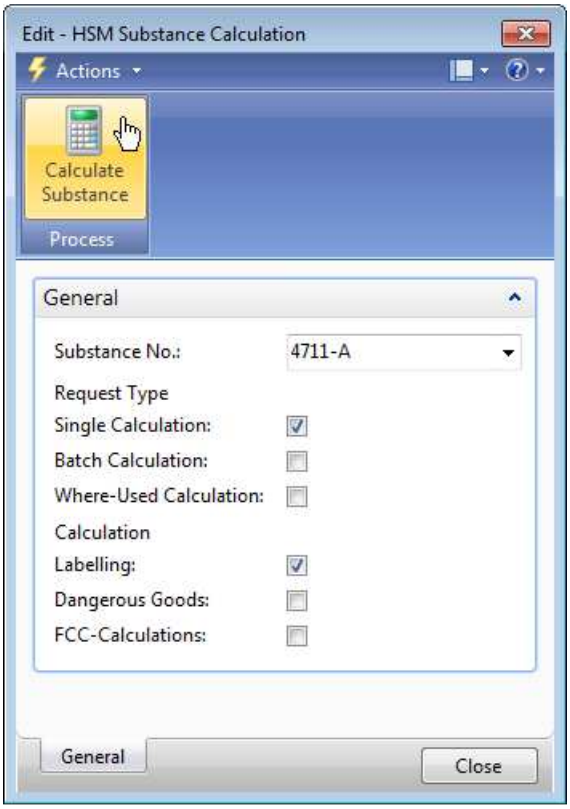
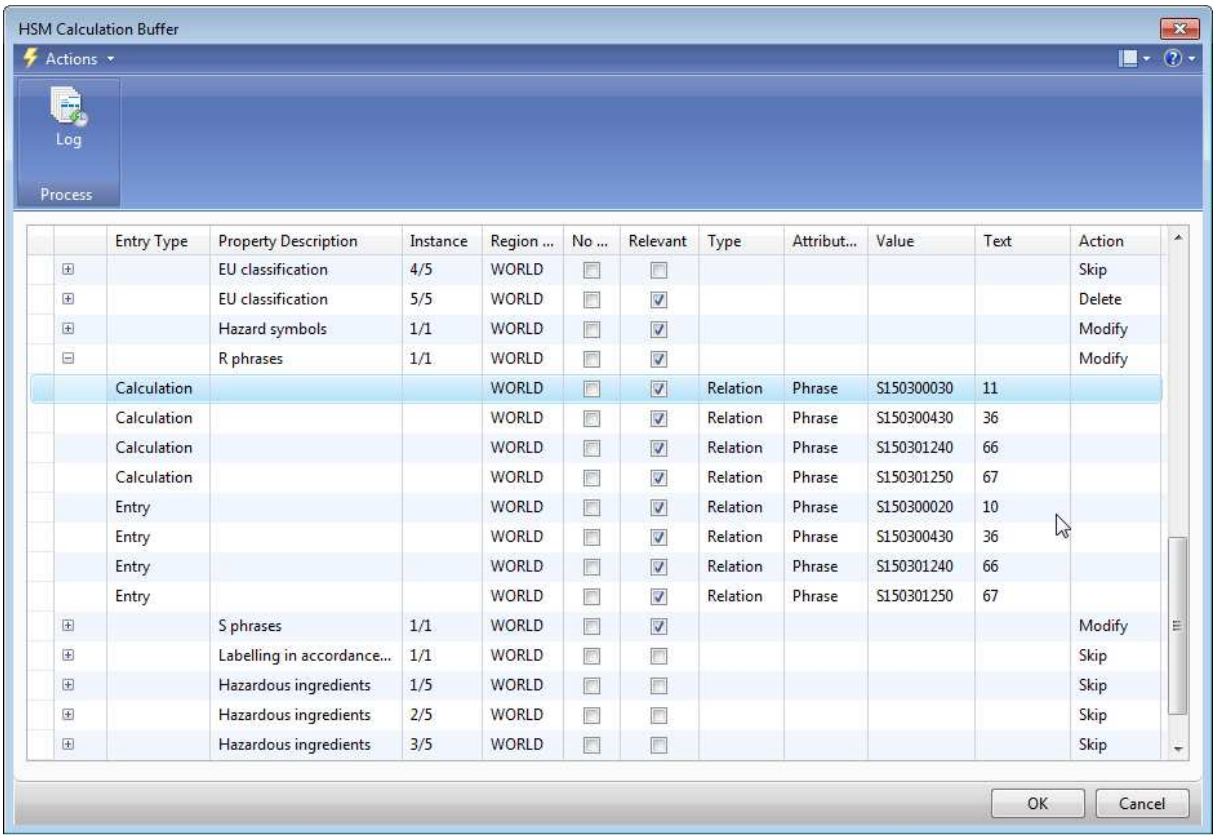


Figure 8: Calculation functions

The calculations can be executed immediately or put on a stack for later batch processing as a so-called request. There may be generated also a stack for recalculation of all recipes contain the corresponding substance (Where-used calculation).

The calculated results are used in the prepared reports. Because of changes in legislation, e.g. in the classification of ingredients, or a changed formulation the results of a new calculation may differ from the results of the previous one.

The newly calculated property values (Entry type: Calculation) are initially kept in the calculation buffer (see the following figure) and compared with the values already existing in the database (Entry). The Action column indicates what will occur when the results are written back into the database.



	Entry Type	Property Description	Instance	Region ...	No ...	Relevant	Type	Attribut...	Value	Text	Action
⊞		EU classification	4/5	WORLD	☐	☐					Skip
⊞		EU classification	5/5	WORLD	☐	☑					Delete
⊞		Hazard symbols	1/1	WORLD	☐	☑					Modify
⊟		R phrases	1/1	WORLD	☐	☑					Modify
	Calculation			WORLD	☐	☑	Relation	Phrase	S150300030	11	
	Calculation			WORLD	☐	☑	Relation	Phrase	S150300430	36	
	Calculation			WORLD	☐	☑	Relation	Phrase	S150301240	66	
	Calculation			WORLD	☐	☑	Relation	Phrase	S150301250	67	
	Entry			WORLD	☐	☑	Relation	Phrase	S150300020	10	
	Entry			WORLD	☐	☑	Relation	Phrase	S150300430	36	
	Entry			WORLD	☐	☑	Relation	Phrase	S150301240	66	
	Entry			WORLD	☐	☑	Relation	Phrase	S150301250	67	
⊞		S phrases	1/1	WORLD	☐	☑					Modify
⊞		Labelling in accordance...	1/1	WORLD	☐	☐					Skip
⊞		Hazardous ingredients	1/5	WORLD	☐	☐					Skip
⊞		Hazardous ingredients	2/5	WORLD	☐	☐					Skip
⊞		Hazardous ingredients	3/5	WORLD	☐	☐					Skip

Figure 9: Display of calculation results on hazardous substance classification (R10 to be replaced by R11)

Also after acceptance with “OK”, it is still possible to modify calculation results in the property masks, e.g. by appending additional S- or P-phrases. Company specific commitments can be met this way.

Apart from substance data, the calculations are based on numerous rule tables, which are looked up by the calculation functions. This allows quick adaptations and modifications of limit values and dependencies implemented because of legal prescriptions.

Dangerous goods classification

The classification of dangerous goods is based on a compilation of rules derived from ADR, IMDG Code and IATA. Based on transport data and additional physical and chemical data of the ingredients the classification of the product is calculated with respect to land-, sea-, and air transport.

The result contains complete classification profiles for each dangerous goods item, consisting of UN Number, Class, Packing group, Proper shipping name, quantity limits for the different transport modes. The determination of the classification profiles is based on the lists of dangerous goods as provided by the said regulations.

Based on the dangerous goods classification in the downstream shipment process exempted quantities and transport prohibitions for the different modes of transport can be determined. Starting from the classification profile the accompanying transport papers are created. These are the Dangerous goods transport document according to ADR, IMO- and IATA Declaration.

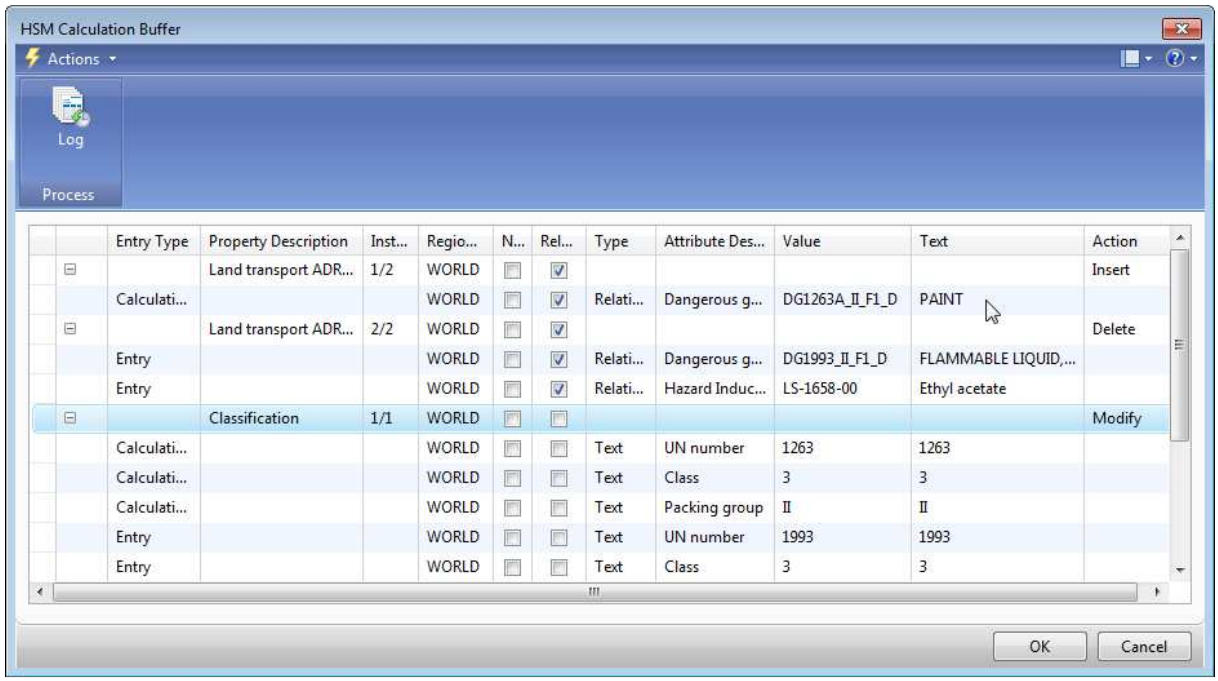


Figure 10: Display of dangerous goods classification

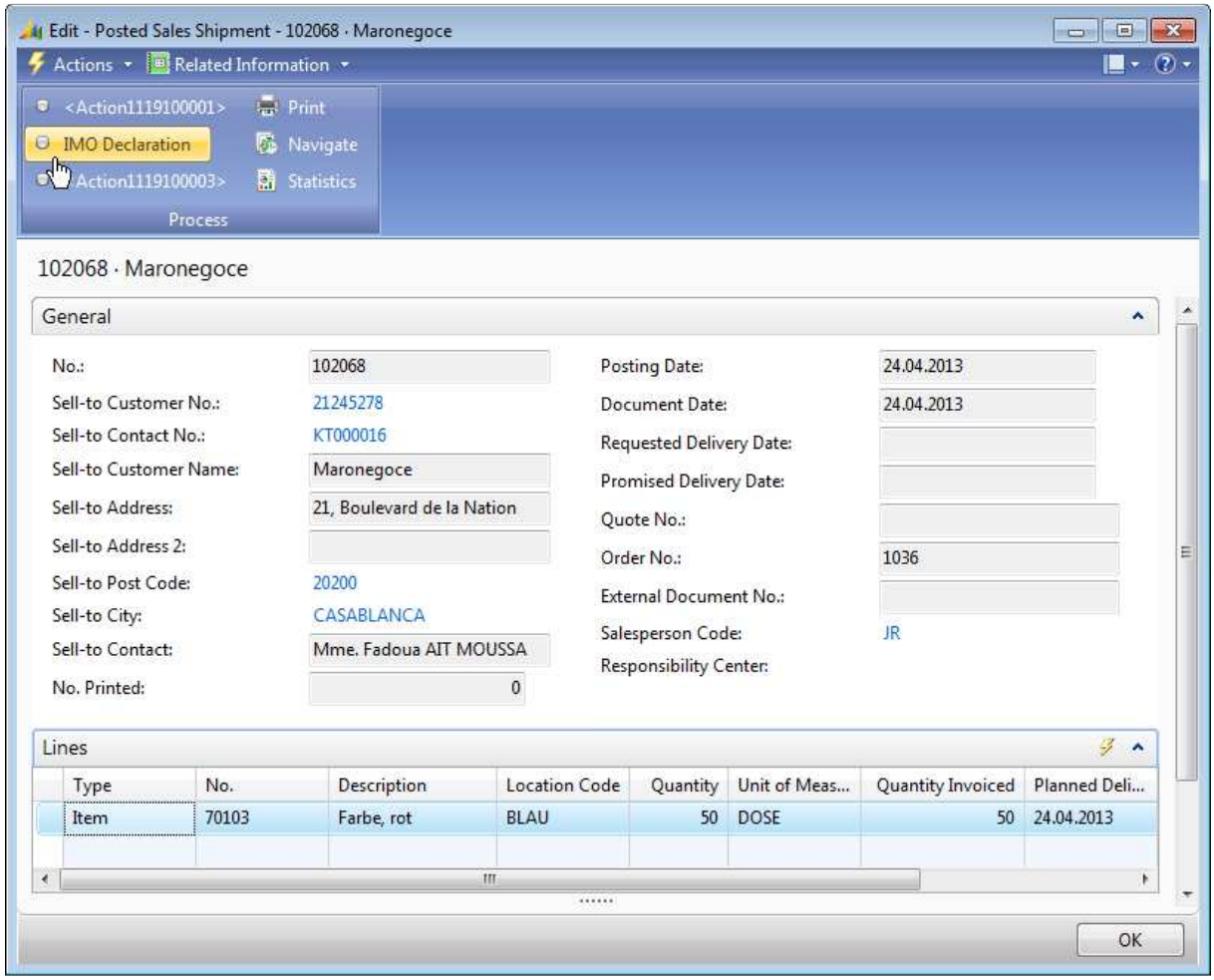


Figure 11: Call of transport documents from Posted Sales Shipment card

Research module: Hazardous substance inventory

Enterprises are obliged to keep an inventory of all hazardous substances handled in the plant. With the HSM Research module the listings for products, intermediates and raw materials with the information prescribed by the legislator, such as hazardous substance name, classification or dangerous properties, volumes in the plant, working areas, where the hazardous substance is handled, etc. can be created.

Because of its integration into the ERP system *HSM* can generate this information on a daily basis at the push of a button. Of course evaluations related to the “Seveso II” Directive, for the REACH registration etc. are possible as well.

Safety Data Sheet View

The most important data collection view for product safety related items is called "EU Safety Data Sheet". Here you can enter data and assign phrases (text modules) to the substances' properties, which are arranges corresponding to the 16 main chapters of a Safety Data Sheet. Chapters, subchapters and the single input items can be modified and extended by the user.

The structure tree shown in Figure 12 can be supplemented or modified anytime. If one e.g. needs additional chapters within a certain view or if one needs an entirely new view, a modification of the software is not necessary. Thanks to this flexibility the user can meet all future challenges.

The values of each property are the result of calculations, entered manually or called by reference to a template substance (master), in which the substance- or product group-specific standards are stipulated, for example phrases for the Sections 4, 5, 6, etc.. The assignment of the appropriate master can be done automatically using the FCC calculations. Thus, a duly filled out SDS can be generated just on the basis of the calculation functions (which, in turn, may be triggered automatically).

Calculation Data View

In this data entry view important parameters are collected, which are necessary for the calculation of hazardous substance classification and labelling, as well as the dangerous goods classification, e.g. flash point, boiling point and vapor pressure data. Some of this information also can be found in the Chapter 09 of the EU SDS and may be edited there as well.

Regulations views

Via the views Regulations (maintain basic substance) and Regulations (formulation) the most fundamental data of listed and basic substances and mixtures can be entered.

Further views

Easy handling and high flexibility of the system allow the definition of further user- or workplace-related views, of which some are already pre-defined:

- Workplace instruction (Plant instruction)
- Data sheets according to the Detergents Regulation
- Data provision for label printing
- Product data sheet

More calculation and evaluation functions are easy to implement or already available. Examples: Danish MAL Code, heavy metal and VOC contents, comparison with inventory lists, i.e. information on whether all the ingredients for example are listed in the U.S. TSCA Inventory or whether no ingredient is listed in the ECHA Candidate List ("SVHC").

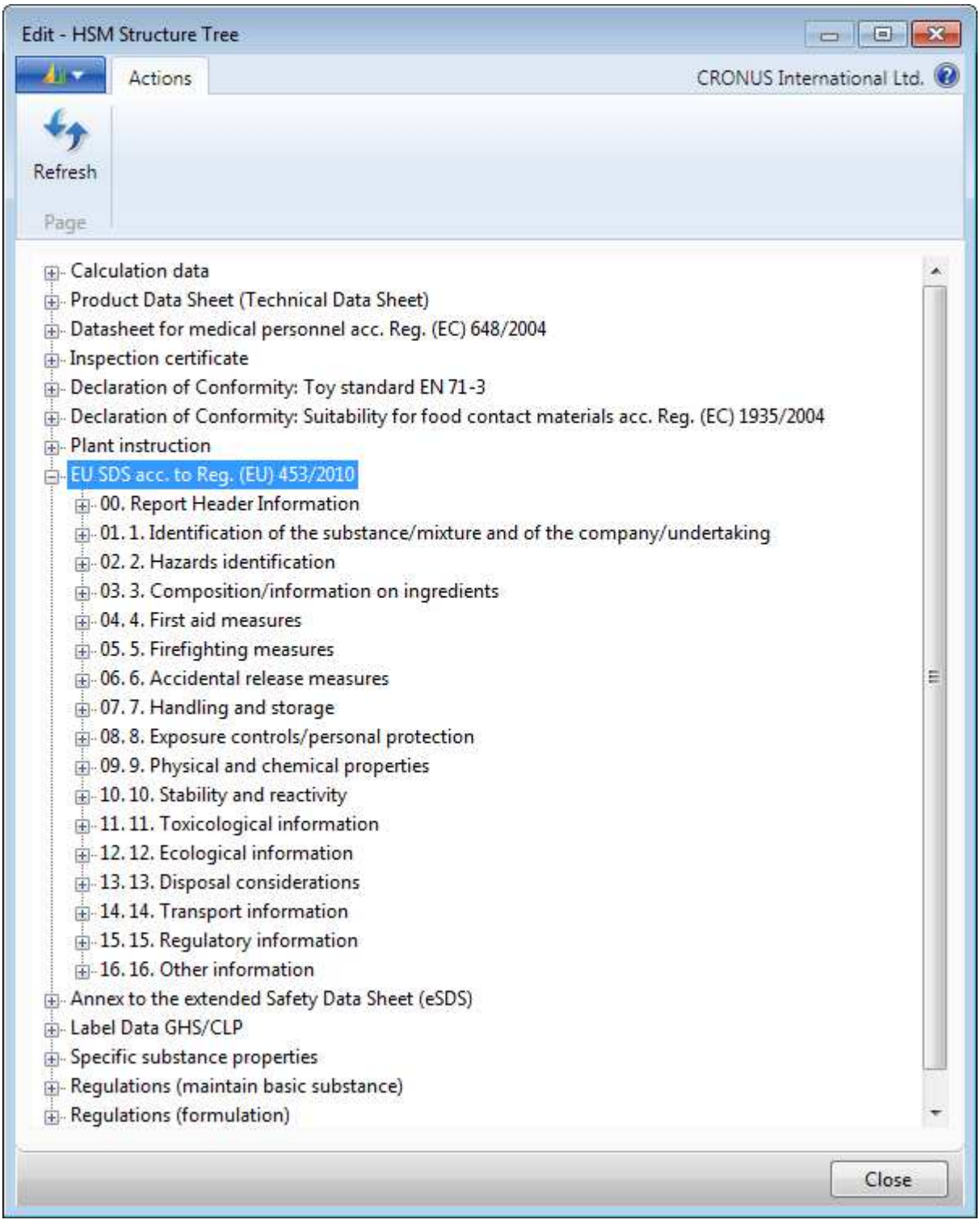


Figure 12: Structure tree for entering properties (with a selection of important views)

Self defined views and reports in accordance with company specific requirements, e.g. product descriptions (technical data sheets), instructions for use, declarations of conformity, certificates of analysis etc. are to be mentioned here as well.

Logistics / Shipment processing

In the course of shipment processing, all documents (Transport document, IMO- and/or IATA Declaration) are automatically requested, created and printed. The necessary substance and dangerous goods data are looked up directly in the substance database and issued on the delivery note.

Substance data

An important resource of a hazardous substance management system with its variety of functions is formed by legislation data, lists and regulations. The basic data, which are necessary especially for the calculation functions and the creation of MSDSs are collected and maintained in *HSM*. A collection of basic data is provided by *Prosisoft*:

- Substance data according to Annex I of EC Directive 67/548/EEC resp. Annex VI of Regulation (EC) 1272/2008 (CLP)
- Workplace exposure limits for most European countries and the USA
- Lists of dangerous goods according to ADR, IMDG, IATA
- German List of water hazardous substances (WGK)
- VOC-substances (Swiss Incentive Tax, EU Solvent Directive, Decopaint Directive)
- Inventory lists like EINECS, TSCA, DSL/NDSL, IECSC, AICS
- etc.

Text modules (phrases)

The output of documents can be made in numerous languages (currently 26 including Chinese). The standard system is delivered with phrases in German and English. Further languages may be added as single languages or as language packages. This makes all documents automatically available in the newly added languages.

By default, the user interface itself is available in German and English; here, too, other languages can be added.

The database may also be added anytime by customer specific phrases. By arrangement with *Prosisoft* it is possible to transfer such phrases into the standard catalogue (with corresponding translations).

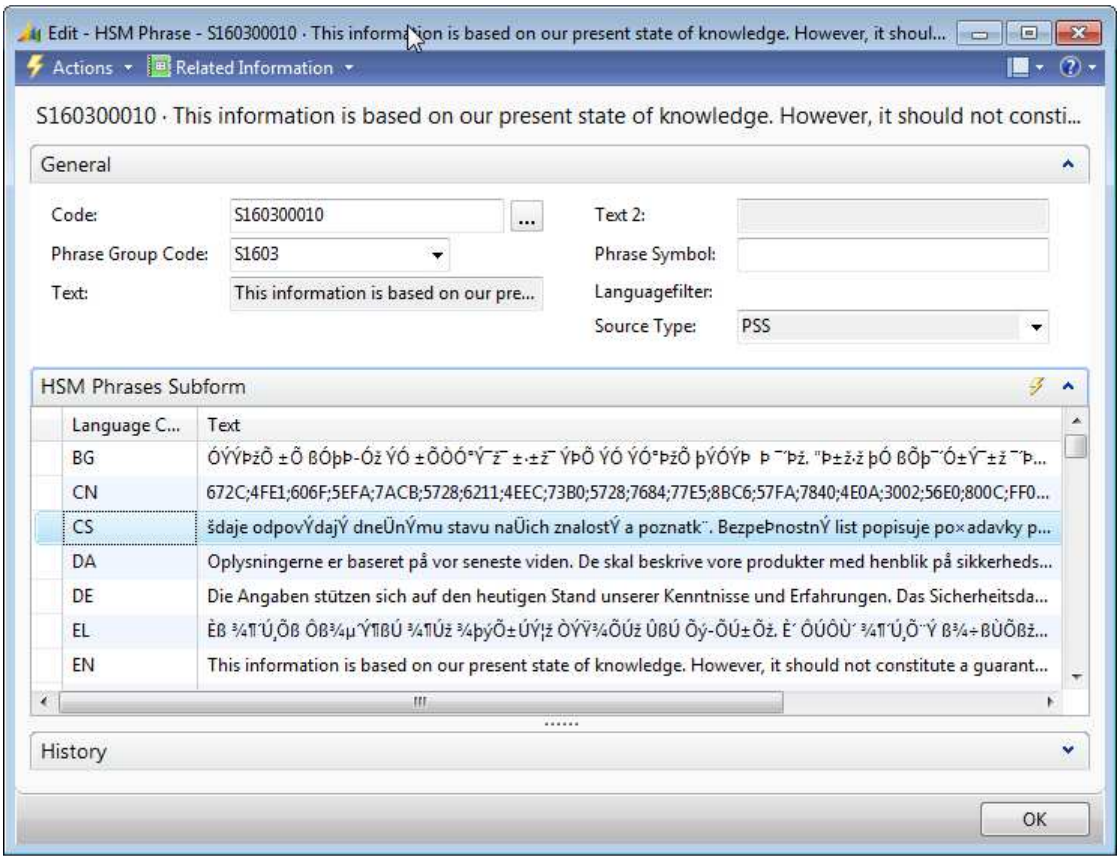


Figure 13: Phrase card with translations for Phrase S160300010

For editing phrase translations in character sets that do not correspond to the default code page of the system, the Prosisoft Phrase Keyboard (see Figure 14) can be used. In this tool, all the fonts on the screen [2] are displayed correctly and can be edited using an on-screen keyboard. User-specific phrases can be taken over from the appropriate source documents without additional conversion steps into the NAV database.

[2] In the generated documents, the different character sets are displayed correctly anyway, of course!

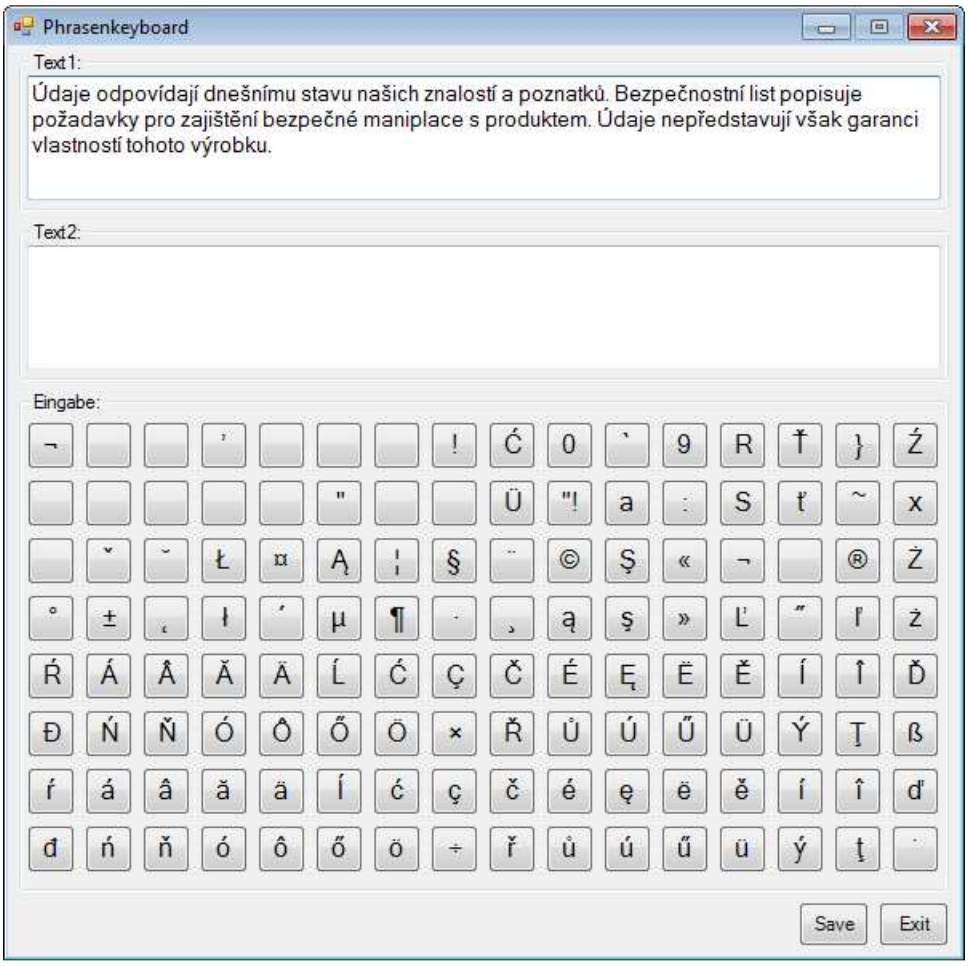


Figure 14: Phrase Keyboard for Czech (CS)

Remark:: The new NAV version NAV 2013 (NAV 7) is now Unicode-enabled so that conversions are no longer necessary, and phrase translations with different character sets can be displayed correctly on the screen even if they appear in a list.

An ***HSM* version for *NAV* 2013 is already available** (see the following figure).

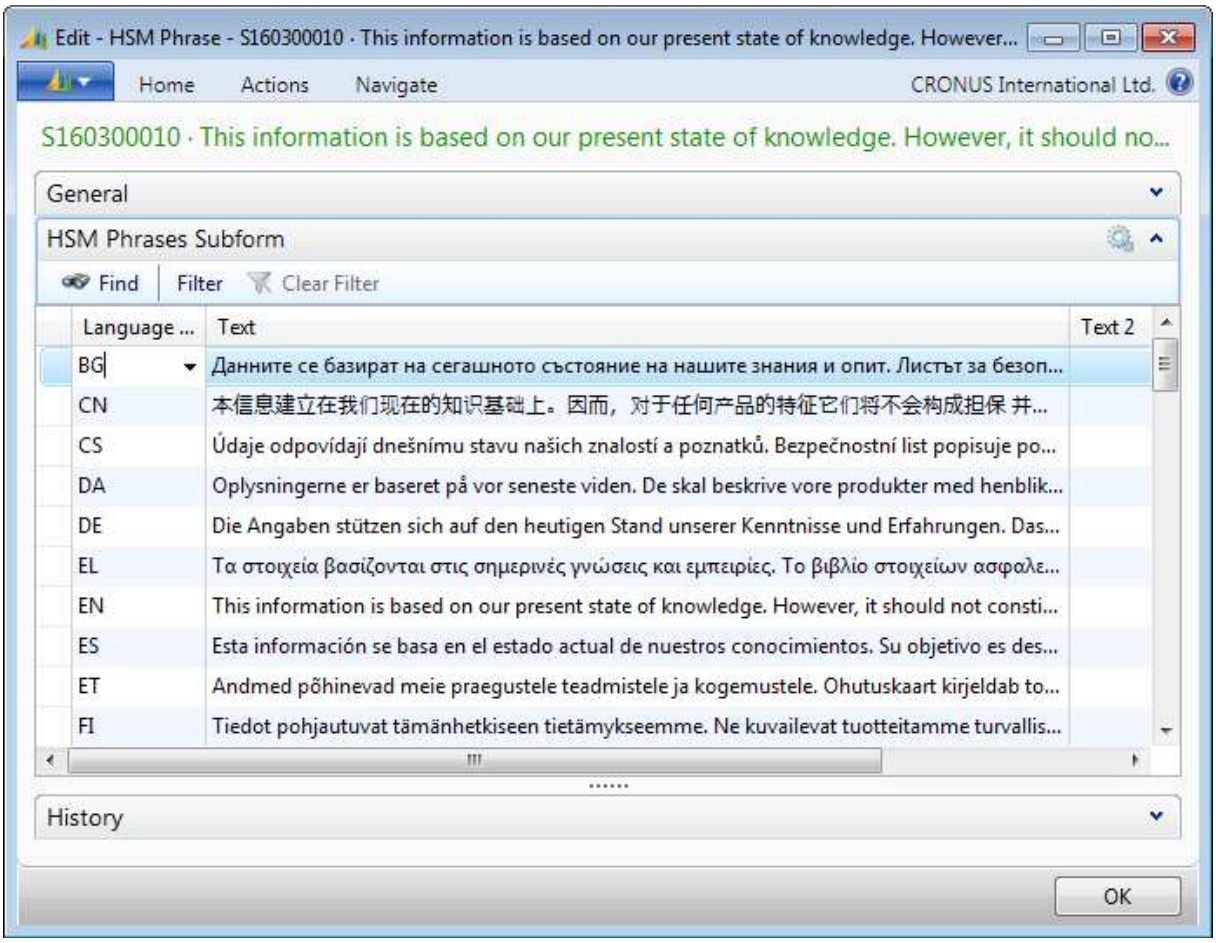


Figure 13.1: Phrase card in HSM for NAV 2013

Versioning

HSM contains a sophisticated version control for the report documents to be generated. With this function, releases for individual countries or supra-national regions like the EU can be granted or withdrawn.

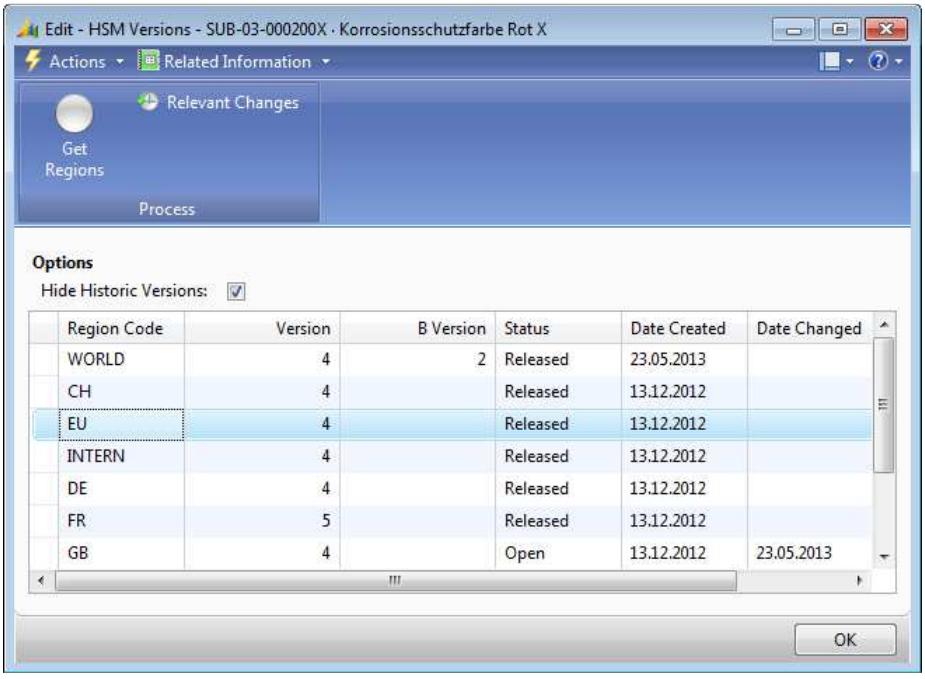


Figure 15: Versions

Versions may be edited in *HSM* until they are released. Released versions may be used *NAV* wide, e.g. for the order-related automatic SDS dispatch.

For each version is logged, in which properties it came to relevant changes.

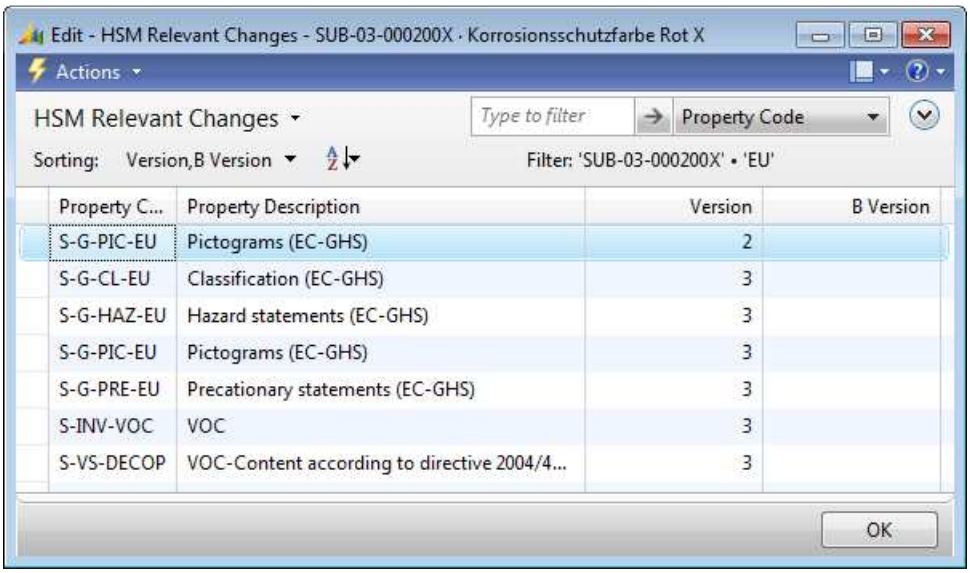


Figure 16: Relevant changes

Requests

For operations such as the mixture calculations, SDS generation and SDS dispatch requests are written into an *HSM* table. The processing of the requests is logged.

Thus, with *HSM* one can always track and prove

- which customer has actually got which report, for example Safety Data Sheets (SDS view code), for a particular item (status: Finished) or
- Which reports for which items where sent to a certain customer.

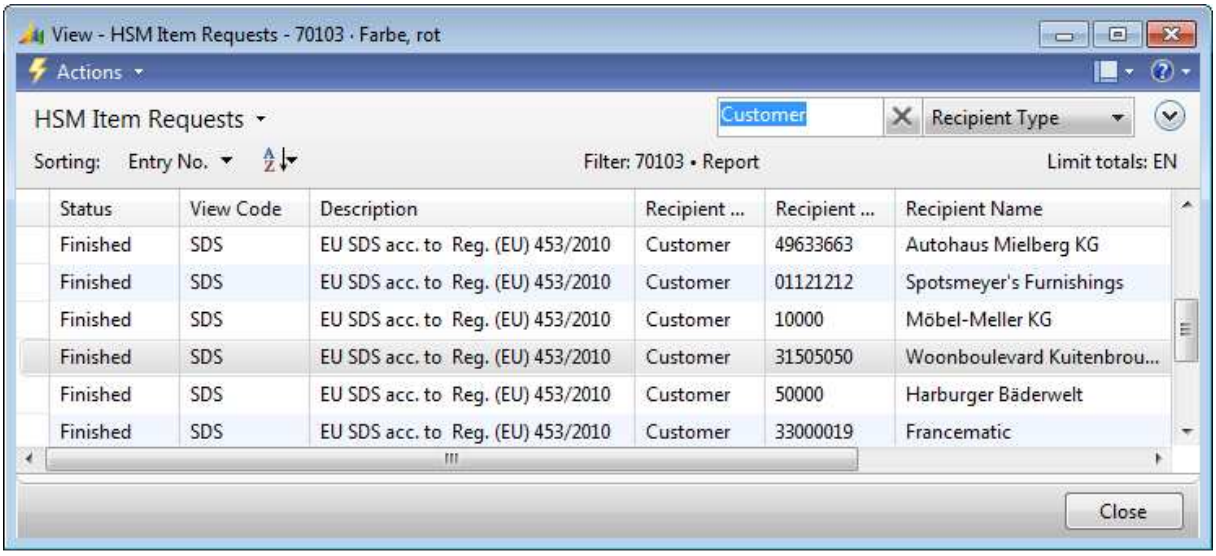


Figure 17: Requested and successfully sent SDSs for item 70103